Champion for Digital Inclusion

The Economic Case for Digital Inclusion

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Contents

Foreword

When I started work with the Digital Inclusion Task Force in June, we were all united by what we believed was the strong moral imperative to make sure the digital divide did not grow any wider in the UK. This report reflects the other part of the imperative, a strong economic case for both the individual and the UK economy as a whole. This work pulls together some new numbers and takes a fresh look at the complex issue of digital inclusion with a highlight on consumer savings, education, skills and employment, health and well-being, and benefits to government. I thank PricewaterhouseCoopers LLP and look forward to working with the public, private and charitable sectors in attempting to reduce the numbers of people who have never used the internet.

Martha Lane Fox
Champion for Digital Inclusion

October 2009

Executive Summary

Background

The Champion for Digital Inclusion, Martha Lane Fox, and her Task Force were appointed in June 2009 when the Government published 'Digital Britain'. Their remit is to reduce digital exclusion by helping to ensure:

'The best use of digital technology, either directly or indirectly to improve the lives and life chances of all citizens, particularly the most disadvantaged, and the places in which they live.' [1]

Against this background, PricewaterhouseCoopers LLP (PwC) was commissioned by the Champion for Digital Inclusion to prepare a report that assesses the potential scale of the 'digital dividend' to the UK of achieving greater digital inclusion. Our work has assessed the expected economic benefits of reducing digital exclusion in key areas and considered the aggregate potential benefits of reducing digital exclusion depending on how many of the digitally excluded can be brought online.

Key findings

Digital and social exclusion
- 10.2 million adults (21% of the UK population) have never accessed the internet including 4.0 million adults (9%) who are both digitally and socially excluded.

Consumer benefits
- Households offline are missing out on savings of £560 per year from shopping and paying bills online.
- People living in 3.6 million low income households which are digitally excluded are missing out on annual savings of over £1 billion a year from shopping and paying bills online.

Education benefits
- Home access to a computer and the internet can improve children's educational performance: if the 1.6 million children who live in families which do not use the internet got online at home, it could boost their total lifetime earnings by over £10 billion.

Employment benefits
- Unemployed people who get online could increase their chances of getting employment with an estimated lifetime benefit of over £12,000 for every person moved into employment. If 3½% of the digitally excluded found a job by getting online it would deliver a net economic benefit of £560 million.
- People with good ICT skills earn between 3% and 10% more than people without such skills. If the currently digitally excluded employed people got online, each of them would increase their earnings by an average of over £8,300 in their lifetime and deliver between £560 million and £1,680 million of overall economic benefit.

Improved government efficiency
- Each contact and transaction with government switched online could generate savings of between £3.30 and £12.00.
- If all digitally excluded adults got online and made just one digital contact each month instead of using another channel, this would save an estimated £900 million per annum.

Total economic benefits
- The total potential economic benefit from getting everyone in the UK online is in excess of £22 billion.

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[1] Letter from Lord Carter, Minister for Communications, Technology and Broadcasting, to Digital Champion and Task Force Members http://www.berr.gov.uk/files/file51885.pdf

Current pattern of digital exclusion

The concept of digital exclusion is multi-facteted: this report focuses on access to and regularity of use of the internet as the key determinants of whether someone is digitally included.[2]

Overall, levels of digital exclusion have declined steadily in recent years although a significant proportion of the population remains digitally excluded. In 2009, 10.2 million adults (21% of the UK population) had never accessed the internet and a further 2.0 million had not used it for 3 months: 7.8 million households (30% of those in the UK) had no internet connection at home[3]

The extent of digital exclusion is, however, not uniform across different groups of the population:

- 62% of the adults who had never accessed the internet (6.4 million) were over the age of 65;

- 51% of those with only basic secondary school education were digitally excluded[4];

- people earning over £40,000 per annum, were more than twice as likely to be digitally included as those earning less than £12,500 per annum;[5]

- more digitally excluded adults needed more frequent contact with public services.[6]

We have also considered the relationship between digital and social exclusion which we define as

'… *what can happen when individuals or areas suffer from a combination of linked problems such as unemployment, poor skills, low incomes, poor housing, high crime environments, bad health and family breakdown*[7].

Evidence from a range of sources points to a strong correlation between digital exclusion and social exclusion although the direction of causation is less clear[8]. We estimate that of the 10.2 million adults who have never used the internet, 4.0 million (9% of the UK population) also suffer severe social exclusion[9].

Understanding the potential economic benefits of digital inclusion

We have examined four main areas of potential economic benefit from enhanced digital inclusion:

- improved education and employment outcomes, for example as individuals enhance their qualifications and this improves their earnings and/or their probability of finding employment;

- improved health and well being outcomes, for example through access to improved health information and health services;

- efficiency savings for public service providers enabled by greater use of online information and transactional services; and

- potential benefits for consumers able to purchase a wider range of products at lower prices.

We have assessed the relevant direct and indirect benefits and how they impact on GDP and broader measures of economic welfare. We have also noted the wider effects on other areas of the economy,

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[2] See for example SEEDA (2007) Digital Inclusion Research – Final Report, p9; CLG (2008) Understanding Digital Exclusion Research Report p24, (2008) Digital Inclusion: An Analysis of Social Disadvantage and the Information Society

[3] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf

[4] OxIS 2009 *The Internet in Britain*

[5] OxIS 2009 *The Internet in Britain*

[6] 'Digital Inclusion: A discussion of the evidence base', UK Online Centres, July 2007

[7] See http://www.cabinetoffice.gov.uk/social_exclusion_task_force/context.aspx

[8] See for example Freshminds UK Online Centres 2007 Understanding Digital Inclusion: A Research Summary

[9] Ibid

including the social, health and environmental impacts.

Education, skills and employment benefits

We have considered the potential education, skills and employment benefits for digitally excluded children and adults.

Children

There is a large body of evidence that suggests that home access to a computer and the internet can have a positive impact on children's educational achievements. This has already been recognised in the development of the Home Access Programme (HAP).

Using the same evidence, we estimate that the potential economic impact of home access to a computer and the internet to the 1.6 million children in digitally excluded households. If all these children had access to a computer and the internet at home, it could enhance their potential lifetime earnings by over £10.8 billion depending on how it affects their academic performance, especially at GCSE level.

Adults

Greater digital inclusion can also benefit digitally excluded adults by:

- enabling and encouraging them to re-engage with learning and so increase their skills and qualifications; and

- helping them to develop the ICT skills needed to access higher skilled and better paid employment opportunities.

These benefits will result in increased earnings by the unemployed accessing the labour market more quickly and in increased productivity and earnings as people obtain more highly skilled jobs.

Providing digital access to the digitally excluded unemployed can be expected to improve their employment prospects by reducing some of the barriers to employment although the evidence is somewhat mixed. Building on the evidence used to underpin the case for the HAP, we have estimated the potential economic benefits if they were digitally included. After allowing for the estimated welfare benefits received by this group, we estimate that the lifetime benefit for each member of this group is £12,430 per person moved into employment. On this basis, if 3½% of the digitally excluded unemployed were helped into work, this would generate lifetime economic benefits of £566 million and if 7½% were helped in this way, the benefit would be £1,212 million.

Greater digital inclusion also has the potential to enhance the skills, especially around digital technologies, of those in employment. Several studies have shown that individuals' ICT skills have an important bearing on their earnings potential: for example, a study by the Centre for Education and Economics estimated an average ICT wage premium of 3–10%[10] while a European study estimated the premium at nearly 20%.[11] Although the evidence is limited about the relationship between digital access and skills, we have sought to estimate the potential productivity benefits for the digitally excluded employed (4 million people). Assuming that between 66,000 and 200,000 of the digitally excluded employed workers realise an ICT wage premium through becoming digitally included, and that they have an average of ten years of their working lives remaining, then this implies that the lifetime benefit for each person is £8,387 and the overall economic benefit is between £558 million and £1.7 billion.

Health and wellbeing benefits

Greater digital inclusion has the potential to improve health and well-being in three main ways:

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[10] Centre for the Economics of Education (2007), *The Impact of Computer Use, Computer Skills and Computer Use Intensity: Evidence from WERS 2004*

[11] Haisken-DeNew, P. (2007), *e-Living D11.3 - ICT and Socio-Economic Exclusion Final Report: 'eLiving' Waves 1 and 2*, 17 November 2007

- by connecting people to a wide-range of health and well-being information across a range of topics:

  – the potential benefits of NHS Choices in terms of the avoided costs of GP consultations is over £60 million per annum across all the digitally excluded;

  – improving digital access to information about the risks of obesity and how to live a healthier lifestyle could reduce healthcare costs by £22 million across all the digitally excluded and reduce sick days off work by 269,000;

- by enabling easier access to health services: these benefits accrue to both citizens and health service providers: the creation of NHS Direct is estimated to have generated cost savings to government and to patients of about £100 million a year, of which £87 million accrues to government and £13 million to citizens users; and

- by enabling health services to be delivered remotely so reducing delivery costs and improving accessibility:

  – the introduction of Computerised Cognitive Behaviour Therapy is estimated to offer potential cost savings of over £15 million per annum; and

  – Expert Patients On-line also offers cost savings to government through a reduction in the need for GP consultations and attendance at outpatients accident and emergency attendance as well as potential time savings for the patient.

Unlike the education, skills and employment benefits where we have been able to estimate the potential aggregate impact across the domain, we have had to rely on a series of case studies under each heading to understand the scale of the potential health benefits. As such, the estimates are less amenable to comparison and aggregation.

Transforming government

Bringing more digitally excluded citizens online has the potential to enable significant economic benefits in terms of the delivery of public services by enabling providers to switch to lower cost delivery channels, by reducing citizens (time) costs of transacting with government and improving their satisfaction with public services.

Evidence from 19 local authorities indicates that the average cost saving to government of an online transaction is between £3.30 (telephone) and £12.00 (post) compared to an online transaction.[12] There are no reliable data on the current volume and pattern of contacts and transactions between all tiers of government and the citizen. It is clear, however, that the potential savings of greater digital inclusion are considerable. For example, we estimate that if each of the 10.2 million digitally excluded adults could be enabled to switch one contact or transaction each year online from other channels, this would generate savings of around £900 million per annum.

Consumers benefits

For the individual, one of the benefits of digital inclusion is that it gives consumers access to a global network of potential suppliers from large household names to small niche retailers. This can generate significant savings for consumers.

Analysis for the Post Office has estimated that the potential gross savings from bringing all digitally excluded households online would be around £560 per household per annum[13]. This is equivalent to £4,510 million per annum across these digitally excluded households, which amounts to over 3% of

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[12] McNish J. 'Customer Contact Profiling', Aston Campbell Associates

[13] 'Broadband in the Home: An Analysis of the Financial Costs and Benefits – Final report to the Post Office', SQW Consulting, September 2008

their household spending.

If we focus on those 3.6 millions households with the lowest 20% of incomes – which will correlate closely with those who are also socially excluded, we estimate that benefits of £1,090 million per annum would accrue. Similarly, we estimate that the benefits to the 4.4 million households with no economically active people are around £1,720 million per annum.

These potential financial savings to digitally excluded households at different income levels do not take account of the costs of being online, in particular the initial costs of acquiring a personal computer and the running costs of online access. Significantly, however, even if these costs are taken into account, the savings from online purchases for most households, even those on the lowest incomes, more than offset the running costs of a computer.

We note that whilst individual households stand to benefit from access to online shopping, at least some of these benefits may be derived at the expense of 'offline' retailers if consumers (are assumed to) switch to online retailers.

Aggregating the potential benefits

Finally, we consider the overall magnitude of the potential benefits of bringing all those who are currently digitally excluded online. In doing this, it is important to recognise that our analysis has not been comprehensive: we have only been able to consider those areas of potential benefit which we expect to offer the greatest potential benefits. Furthermore, our estimates of the benefits in some key areas are necessarily subject to significant margins of uncertainty. We have sought to take a cautious view of the potential benefits.

We estimate that the overall potential economic benefit of getting everyone online is in excess of £22 billion. The derivation is shown in Table 1. Our estimates of the benefits from enhancing education, skills and employment reflect the expected lifetime benefits for the current cohort of digitally excluded. In contrast, the estimated benefits of government efficiencies and online shopping are annual estimates which can be expected to persist for as long as some people remain offline. We have assumed that these benefits will persist for two years. Effectively, we are assuming that all digitally excluded individuals will be online in two years.

Table 1: Estimated aggregate potential economic benefits of digital inclusion

	Annual benefits (£ billion)	Lifetime benefits (£ billion)
Home access for children		10.80
Improved ICT skills for the employed		0.56
Improved access to employment for the unemployed		0.56
Government efficiencies	0.90	1.77
Online shopping	4.50	8.85
		22.54

Source: PwC analysis

Next steps

This report has identified the considerable potential economic benefits from improving digital inclusion. The next step is to consider how best to help those who are digitally excluded and to assess the potential value for money of alternative interventions.

1 Introduction

1.1 Background

The Champion for Digital Inclusion, Martha Lane Fox, and her Task Force were appointed in June 2009 when the Government published 'Digital Britain'. Their remit is to reduce digital exclusion by helping to ensure:

'The best use of digital technology, either directly or indirectly to improve the lives and life chances of all citizens, particularly the most disadvantaged, and the places in which they live. [14]

The work of the group covers all those people across the UK who are still excluded from digital technology, with a particular focus on the digitally and socially excluded. The focus is specifically on:

- highlighting existing and emerging inequalities, particularly in the light of the rapidly changing nature of digital technologies;

- challenging the public sector, the private sector and industry, and the third sector to work together to help disadvantaged people benefit from new technologies of every type;

- making digital inclusion an issue that is clearly recognised by the public as being (for example) as essential to tackle as good public health; and

- ensuring that government reaches out to individuals who are currently unaware of the opportunities available to help them enhance their lives and improve their life chances through technology, and where the greatest benefit can be delivered.

1.2 Objectives

Against this background, PricewaterhouseCoopers LLP (PwC) was commissioned by the Champion for Digital Inclusion to prepare a report that assesses the potential scale of the 'digital dividend' to the UK of reducing digital exclusion. Our work has involved two elements.

First, we were asked to assess the expected economic benefits of reducing digital exclusion in terms of:

- improved education and employment outcomes, for example as individuals enhance their qualifications and this improves their earnings and/or their probability of finding employment;

- improved health and well being outcomes, for example through access to improved health information and health services;

- efficiency savings for public service providers enabled by greater use of online information and transactional services; and

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[14] Letter from Lord Carter, Minister for Communications, Technology and Broadcasting, to Digital Champion and Task Force Members http://www.berr.gov.uk/files/file51885.pdf

- other potential benefits, for example as consumers are able to access a wider range of products at lower prices.

We were also asked to examine how these potential benefits might be expected to be distributed between individuals, businesses and government.

Second, we were asked to consider how the aggregate potential benefits of reducing digital exclusion might be expected to vary depending on how many and which segments of the digitally excluded can be brought online.

The timetable for our work was very tight.

1.3 Approach

Our approach has been shaped by the intended purpose of the analysis and the limited time available for its completion. These have meant that our work has been largely based on collating and synthesising existing evidence from a wide range of sources within a coherent economic framework.

In order to do this, we have developed a set of logic chains which describe how different types of initiative to promote digital inclusion can be expected to deliver outputs and outcomes which will generate economic benefits. Our aim in developing these logic chains has been to:

- provide a coherent basis for understanding the diverse impacts whilst avoiding the risk of double counting potential benefits; and

- define the key relationships which need to be quantified and monetised in appropriate ways if we are to determine the expected economic benefits.

Given the intended audience of policy makers, we have sought to make our approach as robust as it can be within the constraints we have faced. In practice, this has meant that the methods we have used to estimate the economic impacts are as consistent with the requirements of HM Treasury's 'Green Book' as they can be given the other constraints of our work. Thus, we have focused on identifying all the potential benefits and costs: we have sought to exclude those impacts where one stakeholder's benefits are another's costs (and, thus, the national effect is neutral).

Our approach has necessarily drawn largely on existing sources of evidence rather than primary research. Thus, the emphasis of our work has been on identifying existing sources of evidence which are robust enough that they can be used to gauge the potential benefits of digital inclusion. In some cases, we have been able to draw on comprehensive assessments of the actual or potential impact of measures to reduce digital exclusion but in many instances we have made use of available case studies and/or pilots so that we can understand the potential scale of the 'digital dividend' in the UK. We have limited our use of evidence from outside the UK because we believe that there may be significant limitations due to differences in contextual conditions which mean that any transfer of the results needs to be done with great care.

1.4 Report structure

The remainder of our report is structured in six further sections:

- Section 2 provides an overview of the current pattern of digital exclusion in the UK, and describes its relationship to the pattern of social exclusion;

- Section 3 describes the overarching framework we have used to identity and assess the potential economic benefits of reducing digital exclusion in the UK and then to assess their economic value;

- Sections 4 to 6 analyse how reduced digital exclusion can deliver benefits in terms of:

  - improved education, skills and employment outcomes (Section 4);

  - enhanced health and wellbeing (Section 5);

- facilitating government transformation (Section 6);

- online access to cheaper goods and services (Section 7); and

- Section 8 draws together the available evidence to assess the potential scale of the economic benefits of reducing digital exclusion.

2 Pattern of digital exclusion

2.1 Introduction

In this section, we start by describing the current pattern of digital exclusion in the UK and summarising the key factors which affect whether or not adults are likely to be digitally excluded. We then consider the relationship between digital and social exclusion. Finally, recognising the remit of the Digital Champion, we describe three segments of the digitally excluded population which we consider in later sections of this report: families with (school age) children, unemployed adults of working age and those aged 65 and over.

Our analysis necessarily draws on several different data sets and pieces of research which have been undertaken at different times using different survey methods. This means that the data are not always available in the ideal form, nor are they always consistent with each other. Nonetheless, we believe that the pattern of digital exclusion we present is sufficient for the purposes of our analysis.

2.2 Current pattern of digital exclusion

What is digital exclusion?

In setting out the mission he expected the Digital Champion and her Task Force to pursue, Lord Carter's open letter indicated that digital inclusion would involve

'The best use of digital technology, either directly or indirectly to improve the lives and life chances of all citizens, particularly the most disadvantaged, and the places in which they live'[15].

Such a statement highlights the multiple dimensions of digital exclusion. Increasingly, however, measurement of the extent of digital exclusion focuses on access to and use of the internet as the most relevant determinants of whether someone is digitally included.[16] This reflects their role as useful proxy indicators of the use of digital technologies more generally and as indicators of the potential economic benefits from digital inclusion[17].

Overview of digital exclusion

Overall, levels of digital exclusion have declined steadily in recent years although a significant proportion of the population remains digitally excluded (see Figure 1)[18].

In 2009, 10.2 million adults (21% of the UK population) had never accessed the internet whereas 37.4 million adults (76% of the total UK population) had accessed the internet in the past three months. Significantly, nearly 2 million adults had not used the internet for more than 3 months. Of those who

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[15] Letter from Lord Carter, Minister for Communications, Technology and Broadcasting, to Digital Champion and Task Force Members http://www.berr.gov.uk/files/file51885.pdf

[16] See for example SEEDA (2007) Digital Inclusion Research – Final Report, p9; CLG (2008) Understanding Digital Exclusion Research Report p24, (2008) Digital Inclusion: An Analysis of Social Disadvantage and the Information Society

[17] OFCOM (2008b) Media Literacy Audit: Report on UK Adult's Media Literacy

[18] All data from Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf

had used the internet within the past three months, the majority had used it frequently.

Figure 1: Internet access and use
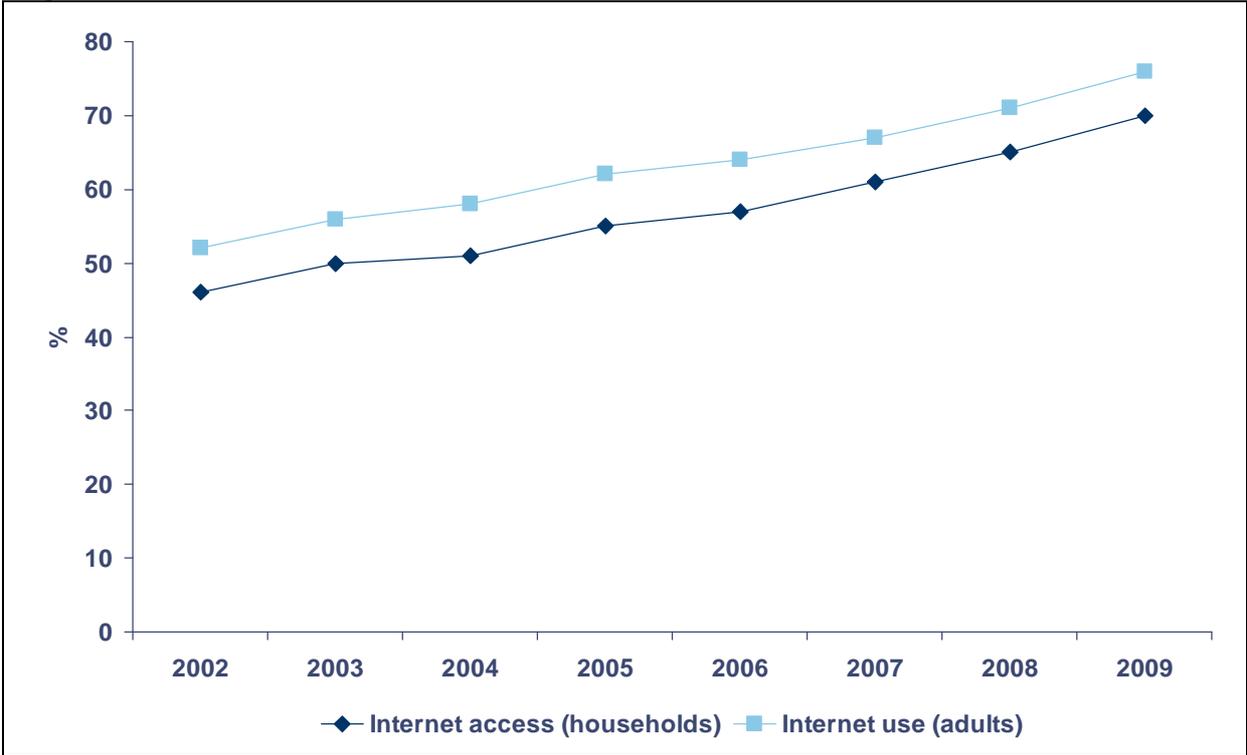
**Figure 2: Households with access to the internet by type of connection**
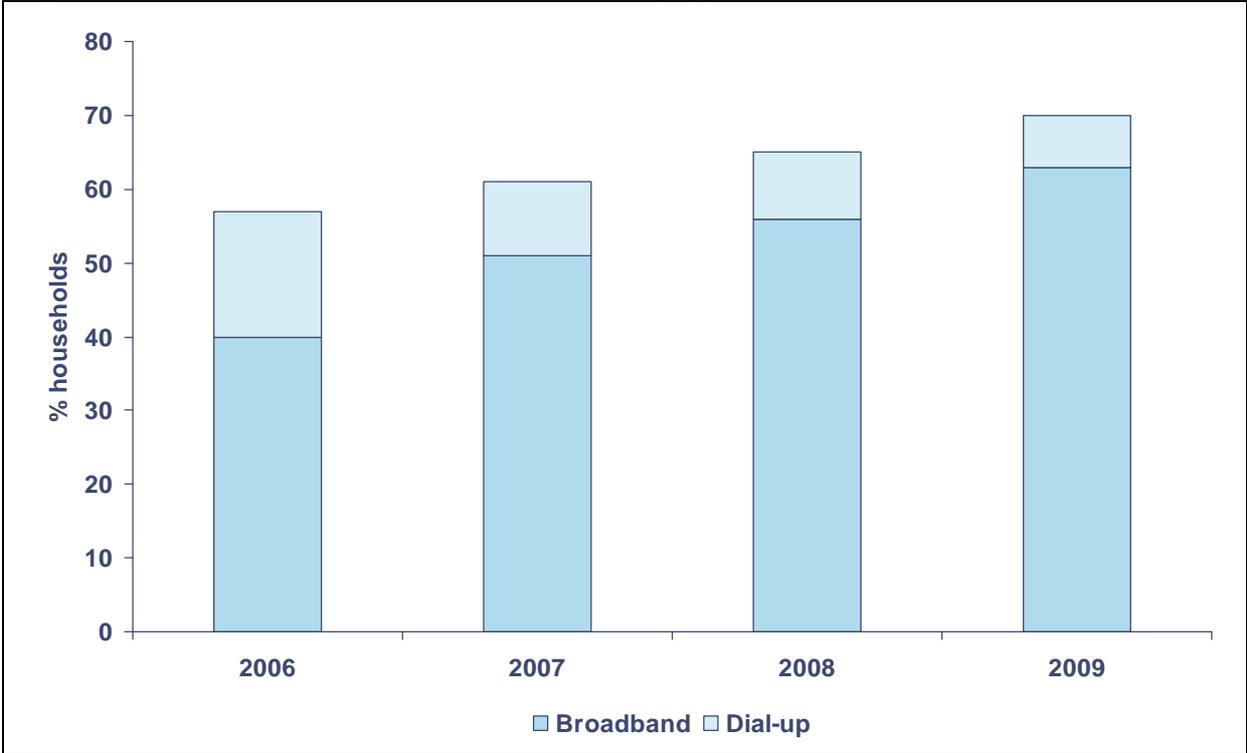
Similarly, in 2009, 7.8 million households (30% of those in the UK) had no internet connection whereas 18.3 million households had internet access[19] This latter figure is significant because 95% of

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[19] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*,

those who accessed the internet did so from their home[20]. Moreover, as Figure 2 illustrates, the proportion of households connecting to the internet by broadband has increased.

The extent of digital exclusion is not uniform across different age groups (see Figure 3). In 2009, virtually all UK adults below the age of 25 had used the internet whereas 62% of the adults who had not done so (6.3 million) were over the age of 65. Digital exclusion has, however, been decreasing amongst the elderly: in 2007, 71% of adults aged 65 and over were digitally excluded using the same measure compared with 64% this year.[21]

Figure 3: Frequency of internet use by age
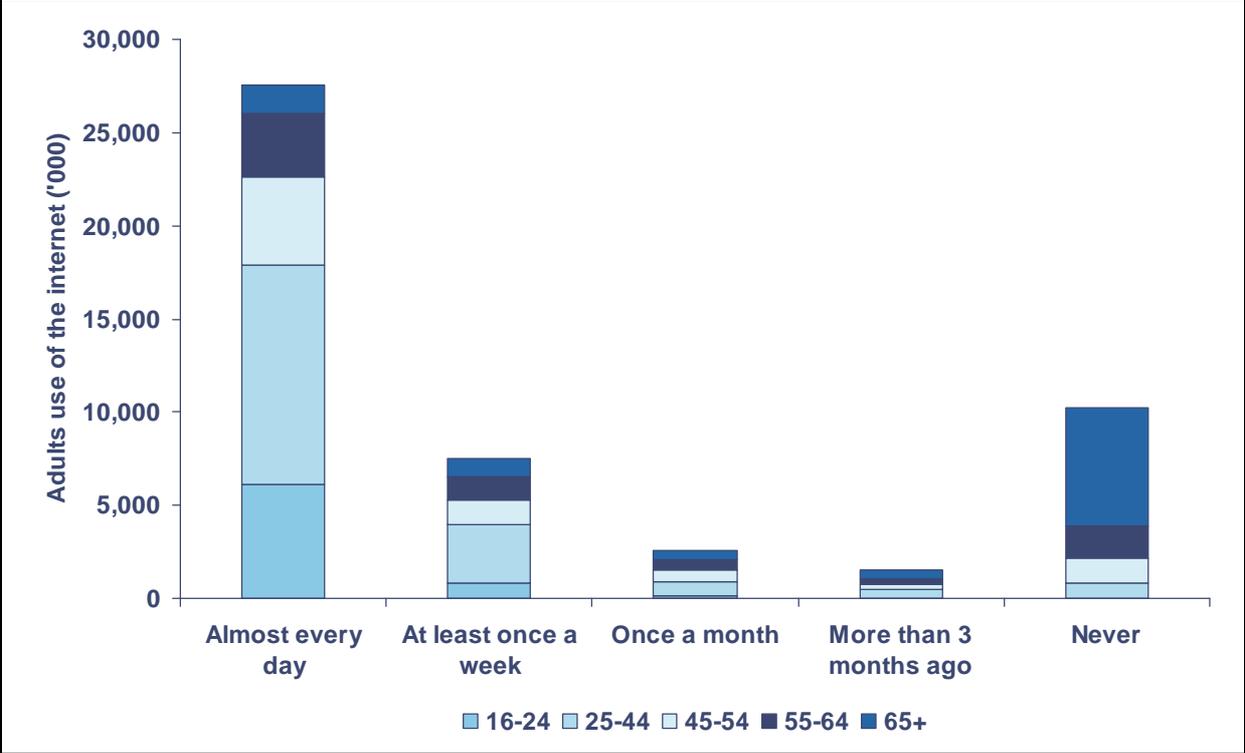
The pattern of internet use for purchasing goods and services shows a similar pattern (see Figure 4).[22] Overall, 64% of the adult population have used the internet to purchase goods or services online, indicating a certain proficiency of engagement, although this is age-sensitive.

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http://www.statistics.gov.uk/pdfdir/iahi0809.pdf
[20] OxIS 2009 The Internet in Britain
[21] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf
[22] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf

Figure 4: Use of the internet for purchasing goods and services
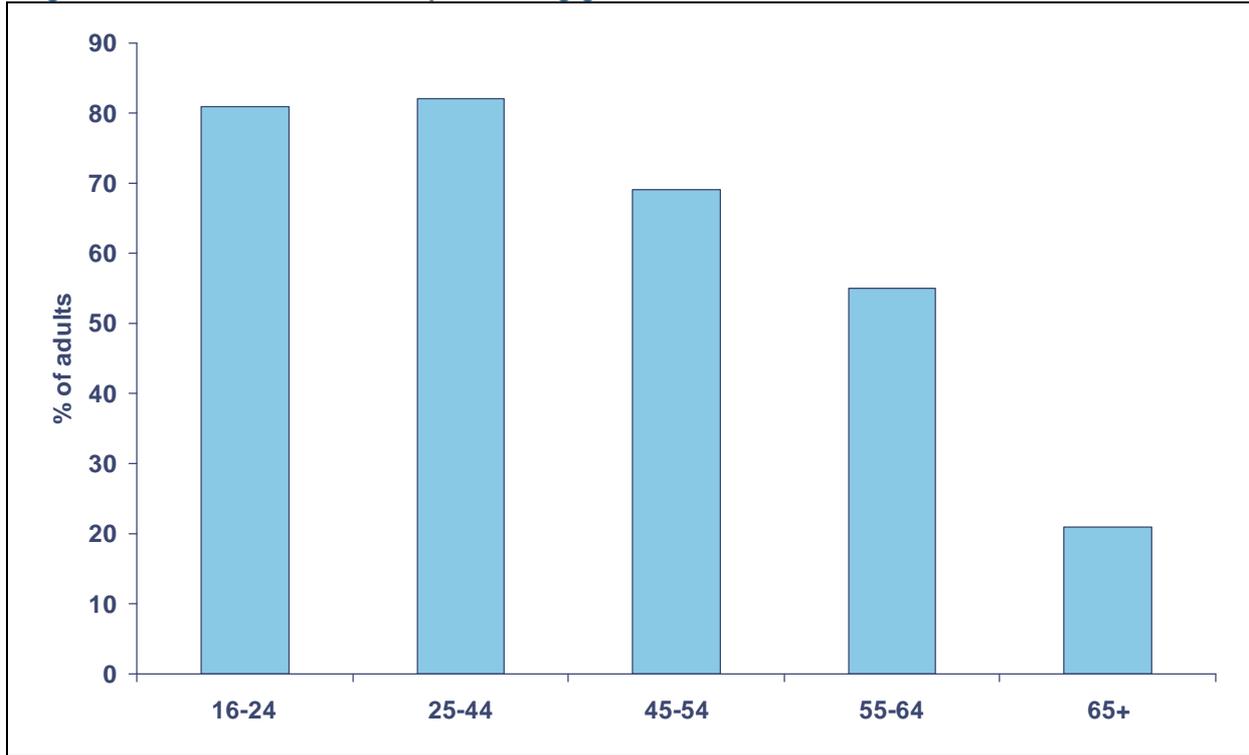
Figure 5: Internet access in households by individuals' highest educational qualification
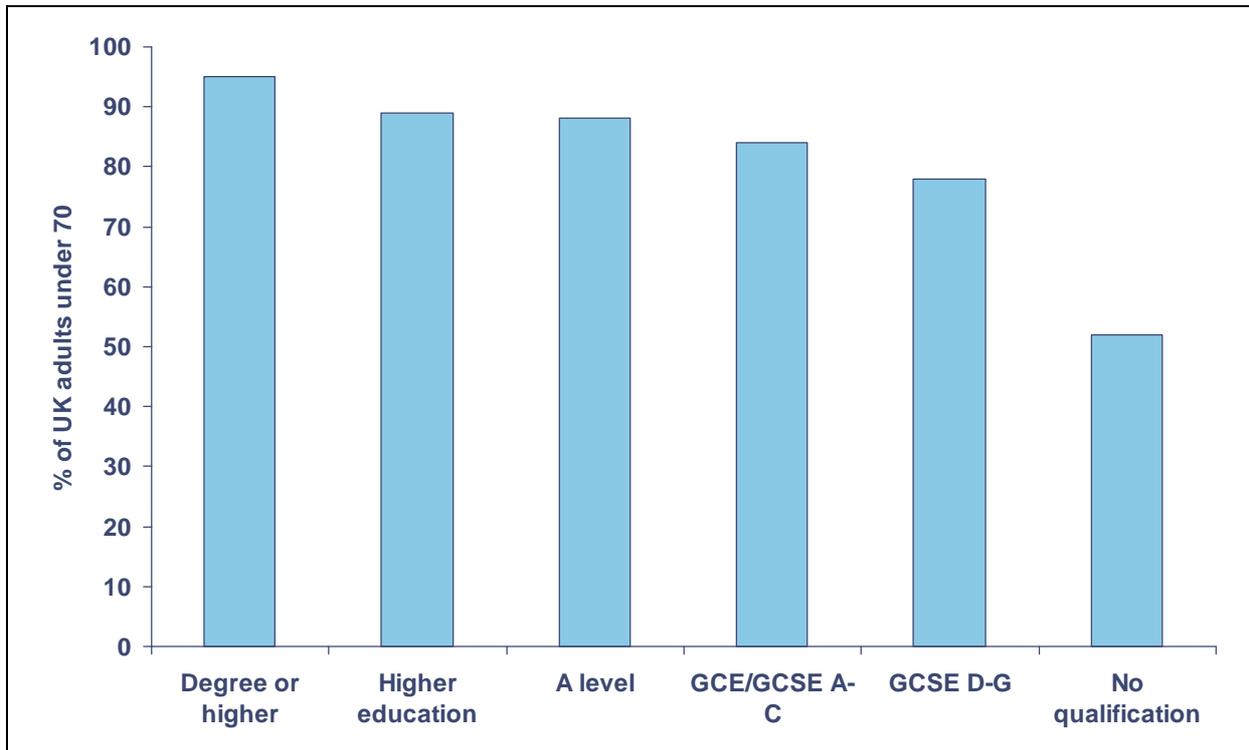
Figure 5 shows that the level of education is positively correlated with internet use.[23] Amongst those with only basic secondary school education, 51% were digitally excluded, rising to just 7% of those

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[23] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf

with a university qualification.[24]

Digitally excluded individuals are likely to have lower incomes: people earning over £40,000 per annum, were more than twice as likely to be digitally included as those earning less than £12,500 per annum.[25]

Digitally excluded individuals are more likely to draw on public services: only 39% of those identified as requiring four regular interactions with public services were judged as digitally included compared with 78% of those with no needs being digitally included[26]

Although the digital divide has narrowed, inequality of access remains an important concern. Looking ahead, as digital technologies continue to develop, for example through the advent of next generation broadband, there is a risk that a new digital divide may emerge. In the long-term, therefore, equality of access to new digital technologies could become a matter of wider concern, particularly if they deliver even greater benefits from which some are excluded.

Factors influencing digital inclusion

Although there has been a steady increase in internet use across all age groups, it is important to understand why some individuals remain digitally excluded in the sense that they do not use the internet in the same way as their peers. The extensive literature on this subject[27] points to three key, interrelated factors which explain an individual's voluntary or involuntary failure to engage with digital technology:

- lack of access to digital technologies driven by issues of affordability: although non-users of the internet have been shown to overestimate the cost of the technology by as much as a factor of two,[28] there is concern that cost will remain a significant barrier, especially for low income groups[29];

- limited motivation which reflects:

  - a lack of a perceived opportunity or need: in 2008, 34% of adults without an internet connection said that it would provide no useful benefit to them;

  - a lack of interest in the internet: in 2008, 24% of adults without internet access were not interested in the potential benefits despite the upward trend in its use, for example for internet purchases[30];

- a lack of the requisite skills and support:

  - effective use of new digital technologies requires new skills and the absence of other users in the household who can provide support can make this barrier particularly significant[31];

  - low literacy levels: only 52% of UK adults with no qualifications have internet access at home, compared with 78% even for those leaving school with basic levels of qualification (GCSE

[24] OxIS 2009 *The Internet in Britain*

[25] OxIS 2009 *The Internet in Britain*

[26] 'Digital Inclusion: A discussion of the evidence base', UK Online Centres, July 2007

[27] e.g.Jos de Haan (2004) *A Multifaceted Dynamic Model of the Digital Divide*', IT & Society, vol. 1, issue 7, http://stanford.edu/group/siqss/itandsociety/v01i07/v01i07a05.pdf;and others.

[28] Paul Foley, Ximena Alfonso, Karl Brown and John Fisher (2003), Connecting people: tackling exclusion? An examination of the impact on and use of the Internet by socially excluded groups in London Greater London Authority, http://www.london.gov.uk/gla/publications/e-london/connecting-commties.pdf

[29] BT (2004) The Digital Divide in 2025: An independent study conducted for BT http://groupbt.com/Societyandenvironment/PDF/Digitaldivide2025.pdf

[30] Office for National Statistics (ONS) (2008) First Release *'Internet Access 2008 Households and Individuals'* http://www.statistics.gov.uk/pdfdir/iahi0808.pdf

[31] Paul Foley, Ximena Alfonso, Karl Brown and John Fisher (2003), Connecting people: tackling exclusion? An examination of the impact on and use of the Internet by socially excluded groups in London Greater London Authority, http://www.london.gov.uk/gla/publications/e-london/connecting-commties.pdf

grade G or above).[32]

2.3 Relationship between digital exclusion and social exclusion

Lord Carter's open letter to the Digital Champion emphasises the importance attached to taking action to help those who are both digitally and socially excluded.

The Social Exclusion Task Force in the Cabinet Office defines social exclusion as:

'what can happen when individuals or areas suffer from a combination of linked problems such as unemployment, poor skills, low incomes, poor housing, high crime environments, bad health and family breakdown[33]*.*

This definition highlights several important features of social exclusion:

- it is multi-dimensional: whilst low income is important, the definition embraces other kinds of disadvantage which may or may not be connected to low income, such as unemployment and poor self-esteem:

- it is multi-layered: although individuals may be excluded, the causes operate at many different levels including at the household, community and institutional levels; and

- it is dynamic: exclusion has the potential to pass between generations as it affects the processes which lead to exclusion and routes back into mainstream society.

The complexity of the definition also means that social exclusion is a matter of degree: individuals may participate to a greater or lesser extent across the different facets.

Having identified the general characteristics of the digitally excluded in the previous section, we examine the extent to which digital exclusion and social exclusion are correlated.

Research for the Department for Communities and Local Government developed an Index of Multiple Individual Deprivation (IMID) based on measures of health, employment, income and education in addition to political and social indicators. Around three quarters of those who suffer from a severe combination of social disadvantage (7.6 million adults) also have limited engagement with the internet in the sense that they are able to perform only one or two basic functions if any.[34]. On this basis, six million adults can currently be classified as both digitally and socially excluded. Applying a stricter definition of digital exclusion slightly to encompass only the 10.2 million adults who have never used the internet, we estimate that 4.0 million (40% of the cohort and 9% of the overall UK population) suffer severe social exclusion[35]. Moreover, those who suffer social exclusion are at least four times more likely to be digitally disengaged than those who are more socially advantaged.[36]

Although there is general consensus that measures of social and digital exclusion correlate at statistically significant levels[37], the direction of causation is less clear. Social disadvantage in the form of poorer qualifications and lower skills can lead to individuals being either unable or unwilling to use digital technologies. It could also be the case that an inability to become fully digitally engaged leads to social exclusion, especially in the forms of reduced employment and socio-political networking opportunities.

Between two and five per cent of the UK adult population are socially included, yet digitally excluded[38]. This corresponds to between 1 million and 2.4 million people. In the context of our analysis, they can

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[32] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf

[33] See http://www.cabinetoffice.gov.uk/social_exclusion_task_force/context.aspx

[34] CLG (2008) Digital Inclusion: An Analysis of Social Disadvantage and the Information Society

[35] Ibid.

[36] Derived from ONS (2007) Internet Connectivity – Q1

[37] See, for example, UK Online Centres 2007 Understanding Digital Inclusion: A Research Summary

[38] CLG (2008) Digital Inclusion: An Analysis of Social Disadvantage and the Information Society

be considered 'unexpectedly disengaged' because they are assumed to have the resources necessary to become digitally included. 28% of this group is over the age of 65, implying that some older adults digitally exclude themselves by choice[39]. This is supported by evidence that 82% of all digitally excluded older adults see no value in e-mail even if the benefits are explained[40]. Furthermore, 31% (between 310,000 and 740,000) of the unexpectedly disengaged are adults with children[41]

2.4 Key segments of the digitally excluded population

Reflecting the significance of the relationship between the digitally and socially excluded populations, our analysis considers three key segments of the digitally excluded population:

- households with children of school age;

- unemployed adults of working age; and

- adults aged 65 or over.

These groups are significant for two reasons: their importance in terms of both number and as beneficiaries of digital inclusion. Below, we assess the size of each segment.

Economically active households with children of school age

There are 7.6 million households in the UK with dependent children. These households contain 16.6 million adults and 11.5 million children[42]. We estimate that 14% of these households are digitally excluded. This corresponds to 2.3 million adults with 1.6 million children. Of these adults, approximately 2 million are estimated to be in some form of employment[43].

Unemployed adults of working age

In June 2009, 2.4 million people were unemployed (and actively seeking employment)[44]. Of these, we estimate that 52% had never accessed the internet, corresponding to 1.3 million adults.[45] Estimating the number of unemployed amongst the digitally and socially excluded is more difficult. We estimate that 38% of the digitally and socially excluded are 'workless' (i.e. either unemployed or economically inactive). We have then estimated the proportion of 'workless' who are unemployed, rather than economically inactive. Using data from the Labour Force Survey, and excluding students and retired people and acknowledging those classified as inactive who 'want a job', we estimate that the number of unemployed may be as many as 0.91 million.

Adults aged 65 or over

There are 9.9 million adults aged 65 and over in the UK[46] of whom 6.4 million (64%) have never used the internet[47]. This is the largest single cohort amongst the 10.2 million individuals earlier identified as being digitally excluded, comprising 62% of the total.

[39] ibid

[40] OFCOM 2009 *Media Literacy Tracker* Table 109

[41] 'Digital Inclusion: An Analysis of Social Disadvantage and the Information Society', Department for Communities & Local Government, October 2008

[42] ONS Labour Force Survey 2009

[43] Ibid

[44] ONS Labour Force Survey 2009

[45] OxIS 2009 The Internet in Britain

[46] ONS 2008 Population data
http://www.statistics.gov.uk/populationestimates/flash_pyramid/downloads/Population_Pyramid_datasets.zip

[47] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf; OFCOM Media Literacy Tracker (2009) Table 79
http://www.ofcom.org.uk/research/stats/cmr/wave1.pdf

Summary

Table 2 summarises the number of adults who are digitally excluded or digitally and socially excluded in the three groups. The groups are not mutually exclusive. Equally, there are individuals within the digitally excluded and socially excluded populations that are not members of any of the groups and, therefore, do not appear in the analysis.

Table 2: Estimated number of digitally and socially excluded adults (2009)

Target group	Digitally excluded adults (millions)	Socially and digitally excluded adults (millions)	Digitally excluded who are also socially excluded (%)
Families with children	2.3	0.76	33%
Unemployed adults	1.3	0.91	70%
65 and over	6.4	1.56	24%

Source: PwC analysis

Although those aged 65 and over form the largest group of digitally excluded individuals, it is the unemployed for whom the correlation with social exclusion is most pronounced. It is least pronounced amongst the elderly: for a significant number of those aged 65 and over, digital exclusion is unrelated to social participation.

3 The potential economic benefits of digital inclusion – a framework

3.1 Introduction

In this section we describe the overarching framework we have used to identity and assess the potential economic benefits of reducing digital exclusion in the UK and then to assess their economic value. As far as possible, the approach we have adopted is consistent with the approach to appraisal and evaluation set out in HM Treasury's ''Green Book'[48].

3.2 Understanding the potential economic benefits of digital inclusion

In considering the potential economic impacts of greater digital inclusion we have first identified how economic benefits might be expected to flow from improved digital access to four different types of public and private service:

- mandatory public services: digital inclusion offers opportunities for providers to realise efficiency savings from greater use of online information, for example about health, and transactional services as well as offering improved service levels to citizens;

- welfare and benefits public services: for example, digital inclusion enables service providers to deliver benefits efficiently to citizens;

- value added public services: digital inclusion enables citizens to achieve better education and employment outcomes, for example as individuals enhance their qualifications through online learning and improve their earnings and/or their probability of finding employment; and

- private e-services: digital inclusion gives consumers access a wider range of products at lower prices.

We have then considered all the relevant benefits and how they impact on GDP and broader measures of economic welfare. We have taken into account the direct effects of greater digital inclusion as well as the indirect, induced and wider effects on other areas of the economy. The latter includes the social, health and environmental impacts. We have excluded those transfer payments that change the distribution of income or wealth, but do not give rise to direct economic benefits.

Table 3 provides a summary of the impact framework we have used to guide our analysis of the benefits of digital inclusion.

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[48] 'The Green Book: Appraisal and Evaluation in Central Government', HM Treasury, http://www.hm-treasury.gov.uk/data_greenbook_index.htm

Table 3: Framework for assessing economic benefits of greater digital inclusion

Service area	Benefits to digitally included citizens	Benefits to service provider - public or private sector	Wider economic benefits	Key outcomes
Mandatory public services	• Easier to comply • Save time	• Reduced transaction costs	• Better regulatory compliance • Dematerialisation	• Increased public sector productivity • GDP growth • Increased satisfaction with government • Increased trust in government & participation
Welfare and benefits public services	• Easier to receive benefits • Save time	• Reduced transaction costs	• Dematerialisation	• Increased public sector productivity • GDP growth • Increased satisfaction with government • Increased trust in government & participation
Value added public services	• Save time • More access to job opportunities • More access to learning • More health awareness	• Reduced transaction costs • More informed effective policies	• Dematerialisation • Lower transport costs (including congestion)	• Increased human capital • Improved health • GDP growth • Decreased social exclusion • Increased social cohesion • Increased satisfaction with government • Increased trust in government & participation
Private e-services	• Access to affordable services/products (e-commerce)	• Increased turn over • Reduced transaction cost savings (potentially reflected in lower prices to customers)	• Increased competition • Dematerialisation	• Increased private sector productivity • Increased private sector jobs • GDP growth
	• Access to information and culture • Access to social ties (peer-to-peer, networking, personal encounters)		• Increased social capital • Increased social participation • Increased social cohesion	• New well informed citizens • New socially engaged citizens

3.3   Valuing the potential economic benefits of digital inclusion

The focus of our work has been on deriving quantitative estimates of the monetary value of the economic benefits to government and society of digital inclusion. Existing studies of the potential

benefits of enabling digital access recognise the methodological challenges involved in monetising at least some of the potential benefits that we have identified.

Market values

Ideally, benefits would be based on observed market prices although sometimes adjustments may be required to take account of relative price changes over time. For example, if digital inclusion provides consumers with access to lower cost goods and services, then the benefits can be measured as the reduced cost of the products. This is the approach we have used to assess the potential benefits of online shopping.

Non-market values

In many cases, however, the economic value of the benefits of digital inclusion cannot be derived using readily available market data, for example where the benefits are social or health related and there is no market price. This is the case with the impacts on qualifications and skills on public sector efficiency savings. In these cases, we have drawn on studies which use a range of techniques to infer the value:

- Revealed preference techniques involve inferring the implicit price by examining behaviour in related markets. For example, estimates of the economic returns to qualifications and skills have been derived by examining differences in individuals' wages and earnings depending on a range of factors including their qualifications and skills.

- Avoided public (and private) sector costs where the benefits of digital inclusion are derived by estimating the avoided costs for example in the health service as a result of needing to deal with fewer patients.

In some cases, it is appropriate to use more than one technique to check the consistency of results since the estimates emerging from a single study using a single method may not be reliable.

There are two specific categories of benefit arising from digital inclusion where non-market values are particularly important:

- The time savings that accrue to both citizens and providers of public and private services: government departments regularly need to attach a value to both working and non working time. Their approach to this is well established[49]. The value of working time is the opportunity cost of the time to the employer which is equal at the margin to the cost of labour to the employer: the gross wage rate plus non-wage labour costs such as national insurance, pensions and other costs that vary with hours worked. The New Earnings Survey provides estimates of different working time. The value of non-working time is assumed to rise at roughly half the rate of real income.

- The improvements to individuals' health that might result from reducing digital exclusion. Various techniques are available with which to estimate these health benefits. They include individuals' willingness to pay for small changes in their own or their household's risk of loss of life or injury which can be used to infer the value of life. The changes in the probabilities of premature death or of serious injury used in such WTP studies are generally very small[50]. Where the health impacts are not simply lives lost or saved, an alternative approach is to consider changes in life expectancy (including expected life years where lives are lost or saved) and the quality of life. This approach is known as the quality-adjusted life year (QALY).

Taking account of who benefits

In assessing the benefits of digital inclusion, it is important to acknowledge the need to adjust for distributional impacts since the impact on an individual's well-being will vary according to his or her

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[49] See DfT website for additional guidance: http://www.dft.gov.uk

[50] Franklin (2000), chapter 7, suggests that individuals systematically undervalue small risks, possibly introducing a downward bias in estimating VPF.

income. In particular, an extra pound will give more benefit to a person who is deprived than to someone who is well off. Other distributional issues may also arise, for example if the impacts vary according to age, gender, ethnic group, health, skill, or location although generally these are largely correlated with income. In practice, however, relative prosperity is best defined by relative income, adjusted for household size, and divided into quantiles (for example, quintiles or deciles)[51].

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[51] The relative prosperity of a household depends on its size and composition as well as income. The varying costs of living of different households can be adjusted for by calculating equivalised income ranges.

4 Benefits for education, skills & employment

4.1 Introduction

In this section we consider the potential educational and employment benefits from enhancing digital exclusion. We examine the potential impacts on three groups of people: children, employed workers and the unemployed. We start by describing two logic chains which depict the way in which greater digital inclusion can deliver benefits for children and for adults. In interpreting these logic chains, it is important to reiterate that realisation of the benefits will not simply depend on providing physical access to digital technologies: in many cases, it will also depend on the successful provision of support and training for users. We then draw on the available research and other evidence to provide estimates of the potential economic benefits for each group of people.

4.2 Impact framework – logic chains

Access to digital technologies, including the internet, now plays an increasing important role in education and employment. A recent survey showed that 65% of people use the internet in the first instance when they are looking for information on issues for a professional, school or personal project.[52] As this trend continues, those digitally excluded will miss out on a rising number of education and employment opportunities.

One of the key impacts of digital inclusion is to provide greater access to education and employment opportunities which in turn generates economic benefits through increased lifetime earnings. An individual's age and lifecycle stage are the key variants in how these benefits are realised. The benefits for children are linked to improved educational attainment resulting in better employment prospects, while for adults there are both potential skills and direct employment impacts. As school based education differs significantly from adult education, the relationship with digital inclusion also differs. Therefore, the following sections consider the education and employment impacts for children and adults.

Education impact for children

There is a wealth of literature which examines how access to digital technologies improves educational performance, with the main drivers being:[53]

- the level of interest in digital technologies which can increase student motivation to study;

- how digital technologies are used to tailor delivery to suit different learning styles and needs;

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[52] Dutton, W.H., Helsper, E.J., and Gerber, M.M. (2009) *The Internet in Britain: 2009.* Oxford Internet Institute, University of Oxford

[53] Valentine, G., Marsh, J. and Pattie, C. (2005) *Children and Young People's Home Use of ICT for Educational Purposes: The Impact on Attainment at Key Stages 1-4*, Department for Education and Skills, Research Report no. 672.

- the increased efficiency, for example in producing and editing documents, which saves teaching time; and

- the greater range and depth of information available through the internet.

For a school age child, improved results through Key Stages 1–4 increase the likelihood of achieving five Grade A*-C GCSEs. In turn, this increases the probability of completing A Levels and achieving a degree level qualification. The key outcome of an increase in qualifications is improved job quality and increased lifetime earnings.

Digital inclusion also increases the potential for the school to engage directly with parents through electronic communication. Schools are beginning to provide electronic reports to parents on students' attainment and attendance, which could provide more timely information to help parents address the behaviour of persistent truants. Reducing truancy increases retention and qualification attainment and subsequently reduces costs to schools and society.

This framework of potential educational benefits for children is shown in Figure 6. It shows how use of digital technologies in education and digital reporting to parents flows through to increased lifetime earnings and additional GVA. It also notes wider qualitative benefits and disbenefits.

Figure 6: Impact of digital exclusion on education for children
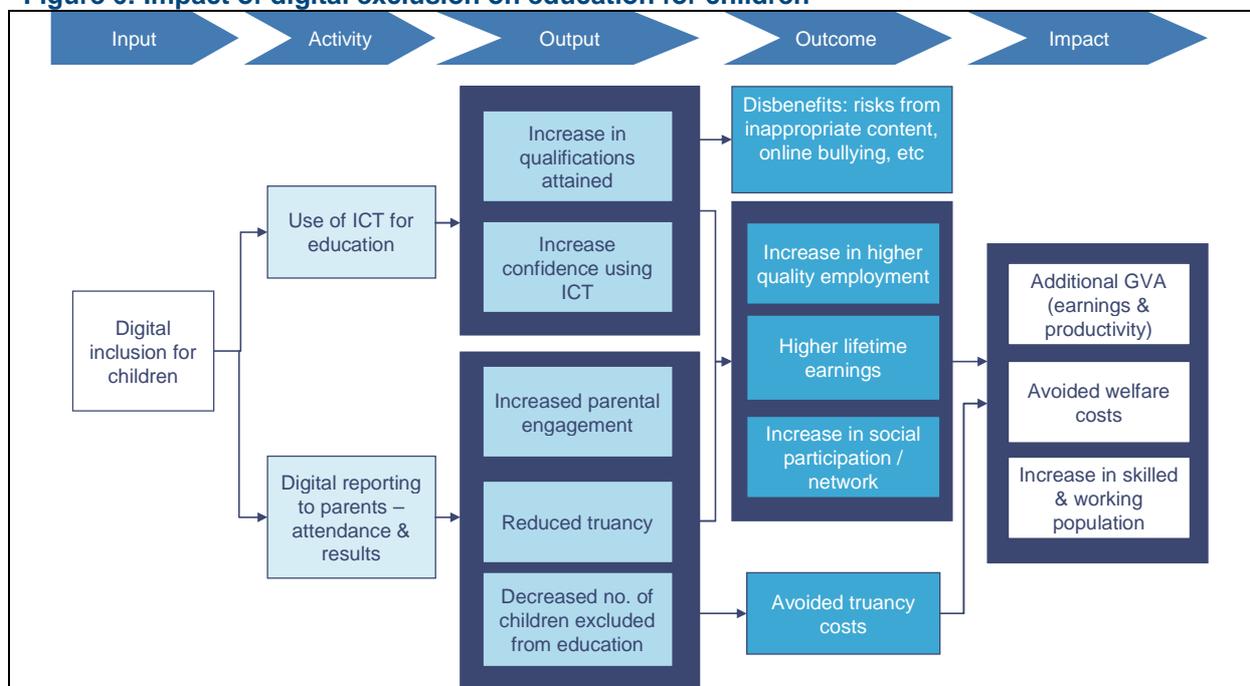
Skills and employment for adults

Greater digital inclusion provides various opportunities for adults to improve their skills and, hence, their employment prospects. These include:

- Increased skills: For some people digital inclusion will require the development of basic skills with digital technologies. For others, digital inclusion may mean take up of online training and education, not necessarily limited to ICT training, where physically attending classes was not an option. An increased skill base will open up a range of employment prospects particularly given estimates that between 75%[54] and 90%[55] of jobs require at least some computer use. For the unemployed this will increase potential for employment, for the employed this will increase their chances of securing higher skilled employment which attract an 'ICT wage premium'.

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[54] Analysis of the 2006 Skills Survey by *Computers and Pay,* Green et al, July 2007

[55] HM Government (2008), 'Delivering Digital Inclusion: An Action Plan for Consultation'

- Better access to information about employment opportunities: The internet provides a huge range and depth of information about careers, employers and vacancies. Improved access to this information could improve chances of securing employment. In 2008, it is estimated that over 15,000 job vacancies were advertised through Jobcentre Plus.[56] Similarly, many employers and private sector agencies rely on the internet to advertise their jobs. The increased availability of information on employment opportunities has the potential to establish a better match between job vacancies and people. This could potentially reduce the time spent looking for a job and the risk of becoming or remaining unemployed.

- Working from home and telecommuting: The internet can facilitate greater flexibility in working arrangements, increasing the ability to for an individual to work from home. This could increase the potential job opportunities, particularly for those with difficulties accessing the labour market, including parents and carers and people with disabilities and mobility issues.

The potential economic benefits for digitally excluded adults are summarised in Figure 7.

Figure 7: Impact of digital inclusion impact on employment and education for adults
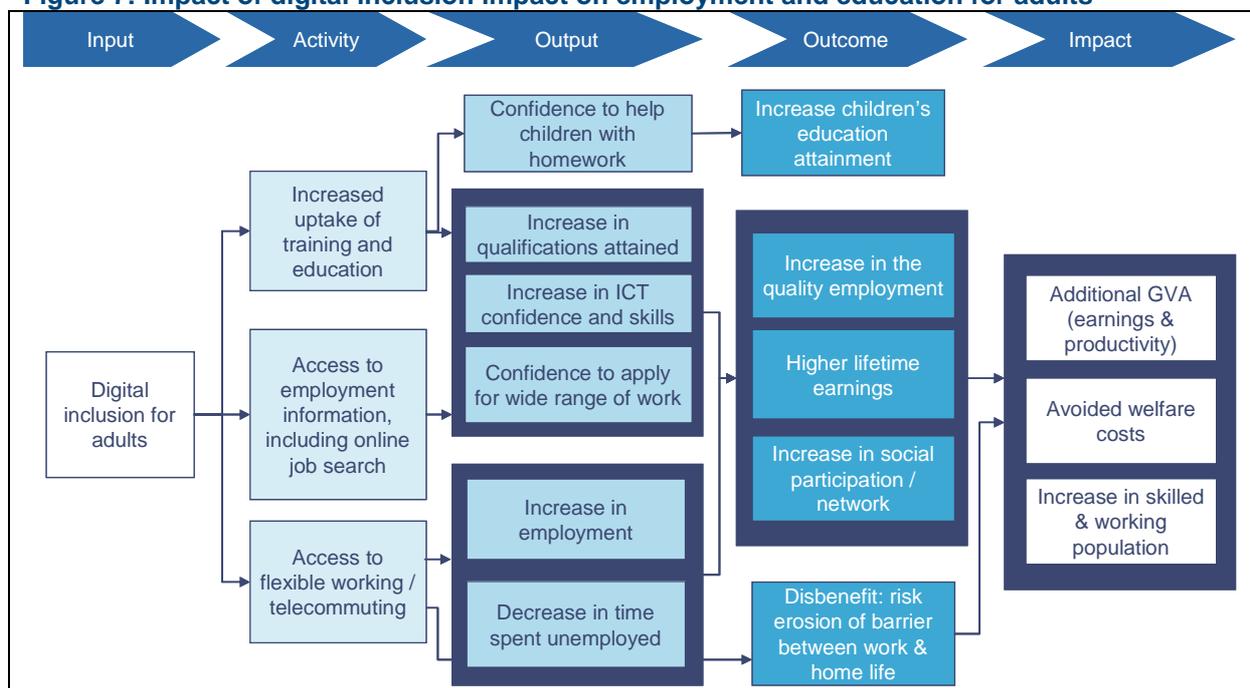
In the rest of this section, we consider the available evidence in relation to both of these logic chains.

4.3 Evidence

Children

There is a large body of evidence that suggests that access to and use of digital technologies, especially computers, particularly at home, can have a positive impact on children's educational results. This is concisely summarised by the Home Access Programme Business Case:[57]

- When computers are used for educational purposes, pupils with home access perform significantly better than those without. A statistically significant relationship was found between households owning computers and the GCSE results achieved by children in those households[58]. There is,

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[56] HM Government (2009), *Transformational Government Annual Report 2008: Part 2 Contributions from public sector providers Departmental Overview*,

[57] Becta (2008), *Home Access Programme Business Case*,

[58] Schmitt & Wadsworth (2004), *Is there an impact of household computer ownership on children's educational attainment in*

however, evidence that the impact on attainment can be negative[59].

- Access to digital technologies resources at home can increase children's confidence and skills in using digital technologies[60].

- Home access to digital technologies is a useful means of encouraging parental involvement in the pupil education success. Digital technologies are currently being used by some institutions to monitor attendance and keep parents informed of any absences. This improves learner attendance and behaviour. Evidence suggests that parents take greater interest in their children's school work when this involves technology[61].

- There is some evidence that home access to digital technologies can also increase parents' / carers' ICT skills.

Children and adults who remain digitally excluded are at risk of missing out on achieving their academic potential. It has been observed that low attainment in disadvantaged children can generally be interpreted as underachievement, since high proportions of disadvantaged children with normal IQs underachieve.[62] Some research also suggests that the education benefit from digital technologies is strongest in disadvantaged communities.[63] Given the correlation between digital and social exclusion, access to digital technologies is a potentially important pathway to improving educational attainment and to avoiding the cycle of exclusion.

In assessing the potential economic benefits for children from better access to digital technologies at home, we have drawn on the same evidence as that used to underpin the Home Access Programme (HAP). The evidence used and the assumptions that have been applied are summarised in Table 4.

Table 4: Assumptions of impact of digital inclusion on school age children

Benefit	Evidence	Key assumptions
Impact on educational attainment at age 16	Where children have 1 or more GCSEs at A* - C, computer ownership increases chance of getting 5 good GCSEs by 9 percentage points.[64]	• 4.5% of digitally excluded children will achieve 5 good GCSEs • Discounted additional lifetime earnings of £120,000
Impact on educational attainment at age 18	There is a link between improved GCSE performance and A level performance. The Youth Cohort study shows that 56% of those achieving 5A*-C gain a L3 qualification compared to 23% of those gaining 1-4 A*-C[65].	• 20% of those improving at GCSE go on to A level • Discounted additional lifetime earnings / productivity benefit £82,000
Impact on university participation	The Youth Cohort study shows that 32% of those in lowest income groups that gain	• 10% of those improving at GCSE will go on to university • Discounted additional lifetime

Britain, CEP

[59] Fuchs, T. and Woessmann, L. (2004). Computers and Student Learning: Bivariate and Multivariate Evidence on the Availability and Use of Computers at Home and at School. Germany: CESifo.

[60] Passey, D. et al. (2004). The Motivational Effect of ICT on Pupils. London: DfES.

[61] Comber, C. et al. (2002). Learning at Home and School: Case Studies. London: DfES.

[62] Becta (2008), *Meeting their potential: the role of education and technology in overcoming disadvantage and disaffection in young people*

[63] ATKearney (2009), *Assessing the economic benefits of digital inclusion*, http://www.digitalinclusion.net.au/sites/www.digitalinclusion.net.au/files/Assessing%20the%20economic%20benefits%20of%20digital%20inclusion.pdf

[64] Schmitt & Wadsworth (2004), *Is there an impact of household computer ownership on children's educational attainment in Britain,* CEP.

[65] DCSF: Youth Cohort Study and Longitudinal Study of Young People in England: The Activities and Experiences of 16 Year Olds: England 2007

Benefit	Evidence	Key assumptions
	5A*-C go on to university compared to 13% of those gaining 1-4A*-C[66].	earnings / productivity benefit £100,000
Increased engagement and reduced truancy	One study found discounted lifetime costs of truancy and exclusion of £44,468.[67] HAP Business Case discounted this figure by 3.5% to revise the cost of a persistent truant. It is assumed that 4% of the target group are persistently truant.[68]	• 1% of persistent truants will stop truanting • Discounted avoided cost of £26,300 per persistent truant

Source: Home Access Programme Business Case

These assumptions have been applied to the 1.6 million digitally excluded children to estimate the potential economic impact (see Section 2). The key assumption for the impact of increased educational attainment is the proportion that will see an increase in GCSE results. While the HAP Business Case assumed 9% improvement, we have applied a more conservative assumption of 4.5% as our central assumption, with sensitivity tests of 2% and 9%. The proportion of children who will desist from truanting has also been subject to sensitivity testing. There is a higher level of uncertainty on this as there is no available evidence on the likely success of electronic reporting in decreasing truancy.

We estimate that increases in educational attainment for digitally excluded children of school age could result in a total lifetime increase in earnings of £10.5 billion, with a range from £4.7 billion to £21.1 billion (see Table 5).

Table 5: Estimated economic benefits of improved educational attainment through greater digital inclusion on children

Benefit	Total discounted benefits		
	Central assumption	Sensitivity – low	Sensitivity – high
	4.5% improve GCSE	2% improve GCSE	9% improve GCSE (HAP)
Impact on educational attainment at age 16	£8.6 billion	£3.8 billion	£17.3 billion
Impact on educational attainment at age 18	£1.2 billion	£0.5 billion	£2.4 billion
Impact on university participation	£0.7 billion	£0.3 billion	£1.4 billion
Increased educational attainment benefit	£10.5 billion	£4.7 billion	£21.1 billion

Source: PwC analysis

We have also estimated the economic benefit of the decrease in truancy. As Table 6 shows, this is estimated to generate a total additional benefit of £16.8 million, with a range of £8.4 – 25.2 million.

Table 6: Estimated economic benefits of reduced truanting through digital inclusion of children

	1% desist truanting	0.5% desist truanting	1.5% desist truanting
Increased engagement and reduced truancy	£16.8 million	£8.4 million	£25.2 million

Source: PwC analysis

Studies of the impact of digital technologies on children have identified a number of risk. This emphasises the need for appropriate support and guidance for children and parents. Any digital inclusion programmes will need to consider ways to mitigate such impacts:[69]

• increased time spent using a computer, for example for leisure activities such as gaming and social

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[66] DCSF: Youth Cohort Study and Longitudinal Study of Young People in England: The Activities and Experiences of 16 Year Olds: England 2007

[67] Brookes et al. (2007), *Misspent youth: The costs of truancy and exclusion*.

[68] DCSF SFR36/2007: Pupil absence in schools.

[69] Becta (2008), *Home Access Programme Business Case.*; Fuchs, T and Woessmann, L., (2004), *Computers and Student Learning: Bivariate and Multivariate evidence on the availability and use of computers and student learning*, CESIFO Working Paper No. 1321; Malamud, O. and Pop-Eleches, C., (2008), 'The Effect of Computer Use on Child Outcomes', in Harris School Working Paper Series 08.12.

networking, may be at the expense of more educational activities or physical activities thus promoting a more sedentary lifestyle (which increases the risk of obesity and ill-health);

- risk of exposure to inappropriate material on the internet; and

- risk of cyber-bullying.

Case study: NotSchool.net

The NotSchool.net project provides learning opportunities for young people excluded from mainstream education. After starting as a research project, a pilot commissioned by the Department for Children, Schools and Families in 2000 was extended as a national project. Through the internet it offers alternative education provision for young people who cannot cope with traditional schooling, home schooling or other specialist units.

To date 5,000 young people have benefited from NotSchool.net.[70] The following outcomes have been achieved[71]:

- Pupils have been shifted out of a model of dependency and non-achievement: of the beneficiaries in 2004/2005, 50% found places at college or in other further education, 26% found college related employment such as modern apprenticeships and 18% entered fulltime employment; and

- Formal accreditation: of the 916 beneficiaries active over 1.4.2004 and 31.3.2005, over 96% obtained an accredited Part B certificate equivalent to GCSE grades D to G or higher (Level 1), and over 50% grades A to C equivalent (Level 2) and roughly 8% the equivalent of A level (Level 13). During this time 1.7% of beneficiaries dropped out and 3.6% did not reach Part B level certificate (national recognised qualification).

Applying the assumptions for lifetime earnings used by the Home Access Programme, the lifetime economic benefit from the children who gained Level 2 and Level 13 qualifications through the Notschool.net project would be around £61 million.[72] While specific conditions are required for Notschool.net to be a success such as an interest in learning and a supportive home environment, an increase in digital inclusion could have a very positive benefit of increasing the proportion of children excluded from school who attain formal qualifications.

Adults

Increasing life-long learning and skills development

A recent study found that adults with no internet access are three times less likely to take part in learning (just 6% reporting current participation), than adults with internet access (22% currently learning).[73] This reflects the significant barriers to lifelong learning faced by the socially excluded which is increasingly necessary for individuals wishing to gain, change or progress in employment. While the difference in education participation rates in adults is not solely due to the being able to access the internet, increasing digital inclusion is likely to result in an increase in adult training and education.

Programmes aimed at reducing digital inclusion have improved peoples' ICT skills and acted as a pathway back into lifelong learning. The primary way digital inclusion has been tackled to date is through the provision of online centres that enable the public, particularly in disadvantaged communities, to access computers and the internet. This has been delivered through the network of UK Online Centres in England. Previously, Community Access to Lifelong Learning (CALL), a three year programme from 2000 – 2003, provided centres across the UK. These two programmes, in addition to a number of other public programmes, have demonstrated various improvements in skills as a result of digital inclusion:

- Improved confidence is reported by a large proportion of surveyed users, around 80% of three studies examined. Increased confidence can be critical to motivating people to continue to build their ICT skills, apply for a wider variety of jobs, and potentially access broader education and

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[70] Inclusion Trust, 2008.

[71] GHK (2008), *Case studies on the 'One Step Up' approach in adult learning: Notschool.net*

[72] The above estimates of the potential benefit of digital inclusion includes all school age children, both included and excluded from participation in traditional school based learning. Therefore the benefits of Netschool.net are not additional to the benefits calculated above

[73] The National Institute of Adult Continuing Education (2009), *Survey on Adult Participation in Learning 2009*, Tuckett, A. and Aldridge, F., May 2009

training opportunities.[74]

- Increased informal skills, with around 80% of beneficiaries claiming that they would not have gained these skills otherwise, and many beneficiaries claiming improved skills for work.[75]

- Enrolled or completed training courses: there is no consistent evidence on how internet access and training centres impact on the proportion of people who complete training and qualifications. From 9% of myguide users going on to start an education training course[76]; 9% of learndirect users gained a qualification[77], 18% enrolled on new training course through a e-Government programme[78]; around 18% of Community Access to Lifelong Learning (CALL) Centres went on to complete qualifications and 45% completed participated in formal education or training courses.[79]

- Increased parental engagement to help children with school work: where parents ICT skills improve up to 50% feel that they are better able to help their children with their homework.[80] This then feeds into the improved lifetime outcomes for newly digitally included children.

This evidence shows that access to digital technologies and the internet can have a positive impact in terms of re-engaging adult learners and increasing their skills and qualifications. Increased skills base through digital inclusion could help a proportion of the employed to access higher skilled jobs, and may help some unemployed to successfully access the labour market. We estimate the potential scale of these impacts below.

Case study: Digital inclusion of disabled people

It is estimated that almost 60% of people with disabilities are digitally excluded, which compares to 25% exclusion of people without a health problem or disability.[81] Such a high rate of digital exclusion is intimately linked to high rates of social exclusion for people with disabilities. In 2007 the Disability Rights Commission reported that of all people in Britain without any formal qualifications, over one-third were disabled, and that of all people of working age out of work, 40 per cent were disabled.[82] While some people with disabilities require adaptive technology the majority don't which means that the digital exclusion is largely the result of social exclusion.

Digital inclusion and advancements in assistive technologies provide a significant opportunity to help people with disabilities to participate equally in society, engage directly with others and receive equal levels of service delivery. Online delivery of FE and HE education provides a solution to people with mobility issues and could significantly increase attainment rates for people with impairments, leading to improved employment and higher lifetime earnings.

Digital inclusion could also have a positive impact on assisting people with disabilities to access the labour market, particularly for those that travel to work is one of the main barriers. Digital technologies can enable people to have remote access and actively participate in online and virtual environments, potentially reducing the importance on physical presence.

However, given the vast range of impairments and conditions, digital inclusion will only assist certain sections of the population. A study for DWP showed that people with skin, disfigurement and hearing disabilities are more likely to be in employment compared to people with mental illness or locomotor / intellectual disabilities. The

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[74] Hall Aitken (2005), *Community Access to Lifelong Learning (CALL) Evaluation – Final Report*, October 2005, p.46; Hall Aitken (2003), *Evaluation of CMF funded UK online centres - final report*, p.35; and UK Online Centres 2007, *myguide pilot – bridging the digital divide – Research Report*

[75] ibid

[76] UK Online Centres 2007, *myguide pilot – bridging the digital divide – Research Report*

[77] Learn direct evaluation

[78] UK Online Centres: Detailed Business Case for CSR 2008 – 11

[79] Figures calculated based on total of 1.1 million users. Hall Aitken (2005), *Community Access to Lifelong Learning (CALL) Evaluation – Final Report*, October 2005

[80] Hall Aitken (2005), *Community Access to Lifelong Learning (CALL) Evaluation – Final Report*, October 2005

[81] Dutton, W.H., Helsper, E.J., and Gerber, M.M. (2009) The Internet in Britain: 2009. Oxford Internet Institute, University of Oxford

[82] HM Government (2008), *Delivering Digital Inclusion: An Action Plan for Consultation*

number and severity of conditions, in addition to demographic characteristics are also important drivers of employment.[83] Even for a proportion of the population which may be better able to access employment opportunities, an evaluation of the Access to Work programme also reported that even where homeworking was an option, respondents preferred to attend their usual place of work.[84]

Given the diverse needs of people with health and disabilities, and lack of quantifiable evidence, it is not possible at this to quantify what the potential impact of digital inclusion. However, as people with disabilities make up a significant proportion of the digitally excluded, the multitude of impairments and conditions and the best way to engage them digitally will need to be carefully considered in policy approaches.

Productivity benefits for the employed

The use of digital technologies such as the internet is positively correlated with higher productivity and, hence, earnings. Only 38% of those in the lowest income category used the internet, compared to more than 97% use in the top income category.[85] Digitally excluded are most likely to be in low skill low income occupations which are typically characteristics by high rates of turnover, higher risk of cycles of unemployment and short-term employment. Key barriers to accessing more prosperous employment opportunities typically include lack of relevant skills and confidence and information on job opportunities.

The value of the digital technologies related productivity improvement captured by businesses is indicated by the additional earnings to employees who use digital technologies. A study by the Centre for Education and Economics estimated an average ICT wage premium of 3 – 10%[86], while a European study estimated the premium to be up to 19.5%.[87] The size of the wage premium clearly depends on the types of skills and training that were undertaken, and the extent and type of digital technologies use. For instance the evaluation of the Train to Gain programme found that on average 41% of employers who participated in the training scheme awarded some pay increase to the participants, while 50% who had accessed Level 3 training courses awarded pay rises.[88] While not limited to digital technologies training, this clearly demonstrates the higher likelihood of reward for higher level of skills acquired.

As more of the digitally excluded become included, their increased ICT skills and confidence increases their likelihood of securing higher skilled employment, through promotion or finding a new job, which is paid an ICT wage premium. As outlined above, as people reengage with learning they are more likely to undertake further training and skills improvement, which could facilitate access to even higher ICT wage premiums.

The NIACE study found that 22% of adults with internet access partake in adult education, compared to 6% of adults without internet access. The 18% difference between these two groups is determined by a range of demographic characteristics, including education, income, age, gender, marital status, and is not solely attributable to internet access. On this basis, we assume that:

- 15% of digitally included workers participate in skills enhancement; and

- between 11% and 33% of these workers are able to improve their skills sufficiently such that they can benefit from the earnings premium available to those with developed ICT skills.

Although it is difficult to establish a strongly evidenced relationship between digital inclusion, skills and earnings, we believe that our assumptions are consistent with the findings from beneficiaries of

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[83] Berthoud, R. (2006), *The employment rates of disabled people*, for DWP, Research Report 298.

[84] Thornton, P. and Cordon, A. (2002), *Evaluating the Impact of Access to Work: A Case Study Approach*, Social Policy Research Unit, The University of York for DWP

[85] Oxford Internet Surveys (2009), *The Internet in Britain in 2009*

[86] Centre for the Economics of Education (2007), *The Impact of Computer Use, Computer Skills and Computer Use Intensity: Evidence from WERS 2004*

[87] Haisken-DeNew, P. (2007), *e-Living D11.3 - ICT and Socio-Economic Exclusion Final Report : 'eLiving' Waves 1 and 2*, 17 November 2007

[88] IFF Research and the Institute of Employment for the Learning and Skills Council (2009), *Train to Gain Employer Evaluation: Sweep 4 Research Report*, June 2009

myguide, learndirect and CALL users completing courses and qualifications.

To assess, the average earnings benefit, we have used the assumptions on additional lifetime earnings which underpin the case for HAP Business Case. We assume that:

- the average wage premium is 7% which is the mid-point in the CEE estimated range of 3 – 10% wage premium;

- digitally excluded workers are in the lowest earnings quartile with an average weekly wage of £325, which is netted off against a weekly benefit of £23.

- the benefit is assumed to persist until the end of each person's working life which is assumed to be around 10 years on average; and

- the probability of being employed in any one year is 73%.

This generates a total discounted lifetime benefit of £8,387 per person affected.

On this basis, Table 7 shows the potential total productivity impact on those employed workers who become digitally included and are better able to access improved job prospects under three different scenarios. The expected benefit ranges between £0.6 billion and £1.7 billion.

Table 7: Total discounted additional lifetime earnings for employed digitally excluded

Low scenario - 66,000 workers benefit from wage premium	Central scenario – 133,400 workers benefit from wage premium	High scenario – 200,000 workers benefit from wage premium
£558 million	£1.1 billion	£1.7 billion

Case study: Older people, employment and digital inclusion

Digital inclusion could play a critical role in upgrading the skills of older workers, and helping to increase their employability by increasing their confidence and ability to use digital technologies. Older people have the lowest level of skills in England, in 2007 33.6% of people aged 50 – 59 had less than a level 2 qualification, which increases slightly to more than 36.5% for people aged 60 – 69, compared to the national average of 29.3%[89]. While this low level of basic skills among older workers is decreasing over time, it is a key contributing factor in the high rates of unemployment and underemployment among older people. Given the trend towards skill-biased technological change barriers to older people remaining in the workforce are likely to worsen over coming years without effective action.

Increasing the retention of older people in the workforce is a significant policy objective for the Government, in response to the pressures of an ageing population, the health and well-being benefits and the significant economic potential of this relatively untapped labour pool. It is estimated that between 430,000 and 1 million older people can be considered potential additional workers, which could add between £12.4 billion and £29.7 billion to annual economic output.[90]

Digital inclusion and skills improvement, along with changes to employment support, the pension system and incentivising employers are the key mechanisms needed to realise some of these benefits. Wider benefits include to retaining corporate knowledge and potentially decreasing recruitment costs, and some studies also indicate that older workers have lower levels of absenteeism and turnover, improved customer relations and successful examples of passing on knowledge.[91]

While the overall likelihood of adult participation in education decreases with age[92], digital inclusion programmes have found a high level of engagement from older people, or 'silver surfers'. The evaluation of the CALL centres

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[89] Department for Innovation, Universities and Skills (2008), *The Level of Highest Qualification Held by Adults: England 2007 (Revised),* DUIS SFR 05/2008

[90] Meadows P, Cook W, (2004). *The Economic Contribution of Older People,* Volterra Consulting and Age Concern England, London

[91] Age Concern (2004), *The Economy and Older People,* February 2004

[92] The National Institute of Adult Continuing Education (2009), *Survey on Adult Participation in Learning 2009*, Tuckett, A. and Aldridge, F., May 2009

found that the majority of older participants were there to complete a course, 80% of 55 – 64 yr olds, and 83% of 65+, instead of email which was the key driver for younger participants.[93] This could indicate that increasing skills could not only be beneficial in improving the employability of older people, but may also be a hook to encourage digital inclusion.

Digital inclusion could also increase older peoples already significant access to volunteer and unpaid work opportunities. An OECD study reported that unpaid work by older people in the UK is worth around £24 billion, which is 2.9% of economic output, while volunteering is worth around £5 billion each year[94]. Hence, greater participation in these activities could again capture further significant economic benefit.

While there is clearly potential for significant benefits from targeting older people, who make up the majority of the digitally excluded, there is no available evidence which indicates what proportion of newly digitally included older people would go on to access labour market and other related economic activities. However, as demonstrated elsewhere the potential economic benefit of increasing participation of older workers is significant.

Employment benefits for the unemployed

For the unemployed, improved digital inclusion could increase employment prospects by providing a better flow of information about job vacancies and other opportunities and by enhancing skills. Unemployed people face a number of barriers to employment including low skills, low self-esteem and confidence, physical and mental health issues and caring responsibilities.[95] A survey by Working Links on the needs of the long-term unemployed identified the key barriers. Two of the most frequently cited types of support were practical assistance with skills training (46%) and courses to improve self-esteem and confidence (42%)[96].

Enhancing digital inclusion has been shown to enable better delivery of support to overcome some of the key barriers and help improve employment prospects through two mechanisms:

- Increasing ICT skills and motivation can open up entry level positions for unemployed or economically inactive people. An increase in basic ICT skills is often a pathway to broader lifelong learning, which could result in further progress up the 'skills escalator' and access to higher earnings. The evaluation of the myguide service demonstrated this benefit flow – nearly half of the respondents who were unemployed and able to work stated that their new computer skills have increased their confidence to apply for a wider variety of job roles (47%), prompted them to take-up a new course of acquire a new skill (44%) or helped them look for a new job (41%)[97]. Evaluation of the CALL centres found that doing a course did not actually make any different to whether people felt that coming to the centre had helped them to get a job, indicating the confidence and motivation can have as much of an impact as specific training.[98] A study for UK Online Centres also found that 75% of internet users were confident of their skills to find a new job whereas only 50% of non-internet users felt similarly.[99]

- Improving access to online job searches can enable more information about relevant job opportunities and vacancies to be accessed. The digitally excluded unemployed have reported feeling frustrated about being excluded from job opportunities as they are less able to access online job searches and online application processes. They reported difficulties finding non-internet applications forms and some viewed the cost of obtaining and returning completed

[93] Hall Aitken (2005), *Community Access to Lifelong Learning (CALL) Evaluation – Final Report*, October 2005

[94] Meadows P, and Cook W, (2004)

[95] DWP (2005), *Understanding workless people and communities: A literature review*, Research Report No 255. and DWP (2005), *What employers look for when recruiting the unemployed and inactive: skills, characteristics and qualifications*, Research Report No 295

[96] Working Links (2008), *Breaking Down Barriers*, by Populus
http://www.workinglinks.co.uk/PDF/ResearchResponsePaperPopulus.pdf

[97] ORC International (2009) *Evaluation of myguide: Phase 3 Report*

[98] Hall Aitken (2005), *Community Access to Lifelong Learning (CALL) Evaluation – Final Report*, October 2005

[99] Freshminds, *Does the internet improve lives ?*, UK Online Centres

application forms as a deterrent to application for some jobs.[100]

There is mixed evidence about the impact of online job searching on the likelihood and duration of unemployment. Some studies have found that the higher contact rate, lower cost, and greater information content provided by advertising job vacancies online could lower rates of frictional unemployment[101] and a higher average match quality.[102] Up to 80% of online job seekers are employed at the time of their job seeking, and internet users are less likely to transition to unemployment and more likely to change jobs.[103] However, other research has found that the positive impacts reported from online searching actually reflects the characteristics of the users which have higher levels of education, experience and lower levels of unemployment. They suggest that internet job search in itself is ineffective in reducing general unemployment duration.[104]

On balance, while it is not possible to explicitly link an increased likelihood of employment simply by having access to online job searches, at a minimum, enhancing digital inclusion is likely to generate benefits from feeling more included in the online application process.

- Increase possibility of accessing flexible employment opportunities: could be made possible through digital inclusion increasing ICT skills and home access. There is potential benefit for those who may have difficulty with being physically present at a workplace either due to health and mobility issues or caring responsibilities. While it is expected that there is a general upward trend number of people working from home, the most recent data from the Labour Force Survey indicates the total number still remains relatively small, with just over 25% of the UK workforce 'sometimes' working at home and 2.5% working mainly at home (of which 62% are self-employed).[105] Surveys indicate that telecommuting is more often an incentive retain and attract skilled workers[106]; and the large majority (77%) of small businesses would find it difficult or impossible to allow working from home.[107] This reflects the trend that the majority of people who do work from home do not work for small businesses and are on average better qualified than the employed workforce as a whole. As such it is not that likely that a significant proportion of the digitally included would benefit from the chance to utilise digital technologies for flexible working arrangements.

Overall, we expect that increasing the skills and confidence with which the digitally excluded make use of digital technologies is likely to have the strongest benefit for the digitally excluded unemployed. Several evaluations of programmes aimed at digital inclusion have demonstrated benefit in this area. For example, UK Online Centres found that 9% of people were helped into employment[108] while the CALL centres were found to have assisted up to 34% of users into employment of which between 9 and 12% were helped 'a lot'.[109] Neither study, however, considered the additionality of the support provided in helping users into employment, nor did they establish a direct casual link between digital inclusion and the increase in employment.

We have taken a similar approach to that used to underpin the HAP. Using the results from the UK Online Centre study, we assume that between 3.5% and 7.5% of the unemployed would be helped into work if they became digitally included.

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[100] Freshminds, *Does the internet improve lives ?*, UK Online Centres

[101] Mortensen, Dale T. 'Panel: Modeling How Search-Matching Technologies Affect Labor Markets', talk given to the IRPP and CERF conference on Creating Canada's Advantage in an Information Age, May 2000.

[102] Krueger, Alan B. 'The Internet is Lowering the Cost of Advertising and Searching for Jobs'. New York Times July 20, 2000

[103] Stevenson, B., (2006), *The Impact of the Internet on Worker Flows*, December 2006

[104] Kuhn, P. and Skuterud, M. (2000), 'Internet Job Search and Unemployment Durations' in *Department of Economics, University of California, Santa Barbara, Departmental Working Papers*

[105] Felstead, A., et. al. (2000), *A Statistical Portrait of Working at Home in the UK: Evidence from the Labour Force Survey*

[106] Natick, M. (2000), 'Sage Research announces the Drivers of Telecommuting', *Business Wire*, January 12, 2000

[107] DWP 2006, *The costs and benefits to employers of recruiting and retaining disabled workers*

[108] Transactional government

[109] Around 375,000 out of 1.1 million users. Hall Aitken (2005), *Community Access to Lifelong Learning (CALL) Evaluation – Final Report*, October 2005

In deriving the expected lifetime benefit, we have again relied on the assumptions used to underpin the HAP:

- weekly wage for bottom quartile earners is £325, which is netted off against weekly income benefit of £265 and job seekers allowance of £60;

- it takes one year for the benefit to occur; and

- each job is retained for 12 months.

This results in a total discounted wage benefit of £12,430 per person moved into employed.

Table 8 shows the expected lifetime benefits which range between £566 million and £1.2 billion depending on the proportion of the unemployed who are assumed to access employment.

Table 8: Total discounted additional lifetime earnings for unemployed digitally excluded

Central assumption – 3.5% access employment	Sensitivity – low 5.5% access employment	Sensitivity – high 7.5% access employment
£566 million	£889 million	£1.2 billion

5 Benefits for health & wellbeing

5.1 Introduction

In this section, we consider the potential health and well-being benefits of digital inclusion.

We first consider the impact framework of benefits and develop logic chains that trace the impact of digital inclusion through to key areas of potential health and well-being benefits. We consider the form and scale of the benefits and who they accrue to.

Following this, we consider evidence of the health and well-being benefits of digital inclusion through five case studies:

- Obesity: we examine how online access to information on obesity and healthy living has the potential to reduce obesity prevalence and deliver benefits to health service providers and users;

- NHS Choices: we consider evidence on how online access to health information has the potential to reduce demand for GP consultations and bring about cost savings to health service providers;

- Computerised Cognitive Behaviour Therapy (CBT): we examine online mental health tools and the potential quality of life benefits they deliver to patients; and

- Expert Patient Programme online (EPP): we consider the evidence on the benefits of the expert patient programme and consider the scale of benefits to online users.

- Pandemic management: we consider how access to online information may be used to manage and control large scale health concerns such as swine flu and, how internet access makes society more resilient to pandemics.

For each of the case studies, we estimate the potential benefits of greater digital inclusion of those currently digitally excluded. There are a range of tangible and intangible benefits that may result from digital inclusion; the focus of our analysis is on quantifying the tangibles benefits.

5.2 Impact framework – logic chains

Health and well-being are fundamental parts of life and the growing digital dimension of healthcare has the potential to deliver a wide range of benefits to health service providers and users alike.

In this section, we consider:

- the pathway from digital inclusion to realising health and well-being benefits;

- the scale and form of the benefits and who the benefits accrue to; and

- how the benefits differ amongst three different groups of the digitally excluded: the elderly, the unemployed and families with young children.

The pathway from digital inclusion to health and well being benefits

In establishing the pathway from digital inclusion to realising the benefits of digital inclusion, we have identified three key activities undertaken by digitally included people that have the potential to lead to health and well-being benefits. These key activities are accessing:

- health and well-being information: digitally included people can readily access information on a wide range of health conditions and treatments through websites such as NHS Choices that offers information on over 750 health conditions and treatment.

- online health service information: digitally included people can go online to find, compare and book appointments with health service providers.

- treatment remotely: digitally included people can remotely access treatment such as order prescriptions online or receive treatment through computerised programmes such as Computerised Cognitive Behaviour Therapy.

The relationship between these activities is complex and, in many ways, unique for each individual. For example, an individual with a health concern may go online to access information on health conditions and symptoms. Alternatively, another individual with a health concern may go online to simply book a GP consultation before accessing any health information. The activity that an individual undertakes depends on a range of factors including their health condition and personal preference.

To understand how the three activities lead to health and well-being benefits and to identify the full range of benefits that may be derived from digital inclusion, we have developed the logic chain over leaf.

Figure 8: Impact of digital inclusion on health & wellbeing

Input	Activity	Output	Outcome	Impact

Input: Digital inclusion

Activity (row 1): Access to health information

Output (row 1):
- Increase in healthy literacy levels and health awareness
- Increase in user access to the right information at the correct time
- Access to personal medical history

Outcome (row 1):
- More effective decision making about when to access health services
- Greater efficiency of GP consultations
- Increase in users' involvement in screening programmes
- Increase on users' involvement in vaccine programmes
- Users access the appropriate level of care
- Appropriateness of time spent at GP's increased
- Reduced attendance at accident and emergency
- Early detection of illness
- Avoided illness

Impact (row 1):
- Avoided health service costs to providers
- Avoided health service costs to user
- Improved health and quality of life

Activity (row 2): Access to health service information

Output (row 2):
- User has greater choice in health services
- Ability to find health service providers increased
- Ability to make an informed selection of provider on the basis of preferred criteria increased
- Ability to manage and reschedule services increased
- Ability to access health services faster
- Users' ability to personalise their health service increased

Outcome (row 2):
- Did not attend rates decreased
- User control in the decisions about their care increased
- Better utilisation of health services

Impact (row 2):
- Increased productivity and efficiency of health services
- Avoided health service costs to providers
- Avoided costs to user
- Personal Satisfaction

Activity (row 3): Access to health services

Output (row 3):
- Users accessing care in the appropriate/preferred setting increased
- Users' ability to manage their long-term conditions in the community increased
- Reduced demand for GP consultations

Outcome (row 3):
- Increase in users accessing care from home
- Reduced demand for hospital beds
- Reduced user cost in accessing health services
- Greater efficiency of GP consultations

Impact (row 3):
- Improved quality of life
- Reduced transaction costs for health services user
- Avoided cost and more efficient use of health services
- Reduced transaction cost for health service provider

Legend:
- Benefits that accrue to health service providers
- Benefits that accrue to health service users

The logic chain traces the intervention of digital inclusion through to impact. The pathways from digital inclusion to health and well being benefits can be considered based on three activities outlined above: accessing health and well being information, accessing health service information and accessing treatment remotely. For each activity, the logic chain displays the potential, outputs, outcomes and finally, the potential impacts or benefits of digital inclusion.

There is not a single clear path from digital inclusion to benefits. As such, arrows have deliberately been left off the logic chain to illustrate that there are a number of possible pathways by which the benefits of digital inclusion may be realised.

The scale and form of health and well-being benefits

The scale and form of the health and well-being benefits from digital inclusion are largely determined by who receives the benefits.

Most of the monetary health and well-being benefits that result from digital inclusion accrue to health service providers through avoided costs and greater efficiency. The avoided costs manifest in several different ways including:

- reduced transaction costs generated by people that remotely access health information and services;

- reduced attendance at GP consultations, outpatients and accident and emergency: people that access health information will have greater health literacy levels that in turn, will allow them to make more appropriate and informed choices about when and how to access health services; and

- a more efficient and effective health service due to a reduction in 'did not attend' rates and reduced demand for face-to-face engagement with health care service.

The potential health and well-being benefits that result form digital inclusion and accrue to health service providers include:

- personal satisfaction: digitally inclusion gives people greater choice in health service provider and more control in their health management;

- improved quality of life: people suffering from illness can access treatment in their preferred environment; and

- avoided illness and health costs: digital inclusion increases health literacy and awareness that in turn, may lead to avoided illness or early detection of illness.

Health and well-being benefits for different groups of the digitally excluded

Unlike employment, skills and education, the potential pathways to health and well-being benefits are similar for all segments of the digitally excluded even if the scale of the impact can be expected to differ. The elderly, unemployed and families with children are capable of experiencing the full range of health and well-being benefits.

The key determinant of the pathway that an individual takes to realise the benefits and, the quantum of benefits that accrue is the health status of the individual. It is logical to expect that the poorer the health status of an individual, the higher the demand for health services and therefore, the greater the potential benefits of digital inclusion.

As such, we consider the health status of different groups of digitally excluded:

- the socially excluded: social exclusion has a major impact on the health status of individuals. Poor social and economic circumstances affect health throughout life leading to greater risk of premature death[110]:

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[110] Social determinants of health: the solid facts, World Health Organization, 2003

- the elderly: by virtue of age, the elderly are at greater risk of illness and have a higher demand for health services;

- the unemployed: job security increases health and well-being. Evidence suggests that unemployed people and their families are at greater risk of illness and premature death[110]; and

- families with children: there is no substantial evidence that suggests families with children have below average health status.

The variation in the magnitude of health and well-being benefits is further explored in the case studies below.

5.3 Evidence

We have gathered evidence on the health and well-being benefits of digital inclusion focusing on five case studies. The case studies illustrate the potential benefits of digital inclusion and consider the form of benefits, who the benefits accrue too and the magnitude of benefits. We have also considered the nature of the benefits that accrue to different segments of the population of digitally excluded.

A range of case studies have been selected to illustrate the different type of potential benefits that can be delivered through the previously mentioned activities that provide people with greater access to:

- health and well-being information: we consider evidence on the potential benefits of accessing information on health and obesity;

- health service information: we consider the benefits of online NHS Direct; and

- remote treatment: we consider evidence on the potential benefits of the Expert Patient Programme online and computerised Cognitive Behaviour Therapy.

We also consider how digital inclusion may contribute to social resilience: we examine evidence on how digital inclusion contributes to social resilience and the effective management and control of pandemics.

Access to health and well-being information

Digital inclusion allows people to access to an enormous amount of information on health covering a wide-range of health conditions, possible treatments and well-being topics. Health is an information intensive sector and studies suggest that approximately one fifth of internet users search online for health information. The use of the internet for seeking health related information is highest varies for different age groups and is lowest for ages 16-24 (31%) and highest for people aged 45-54 (47%).[111] The use of the internet for seeking health related information among the elderly is 38%.

Greater access to timely and convenient health information has the potential to increase society's health literacy and health awareness. This, in turn, may lead to more informed decision making about whether and, if so, how and when to access health services as well as promoting greater involvement in health prevention initiatives such as vaccine and screening programmes.

Below, we consider the potential benefits of access to a range of health information on the NHS Choices website and then look specifically at the potential benefits of access to obesity information.

Case study: NHS Choices

NHS Choices is the leading provider of online health information and is the digital gateway and public front door to the NHS. NHS Choices provides online access to information on over 750 conditions and treatments as well as a wide-range of healthy lifestyle advice.[112]

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[111] Office for National Statistics (ONS) (2009) Statistical Bulletin *'Internet Access Households and Individuals'*, http://www.statistics.gov.uk/pdfdir/iahi0809.pdf

[112] NHS Choices Annual Report 2009

One of the key benefits of providing online health information is that it increases health literacy and health awareness levels. This in turn, allows people to make more informed decisions about the appropriate level of health services to access and the appropriate time to access health services. In this case study, we estimate the potential reduction in GP consultations and avoided costs that may result from increased health literacy and health awareness.

In estimating the potential benefits of online health information, we have considered the following evidence:

- according to a study by Freshminds, 18% of internet users with a health concern search online for symptoms and only escalate if needed[100];
- according to the eUSER[117], survey, approximately 23.2% of people in the UK that search online for health information decide to treat themselves rather then consult a GP; and
- the average costs of a GP consultation is £36 and 11.7 minutes per consultation;
- the average number of GP consultations per year is different for families and children (4), the unemployed (6) and the elderly (7).

Drawing on the above evidence and assumptions, we have estimated the potential benefits associated with avoided GP consultations displayed in the table below.

Table 9: Potential benefits of NHS Choices

	Socially and digitally excluded			Digitally excluded
	Families with children	**Unemployed**	**Elderly**	
Population size	760,000	0.36 million	1.56 million	10.2 million
Average number of health concerns a year[113]	4	6	7	4
Avoided cost of GP consultations	£5.7 million	£3.2 million	£16.4 million	£61 million

It is important to note that the analysis uses the average number of GP consultations as a proxy for the number of times someone has a health concern. The average number of times someone has a GP consultation is based on the entire digitally included and digitally excluded population. It is, therefore, likely to be a conservative assumption and the number of times someone has a health concern is likely to be larger. Hence, the benefits may also be larger.

Case study: Potential benefits of accessing online obesity information

Obesity is the leading cause of death in England and the cost of obesity to the NHS is expected to reach £6.3 billion by 2015[114]. As such, a decline in the prevalence of obesity has the potential to generate large cost savings for the NHS as well as improved quality of life benefits for individuals.

In this case study we consider how greater digital inclusion may increase health literacy and awareness levels of obesity and, in turn, reduce the prevalence of obesity amongst the digitally excluded. We have examined the extent to which obese people access online information and how effective this information is in bringing about a significant lifestyle change that reduces obesity. In doing this, we have drawn on the following evidence and assumptions:

- approximately 24% of the UK population is obese[115] which implies that approximately 2.4 million digitally excluded people are obese and 1 million digitally and socially excluded people are obese;
- the estimated annual cost of obesity in 1998 was 18 million sick days, 30,000 deaths a year and 40,000 lost years of working life[116]: based on this evidence, we estimate that, on average, obesity costs each person approximately 2 sick days per year, 0.003 deaths a year and 0.004 lost years of working life;
- the total cost to the NHS of treating obesity in 2007 was approximately £2.3 billion which is equivalent to £156 per person;
- the average number of years by which deaths linked to obesity shorten life is 9 years;
- approximately 18 % of internet users access health information online; and

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[113] Based on average number of GP consultations: http:www.statistics.gov.uk/downloads/theme compendia/GHS06/GHS06chapter7-Health.xls
[114] http://www.healthcarerepublic.com/news/934442/Cost-obesity-NHS-England-rise-62-billion/
[115] Overweight and obesity: the public health problem
[116] Tackling obesity in England, National Audit Office, 2001

- approximately 19.2% of people that access health information online make a significant lifestyle change as a result of the information they receive[117].

Based on this evidence, we estimate the potential benefits of access to online obesity information.

Table 10: Estimated benefits of online access to information about obesity

	Digitally excluded	Digitally and socially excluded
Reduced number of obese people	141,000	33,000
Reduced treatment costs to the NHS	£22 million	£5 million
Reduced number of sick days per year for illnesses attributable to obesity	269,000	63,000
Reduced cost of sick days per year[118]	£8.4 million	£2 million
Reduced number of early deaths attributable to obesity	449	106
Reduced number of lost years of working life	599	141
Reduced cost of lost years of working life[119]	£4.2 million	£1 million

Source: PwC analysis

It is important to note that our analysis assumes that the prevalence of obesity in the two populations is the same as the national average. Qualitative evidence, however, suggests that there is a strong correlation between obesity and socio-economic status, and that obesity is most prevalent amongst people aged between 65 and 74. Therefore, it is likely that the potential benefit to the two populations is higher then estimated.

Enabling people to access health service information:

Digital inclusion provides greater access to a wide-range of information on health services including: the location of health service providers, the ability to compare and review health service providers and the ability to book and reschedule appointments. This, in turn, allows users to make more informed and better decisions about their health care against their own set of criteria. Users experience a more personalised service, greater control of their health, improved personal satisfaction and are more likely to attend appointments.

Evidence on 'Choose and Book', a programme whereby users can select, book and reschedule referral appointments, suggests that when users are able to exercise choice over their health care, there is a significant reduction in 'did not attend' rates[120]. Fewer missed appointments has the potential to lead to significant cost savings for health service providers and improve the efficiency and effectiveness of the health sector.

There are many health initiatives that offer information on health service providers. One such initiative, NHS Direct Online, was developed in 1998 to provide users with access to information on healthcare service providers to enable them to make better choices about health care services. A study by the European Commission in 2006 estimated the net benefits of NHS Direct Online to be in excess of 100 million euro in the year 2008. The study also found that 87% of the benefits accrued to the NHS through avoided costs and 13% accrued to health service users.

It is clear from this example that a large proportion of the potential benefits of enabling people to access information on health service are associated with channel shift savings. As users increasingly access health information on the internet rather then via the phone or face-to-face engagement, there is growing potential for substantial transactional savings. We consider the potential transactional benefits in Section 7 on transformation government.

It is important to note that allowing users to access health service information establishes a two-way flow of information. Initiatives such as Choose and Book, NHS Choices and NHS Direct allow users to

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[117] eUSER survey http://www.euser-eu.org/

[118] Calculated assuming that the average digitally excluded employee earns the minimum wage of £5.80 per hour

[119] Calculated assuming that the average digitally excluded employee earns the minimum wage of £5.80 per hour and works 38 hours a week and 225 days a year

[120] http://www.chooseandbook.nhs.uk/staff/commsmaterials/case-studies/donc-dnas.pdf

share their own experience and knowledge, review health services and express preferences for health services through making online appointments.

Delivering treatment remotely

Digital inclusion will allow people to access certain health treatment and services remotely via the internet. Remote access to healthcare allows users to access care in their preferred settings and the most appropriate setting.

In the case studies below, we consider how the remote delivery of Cognitive Based Therapy (CBT) and the Expert Patient Programme may lead to benefits.

Case study: Remote treatment for depression and anxiety - Computerised Cognitive Based Therapy

Cognitive Based Therapy is used in the management and treatment of depression. Computerised CBT is a self-help option which is delivered over the internet or via the telephone using voice response systems.

The prevalence of depression ranges between 29 and 42 cases per 1,000 people and it is projected that by 2026 over 1.45 million people will have depression[121]. Depression is associated with poor quality of life, occupational disadvantage, impairment in interpersonal and family relationships and suicide[122].

In this case study, we consider the potential benefits of extending the use of an online CBT programme used to treat mild to moderate depression and anxiety. Our analysis considers the benefits of an online CBT programme, 'Beating the Blues' that consists of a 15-minute introductory video and eight 1-hour interactive weekly computer sessions.

The NHS National Institute for Health and Clinical Excellence completed a review on Computerised cognitive behaviour therapy for depression and anxiety in September 2008. The review compared *Beating the Blues* with 'treatment as usual' and found that:

- 'Beating the Blues' improved depression compared with normal treatment and patients that received 'Beating the Blues' were more satisfied with the treatment;
- the total average service costs including lost employment were less for *Beating the Blues* (£533) compared for treatment as usual (£900);
- the average number of depression free days was 89.7 for *Beating the Blues* compared with 61 for treatment as usual; and
- the utility of depression days and depression free days is 0.59 and 1.0 respectively: based on this, the cost per quality adjusted life year gained by *Beating the Blues* treatment is £1,250 per person. This means that the disease burden is lower for *Beating the Blues* treatment compared to treatment as usual.

In order to estimate the potential benefits of accessing computerised CBT, we have estimated the number of digitally excluded people who, if digitally included, would access computerised CBT. We draw on the following evidence:

- the prevalence of depression is between 29 and 42 cases per thousand people;
- *Beating the Blues* is a treatment for mild to moderate depression;
- approximately 76.8% of people in contact with services have moderate or server depression;
- a large proportion of people with depression go undiagnosed; and
- 2.5% of people who suffer from moderate to severe depression are treated with computerised CBT.

Based on this evidence, we assume that the prevalence of depression for digitally and socially excluded people is 36 cases per 1000 people[123] and, beating the blues is an appropriate treatment for 30 percent of the people in the digitally excluded who suffer from depression.

Drawing on these assumptions, we estimate that the potential benefits of digitally inclusion are:

- a reduction in the cost of treating depression including lost employment costs to the value of £15.6million per annum;
- 1.2 million fewer depressed days; and
- a reduction in the cost per quality adjusted life years of £53 million.

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[121] Paying the Price, The cost of mental health to England in 2016, King's Fund, 2008

[122] Computerised cognitive behaviour therapy for depression and anxiety, NHS National Institute for Health and Clinical Excellence, reviewed September 2008

[123] The range in prevalence for obesity is between 29 and 42 cases per 100 people, 36 is the average of the upper and lower ranges

Our analysis is based on assuming that the prevalence of depression amongst the digitally excluded is the same as the prevalence of depression in the total UK population. However, evidence suggests that unemployment and social exclusion are common characteristics of depressed people.

Case study: Expert Patient Programme Online

The Expert Patient Programme (EPP) online is a self management programme for people who suffer from long term conditions. The programme provides information on a range of health related topics including healthy eating, dealing with pain and extreme tiredness, relaxation techniques and coping with feelings of depression. EPP online is delivered by trained and accredited tutors who are also living with long term health conditions and aims to give people the confidence to take more responsibility and self-manage their health.

Approximately 33% of the English population suffer from one or more long-term health conditions and 68% of the NHS budget is spent on caring for people with long-term conditions. [124]

The 2007 Oxford Internet Survey indicates that people with a long term conditions are half as likely to use the internet as those without (36% compared to 77%).

A recent evaluation by the Department of Health and Stanford University of the effectiveness of EPP online found that patients that participated in EPP online had fewer visits to the GP, lower attendance at accident and emergency and fewer hospital admissions. The study estimated that the decline in health service use was to the value of £272 per person over the one-year study period. Participants in EPP online also had an improvement in five of the seven health status measures, three of the four health behaviours and three of the five utilisation measures. It is clear from this study that EPP online has the potential to deliver both cost saving benefits to the NHS and improved quality of life for patients.

In this case study we draw on these findings to estimate the avoided cost associated with the uptake of EPP online.

In order to understand the potential benefits that EPP online may deliver to our digitally excluded populations, we must first examine the relationship between EPP delivered face-to-face and EPP online, as well as consider how many digitally excluded people suffer from long term conditions.

The relationship between the use of EPP delivered through face-to-face engagement and EPP online is complex. Some of the potential benefits of EPP online may already be accessed through EPP face-to-face engagement. In such cases, the additional benefit gained by digital inclusion is the transaction cost savings associated with switching from face-to-face engagement to online engagement. In most cases, we expect that people who access EPP online would not otherwise access EPP through face-to-face engagement. This is consistent with the rationale for EPP online which is to make EPP available to people who either cannot or will not attend small group sessions[125].

To estimate the potential benefits of EPP online that may result from digital inclusion we need to estimate the number of digitally excluded people that suffer from a long term condition. We consider the relationship between the digitally excluded and long-term conditions:

- 14% of people in the UK suffer from a limiting long-term illness: based on this, we estimate that 109,000 people from digitally and socially excluded families suffer from long-term conditions;
- 43% of the retired population suffer from a limiting long term illness: based on this, we estimate that 678,000 elderly people who are digitally and socially excluded suffer from long-term conditions;
- 16% of unemployed people suffer from a limiting long term illness: based on this, we estimate that 57,000 unemployed people who are digitally and socially excluded suffer from long-term conditions.

Drawing on these assumptions, if 30% of the digitally excluded who suffer from long-term conditions participate in EPP online, we estimate that the potential benefits include avoided costs to health service providers of approximately:

- £4.6 million for unemployed people;
- £8.9 million for people from children with families; and
- £55 million for elderly people;

It is important to note that our analysis is based on the number of people with *limiting* long term conditions. EPP online is available for long-term illnesses in general and hence we may have underestimated the proportion of

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[124] The expert patients programme online, a 1-year study of an Internet-based slef-management programme for people with long-term conditions Lorig *et al* 2008

[125] The Expert Patients Programme online, a 1-year study of an Internet-based self-management programme for people with long-term conditions

people that will participate in EPP online.

Furthermore, in the absence of data, we assume that 30% of the digitally excluded who suffer from long-term conditions participate in EPP online. If the participation in EPP online is higher or lower, the potential benefits will be affected accordingly.

Social resilience

Beyond the direct health and well-being benefits considered above, digital inclusion has the potential to deliver wider, catalytic benefits through increasing the resilience of society and the economy to shocks such as influenza pandemics. Digital inclusion enables people to work from home, shop on-line, communicate with family and friends and access a range of information without the need for face-to-face engagement. By reducing the need for travel and face-to-face engagement, digital inclusion could limit the spread of a pandemic and create 'social distance'.

In times of pandemic the internet can also be used by the government to communicate with the public in a fast, effective and timely way.

Case study: Potential benefits from pandemic management[126]

A recent study commissioned by the Broadband stakeholder group considered how broadband may contribute to the effective management of pandemics[126]. In this case study we draw on this analysis to consider the how digital inclusion may contribute to the effect management of pandemics.

There ways in which greater digital inclusion may facilitate improved pandemic control include:

- reduced need for business people to travel to pandemic-affected countries and therefore, delay the arrival of the pandemic in the UK: meetings can take place via online video-communication;
- greater feasibility and acceptance of closing educational facilities: students could continue to be taught in virtual classrooms.
- greater acceptance of closing workplaces: the internet provides scope to work effectively from home;
- greater feasibility and acceptance of instituting a wide range of social distancing measures (for example, reducing the number of public gatherings, cinema and church attendance): the internet offers viable online alternatives.
- citizens can access online pandemic health information online on preventative measures, symptoms, treatment and what to do if you suspect you are infected;
- the potential for virtual home visits by general practitioners: this would help GPs to determine the need for hospitalisation, given that UK hospitals and reduce the risks of disease spread within primary care settings; and
- the increased capacity for home monitoring may allow for early discharge from hospital.

The potential benefits of digital inclusion include less disruption arising from a pandemic, mitigation of the spread of the disease and a fewer mortalities. Here, we draw on the following evidence and assumptions to consider the potential for digital inclusion to reduce the mortality of pandemics:

- the value of a reduction of a transport death is approximately £1 million per death avoided;
- a major influenza pandemic might produce mortality of around 0.6 per cent; and
- pandemics have a frequency of 2-3 per century: based on this, it is estimated that for a population of 65 million the expected annual cost of mortality is £3.9 billion per annum allowing for the probability of a pandemic.

If the mortality rate of pandemics could be reduced by 5% through greater digital inclusion, the potential benefit in terms of deaths avoided would therefore be:

- approximately 76 saved lives and £76.5 million per annum if all digitally excluded people were online; and
- approximately 30 saved lives £30 million per annum if all digitally and socially excluded people were online.

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[126] A framework for evaluating the value of the next generation of broadband, Plum Consulting, June 2008

6 Benefits from transformational government

6.1 Introduction

The previous sections have shown how enhanced digital inclusion has the potential to deliver important benefits to those individuals and families. This section examines how government can also benefit in terms of the reduced costs of providing services to the digitally included, whether that be the provision of information or transaction facilities.

In this section, therefore, we explore how these benefits might accrue to both government and the digitally excluded. We focus on how bringing the digitally excluded community into the digital fold will allow them to fully exploit the advances that have been made in service transformation across the public sector. We use a series of case studies to indicate the potential scale of the value of these benefits.

6.2 Impact framework – logic chains

We expect service transformation in government to deliver potential benefits to both government and to the digitally excluded individual. The mechanisms by these potential benefits might arise are reflected in the two logic chains below: Figure 9 shows how the potential benefits might accrue to the citizen and Figure 10 refers to the potential benefits to government.

Figure 9: Potential service transformation benefits of digital inclusion for the citizen
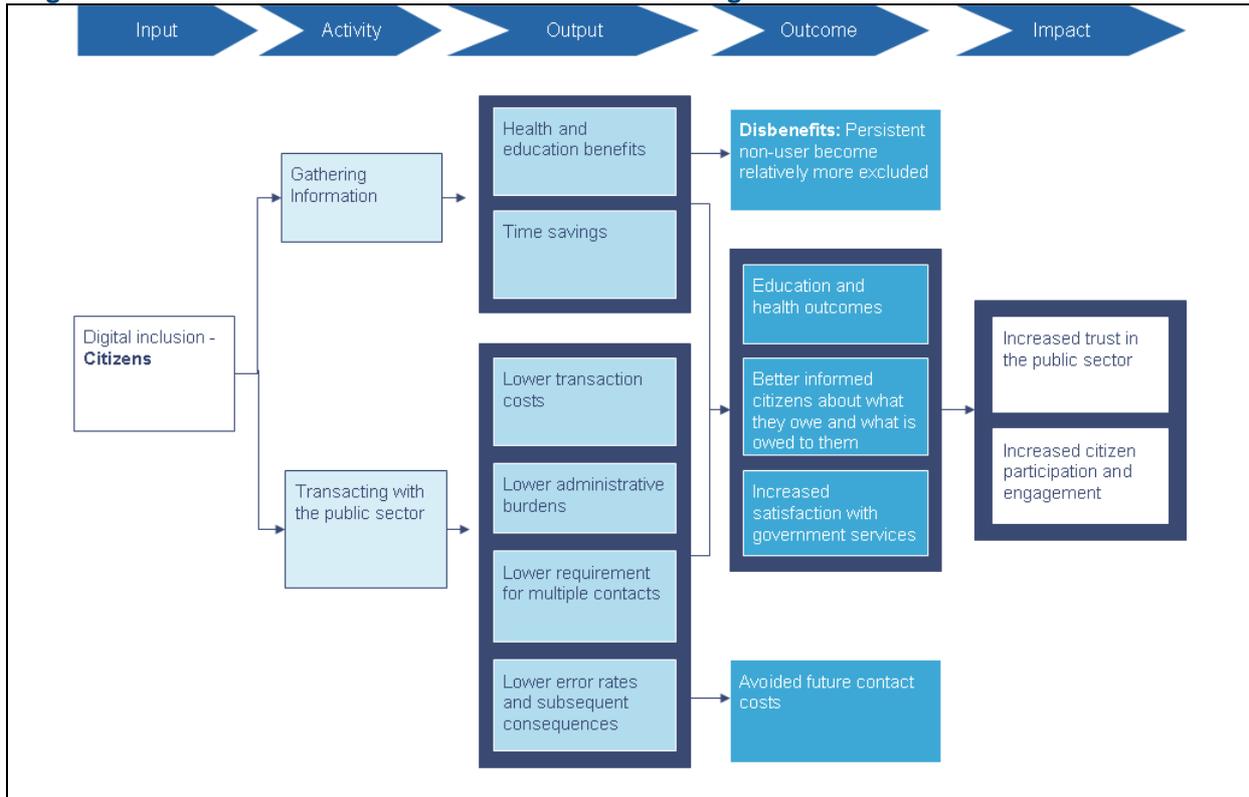

Figure 10: Potential service transformation benefits of digital inclusion for the public sector
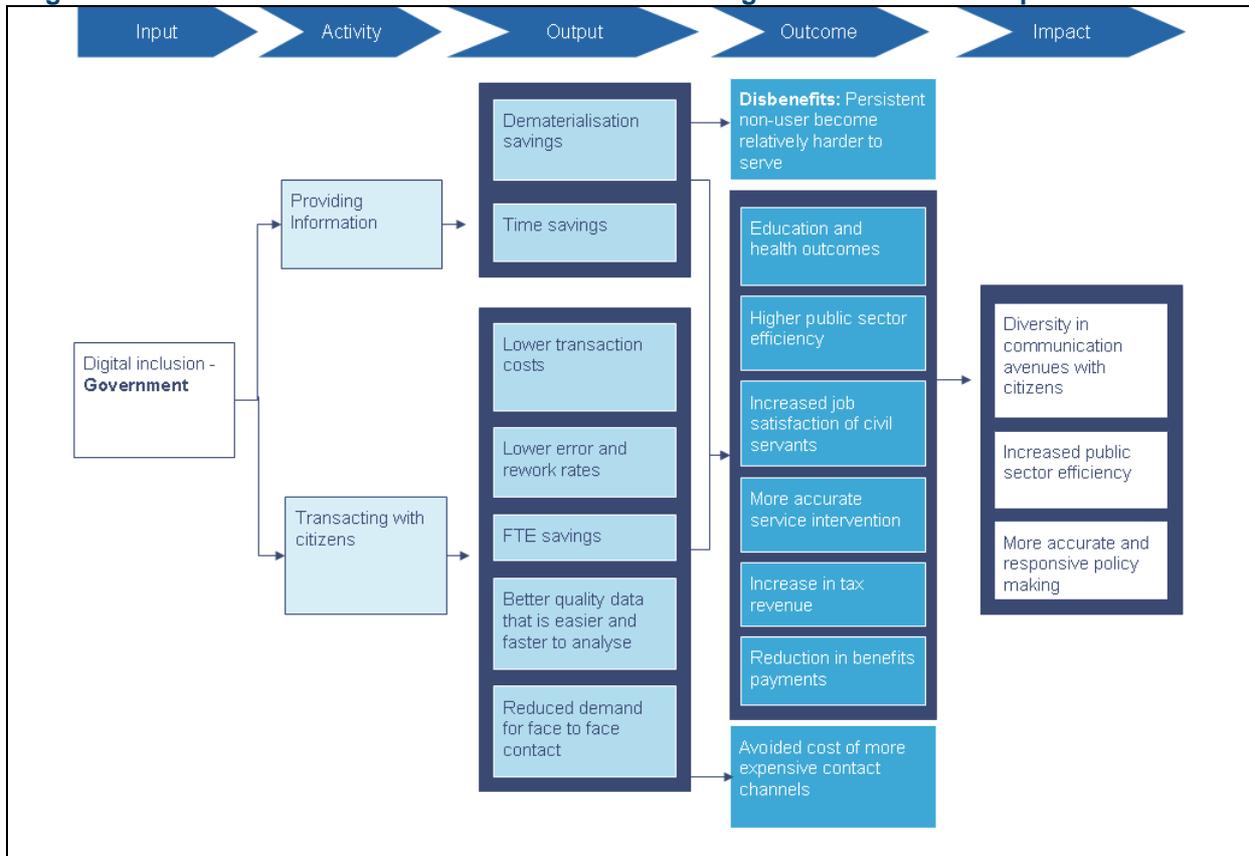
The benefits from service transformation can also be broadly grouped under the headings of financial and non-financial benefits (see Table 11).[127] The ease with which the benefits can be assessed varies. In principle, the costs to the public sector of printing (dematerialisation savings) ought to be more readily identifiable. Quantification of the non-financial benefits, which are time based and value based, are more difficult because the necessary data are not always captured and impacts are often indirect.

Table 11: Categories of service transformation benefits

Form of benefit		Beneficiary	
		Public service provider	**Citizen**
Financial		• Reduced demand for service (and time cost of delivery) • Scope for economies of scale	• Reduced cost of transmitting information
Non-financial	Time based	• Reduced processing time through common standards • Reduced need for handling multiple submissions • Reduced error rates • Scope for more flexible working	• Reduced need for multiple submissions •

	Value based	• Information benefits (double count)
		  – More accurate data
		  – Scope for information sharing
			• Quicker responses
			• Improved information
			• Improved choice/convenience
			• Improved service: choice, functionality, personalisation, integration
			• Democratic engagement

Citizen benefits

The nature of the benefits to digitally excluded citizens depends on whether the contact with government is of an informational or transactional nature. Some of the key potential benefit to citizens from the provision of value added public services have already been captured in the previous sections covering education, skills and employment and health and wellbeing. There will also be other potential benefits, mainly in the form of time and transaction cost savings.

In the long term, digital inclusion will result in better informed and more satisfied citizens. This has the potential to produce knock on effects on citizen participation and democratic engagement. The logic chain, however, also highlights the risks that might arise if those that remain digitally excluded for whatever reason become relatively more excluded.

Value and time based benefits are a significant feature of the landscape of citizen benefits. As stated earlier, however, we have captured some of the potential benefits in education and skills and the health sections.

Public sector benefits

A significant part of the potential benefits from service transformation would be expected to accrue in the first instance to the public sector in the form of efficiency savings. By definition, the digitally excluded will be harder to reach by virtue of the reduced contact channels through which they can be reached. Harder to reach often means more costly so being able to reach this group in a cost effective way has obvious benefits for the public sector.

We note that a number of the outputs and outcomes, such as more accurate service delivery, are difficult to quantify but are important nonetheless. Also, as with citizen benefits, there are also some potential risks if any people who remain digitally excluded become relatively harder and, therefore, more expensive to reach. This highlights the importance of the challenge for the public sector in

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[127] Office of Government Commerce, HMT, ' Measuring the expected benefits of e-Government', 2003 www.ogc.gov.uk/documents/HMTGuidelinesVersion1_4.pdf

optimising its channel strategy.

6.3 Evidence

From the perspective of public service transformation, digital inclusion is primarily an issue of channel strategy and migration. Despite the attention being given to the topic, there is only limited evidence in the public domain which provides an insight into the likely benefits of bringing (more of) the digitally and socially excluded population online.

We have, therefore, developed a high level approach to gauge the likely scale of the benefits. It is based around two key pieces of information:

- the costs to public service providers of using different channels for contacts and transactions; and

- the volume of transactions that would be switched between different channels.

We have supplemented this high level approach with a small number of individual case studies that describe how the benefits can and are being delivered on the ground.

Table 12**Error! Reference source not found.** shows the average costs of a contact/transaction for different channels based on evidence from 19 local authorities.[128] It highlights the potential efficiencies that can be derived from switching contacts and transactions to online channels.

Table 12: Average costs of transactions in different channels

	Face to Face	Telephone	Post	Online
Cost per transaction	£10.53	£3.39	£12.10	£0.08

We have been unable to find any reliable data which provide an indication of the number of contacts and transactions in relation to the spectrum of public services which could be delivered at least in part online. Some indication of the potential scope of the services and the number of customers they affect can be seen from Table 13 and Table 14.

Table 13 indicates the different services provided by different types of local authority to citizens. Aspects of the delivery of many of these services are amenable to online delivery.

Table 13: Key local government services

Services	Unitary Councils [129]	Shire District Councils	County Councils
Children's services (school admissions, free school meals, youth services, teenage pregnancy, looked after children and SEN)	▲		▲
Highways (condition of roads, street lighting)	▲		▲
Housing (benefit claims, council tax benefit, repairs, lettings process for social housing)	▲	▲	
Environmental health services (licensing, food safety, pollution and pest control)	▲	▲	
Waste collection and street cleaning	▲	▲	
Payment of council tax and national non-domestic rates	▲	▲	
Planning services (local planning issues and applications for household enforcement activities)	▲	▲	
Building control	▲	▲	
Trading standards	▲		▲
Adult social services (care packages, dial-a-ride, home helps, meals on wheels)	▲		▲

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[128] McNish J. 'Customer Contact Profiling Report – ESD Toolkit', Aston Campbell Associates 2008
www.**esd**.org.uk/**esdtoolkit**/Documents.ashx?doc=61149&agency
[129] Metropolitan Borough Councils, London Borough Councils and City of London

Services	Unitary Councils[129]	Shire District Councils	County Councils
Parking permits and parking control notices	▲	▲	
Invoice processing and payments (debtor and creditor)	▲	▲	▲
Change of address	▲	▲	▲

Source: PwC analysis

Table 14 provides an illustration of the range of services provided to citizens by central government along with an indication of the number of customers for each service.

Table 14: Number of customers and transactions for a number of central government department and agency services

Department	Service	Type of service	Number of customers/ transactions
Department for Work& Pensions (DWP)[130]	Benefits and Pensions	DWP is the biggest public service delivery department in the UK leading on welfare and pension issues	Over 20 million customers
Jobcentre Plus (Directorate of DWP)	Working age benefits, including Job Seekers Allowance, Employment and Support Allowance, Carer Allowance, Bereavement Benefit etc.	DWP provides benefits to diverse groups including those out of work, carers and the bereaved	5.8 million working age benefits claimants, including 2.6 million Employment Support Allowance customer and 1.4 million Job Seekers Allowance customers.
The Pension, Disability & Carers' Service (Directorate of DWP)	Pension Credit	There are two different types of Pension Credit: • Guarantee Credit is for those aged 60 or over • Savings Credit is for those aged 65 or over.	2.7 million (3.3 million including couples) of which 1.2 million receive both the Guarantee and Saving Credits, 0.9 million receive the Guarantee Credit only and 0.6 million the Savings Credit only
	Disability Living Allowance	Introduced on 1st April 1992 this is a benefit for people who have become disabled before the age of 65 and who need assistance with personal care or mobility	3 million recipients of DLA (not including suspended cases)
	State pension	Paid to people who have reached the state pension age and fulfil the residency and contributions conditions.	12.2 million recipients of which 38% are male and 62% are female
Child Support Agency[131] (CSA)	Child Maintenance	The CSA is responsible for tracing non-resident parents, working out how much maintenance they should pay, and collecting and enforcing payments.	There were 1.26 million cases at the end of June 2009.
HM Revenue &	Tax and tax	HMRC is the UK tax authority collecting taxes	There are an estimated

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[130] 'First release – DWP quarterly statistical summary' August 2009

[131] 'First release – Child Support Agency quarterly summary of statistics', July 2009
http://www.childmaintenance.org/pdf/CSA_First_Release_Jun2009.pdf

Department	Service	Type of service	Number of customers/ transactions
Customs (HMRC)[132]	credits	worth £435.7 billion and paying out tax credits of over £35 billion[133]	29.3 million taxpayers in the UK
	Child Benefit	A tax-free payment for children and paid every four weeks and, in some cases, weekly	7.5 million families with 13.3 million children
	Tax credits	Payments to support families with children and workers on low wages	6.1 million families with 10.1 million children
	Working Tax Credit (WTC)	Tops up the earnings of families on low or moderate incomes depending on how many hours worked	0.5 million customer receive WTC only
	Child Tax Credit (CTC)	Provides support to families for children and 'qualifying' young people. It is paid in addition to Child Benefit.	5.7 million families receive CTC, of which 1.8 million are claiming both WTC and CTC.
Department for Children Schools and Families (DCSF)[134]	Education Maintenance Allowance (EMA)	Weekly allowance to supports learners from low income households to continue in learning	0.54 million learners in England benefit from EMA
Driver Vehicle Licensing Agency (DVLA)[135]	Driver licensing	Licences drivers	109 million transactions in 2008/09 Just over 1 million first applications for drivers' licenses Nearly 1.4 million renewals
	Vehicle licensing	Maintains register of vehicles and collects vehicle excise duty (car tax)	43 million vehicle license transactions 28 million manual transactions 15 million are online
Department of Health (DH)[136]	National Health Service (NHS)	Health services provider	75.9 million outpatient appointments were made: 61.4 million attended by the patient
	Social care	Social care provided to groups such as the elderly and disabled	0.35 million households received home help and home care
Home Office (HO)	Passports	Passport provision to UK citizens	The demand for passports in 2007/8 stood at just over 4.2 million[137]

On the basis of the channel costs in Table 12, we have estimated the potential efficiency savings for the public sector under various scenarios. Specifically, we assume:

- a range of contacts per year between 6 and 24 – DWP contact data alone suggest an average of

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[132] HM Revenue & Customs, National Statistics http://www.hmrc.gov.uk/stats/
[133] HMRC, 'Departmental Report 2009', July 2009 http://www.hmrc.gov.uk/about/dept-ann-rep09.pdf
[134] Learning and Skills Council, 'EMA take-up 2004/5 to 2007/8 (YTD) by Local Authority, LSC Area'
[135] Driver and Vehicle Licensing Agency, 'DVLA Business Plan 2009-10'
[136] The Information Centre for health and social care http://www.ic.nhs.uk/statistics-and-data-collections/hospital-care/accident-and-emergency-hospital-episode-statistics-hes
[137] Home Office, Identity & Passport Service, 'Freedom of Information Request' http://www.ips.gov.uk/cps/files/ips/live/assets/documents/8761_response.pdf

around four contacts per adult[138] while the Varney Report indicates at least 11 contacts with the public sector per person where the individual was required to verify their identity[139]; and

- the proportion of existing offline contacts which are switched online: we consider a range from 40% to 100%, recognising that in some cases, services are not available online yet.

On this basis, Table 15 illustrates the range of potential savings if all the digitally excluded are brought online depending on the average number of citizen contacts/transactions with the public sector and the proportion of transactions which are switched online.

Table 15: Potential savings from online contacts/transactions with government

Number of contacts/transactions per month on average	40% online	60% online	80% online	100% online
Once every two months	£184m	£275m	£367m	£459m
Once a month	£367m	£551m	£735m	£918m
One and a half times a month	£551m	£826m	£1,102m	£1,377m
Twice a month	£735m	£1,102m	£1,469m	£1,837m

There are two points to note about these results:

- no distinction is made between information gathering and transacting: thus, the estimated potential benefit will vary depending on the balance between the two types of transaction; and

- the savings in expenses from shifting channels, such as dematerialisation savings, will be captured in the differences in unit transaction costs.

We have also identified three case studies which illustrate the potential economic benefits of moving more elements of public service delivery online. They cover:

- online free school meals;

- online vehicle tax payment; and

- online booking of health service appointments.

Case study: Online Free School Meals[140]

Over a million children in England alone are registered as eligible for free school meals (FSM) each day, with local authorities responsible for the delivery of the service and the application process. The Online Free School Meal Project, funded by the Department of Children Schools and Families (DCSF) supports local authorities in overcoming barriers to delivering free school meals efficiently and quickly.

Currently, the application based process requires claimants (parents and carer of school age children) to prove their entitlement by taking the completed form to their local job centre where it is stamped to show that they meet the requirement. This paper based approach adds considerable time to the process, delaying the delivery of meals to children and bringing extra work to children and schools. It is even not uncommon for applicants to abandon their claim altogether, resulting in children missing out on their entitlement. By being able to apply online, the burden of proof is shifted away from a one of the most vulnerable sections of society, the application journey time is reduced and the need for multiple contacts (reapplying for example) is also reduced.

DCSF have developed a Hub, launched in March 2008, which provides online services for local authority employees to check claimants' eligibility against central government data held by Department for Work and

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[138] National Audit Office, 'Department for Work and Pensions, Communicating with Customers', 2009 http://www.nao.org.uk/publications/0809/communicating_with_customers.aspx

[139] Varney, D, 'Service Transformation: A better service for citizens and businesses, a better deal for the taxpayer', 2006, page 16 http://www.hm-treasury.gov.uk/d/pbr06_varney_review.pdf

[140] Local Government Delivery Council, 'Front Office Shared Services, Case Study – Online Free School Meal' 2009 www.idea.gov.uk/idk/aio/10011029

Pensions, HM Revenue and Customs and the Home Office. This facilitates the burden of proof transfer as well as supporting a paperless back office solution. In Bournemouth, 95% of applications are now established as eligible on the day of receipt, improving the service for parents and minimising the delay of free meals to children. The hub has also halved the workload for council employees, providing efficiency savings and allowing better use of staff resources.

Data from Tameside Metropolitan Borough Council suggest that the processing cost of traditional FSM applications is around £9 per application, compared to the 6p end-to-end processing cost for the online self service facility. Using this data and assuming that the 760,000 families with of children in our digitally and socially excluded group are currently subject to the traditional FSM application process (i.e. face to face), we estimate a benefit of digital inclusion could be as high as £7m.

Case study: Online Vehicle Tax Payment, DVLA[141]

In October 2006 the Government launched an electronic tax renewal system that allowed drivers of the estimated 33 million active vehicles in the UK to purchase their tax discs either online or over the phone. The DVLA Annual Accounts for 2007-08 show that 13m customers relicensed or completed a Statutory Off Road Notification transaction online, roughly 30% of total vehicle licensing transactions.

The Annual Accounts also show a reduction in unit costs of dealing with Vehicle Excise Duty (VED) and an increase in transaction volumes, with unit costs falling by approximately 15% (per £100 of Vehicle Excise Duty collected) between 2006, when the electronic system was introduced, and the forecast 2009-10 value. It is difficult to account for the individual contribution of online facilities in these savings, but the DVLA do note that efficiency has been 'significantly assisted by the introduction of e-services and managed channel shift from the old manual paper based system[142]'.

There are also significant benefits to users of the electronic system. Using the system means that customers are not required to produce paper copies of their MOTs or insurance, reducing the administrative burden of complying. As an electronic system it can be accessed 24 hours a day, 7 days a week, which has clear convenience benefits over face-to-face car tax renewal in particular. Online and telephone transactions can also be made in an average of 4 minutes, and while there is no available data on transaction times using face-to-face channels, is likely to represent a time saving to users over that channel.

Given that annual cycle of car tax renewal, and assuming that all adults within in the digitally excluded population are drivers and currently renew the car tax face-to-face, we estimate the potential benefit to DVLA in terms of reduced transaction costs to be approximately £107 million. This indicative estimate assumes the equivalent per transaction channel costs as found in local government.

Case study: Enabling people to access health service information

We have already seen that digital inclusion provides greater access to a wide-range of information on health services, which allows users to make more informed and better decisions about their health care. Users experience a more personalised service, greater control of their health, improved personal satisfaction and are more likely to attend appointments.

Evidence on 'Choose and Book', a programme whereby users can select, book and reschedule referral appointments, suggests that when users are able to exercise choice over their health care, there is a significant reduction in 'did not attend' rates . Fewer missed appointments has the potential to deliver significant cost savings for health service providers and improving the efficiency and effectiveness of the health sector.

There are many health initiatives that offer information on health service providers. One such initiative, NHS Direct Online, was developed in 1998 to provide users with access to information on healthcare service providers to enable them to make better choices about health care services. A study by the European Commission in 2006 considered the net economic benefits of NHS Direct. The study estimated that the net benefits of NHS Direct to be in excess of 100 million euro in the year 2008. The study also found that 87% of the benefits accrued to the NHS through avoided costs and 13% accrued to health service users. Therefore as users increasingly accessing health information on the internet rather then via the phone or face-to-face engagement, there is potential for substantial channel shift savings.

It is important to note that allowing users to access health service information establishes a two-way flow of

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[141] Reference Fresh Minds report – Economic Benefits of Digital Inclusion

[142] Driver Vehicle and Licensing Agency, 'DVLA Annual Report & Accounts 2007-08' http://www.official-documents.gov.uk/document/hc0708/hc09/0920/0920.pdf

information. Initiatives such as Choose and Book, NHS Choices and NHS Direct allow users to share their own experience and knowledge, review health services and express preferences for health services through making online appointments.

7 Consumer benefits

7.1 Introduction

In this section, we consider the benefits which can be expected to arise from improved access to online shopping.

7.2 Online purchases

For the individual, one of the benefits of digital inclusion is that it gives consumers access to a global network of potential suppliers from the largest household names to the smallest niche retailers. This serves to expand the degree of consumer choice. Search engines and price comparison sites reduce the time and cost spent finding goods and services and enable consumers to compare products which not only increases the efficiency with which buyers and sellers are matched as well as driving price competition. This can generate significant savings for consumers.

Analysis for the Post Office has estimated that the potential gross savings from bringing digitally excluded households online would be around £560 per household per annum[143]. This is equivalent to £4,510 million per annum across all digitally excluded households (see Table 16), which amounts to over 3% of household spending. Focusing on those households which are also socially excluded, we estimate that benefits of £1,090 million per annum would accrue to the 3.6 million households in the lowest 20% of incomes. Similarly, we estimate that the benefits to the 4.4 million households with no economically active people are around £1,720 million per annum.

Table 16: Estimated benefits of online shopping for digitally excluded households

Household income (decile)	Gross direct benefits per household (£ pa)	% households online	Number of households offline (million)	Number of households online (million)	Gross direct benefits across offline households (£m pa)
Lowest	£279	20	2.0	8.0	£558
Second	£334	35	1.6	3.0	£534
Third	£481	50	1.3	1.3	£625
Fourth	£570	65	0.9	0.5	£513
Fifth	£706	75	0.6	0.2	£424
Sixth	£816	80	0.5	0.1	£408
Seventh	£917	85	0.4	0.1	£367
Eighth	£1,112	88	0.3	0.0	£334
Ninth	£1,306	90	0.3	0.0	£392
Upper	£1,775	92	0.2	0.0	£355
	£557		8.1	13.2	£4,510

Source: PwC analysis based on SQW Consulting report

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[143] 'Broadband in the Home: An Analysis of the Financial Costs and Benefits – Final report to the Post Office', SQW Consulting, September 2008

The estimates in Table 16 are based on four key steps.

First, the analysis identifies those goods and services which can potentially be bought online more cheaply than offline. On the basis of evidence from various sources, the report identifies 15 product groups where potential savings are possible. These include electricity, clothing, mortgage interest payments, insurance, telephone services and package holidays. They exclude groceries on the grounds that major retailers do not offer price savings to online customers.

Second, the analysis makes a set of evidence based assumptions about the potential savings available to online customers (compared with those buying the same products offline). The savings range from 3% to 30% depending on the product group.

Third, the analysis uses data from the ONS' Family Spending (2008)[144] to establish the pattern of household spending by product group for households in each (decile) income group. Using this information, the analysis estimates the potential annual savings per household: these are the gross direct benefits per household in the second column of Table 16.

Finally, the report uses data from the Oxford Internet Survey for 2007[145] to estimate the proportion of households in each decile group which are (or were) digitally excluded in 2007. Evidence from the latest Oxford Internet Survey suggests that these proportions have altered little[146]. We use these data to estimate the number of households that are presently offline (and therefore able to benefit from online savings) and use this information to estimate the potential gross benefits across offline households (see the final column of Table 16).

The estimated savings need to be interpreted with care. The potential financial savings to digitally excluded households at different income levels do not take account of the costs of being online, in particular the initial costs of acquiring a personal computer and the running costs of online access. Significantly, even if these costs are taken into account, the savings from online purchases for most households, even those on the lowest incomes, more than offset the running costs of a computer.

Furthermore, whilst individual households stand to benefit from access to online shopping, at least some of these benefits may be derived at the expense of 'offline' retailers as consumers (are assumed to) switch to online retailers. There may, however, be efficiency benefits for the economy as a whole if the lower prices of online retailers are assumed to reflect the lower costs of servicing customers.

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144 ONS, Family Spending Survey,
http://www.statistics.gov.uk/downloads/theme_social/Family_Spending_2007/FamilySpending2008_web.pdf

145 OxIS 2009 *The Internet in Britain*

146 OxIS 2009 *The Internet in Britain*

8 Aggregating the potential benefits

In this final section, we consider how the benefits identified in previous sections can be brought together to understand the potential aggregate benefits of reducing digital exclusion. We then conclude the section by explaining how the evidence presented in the report should be interpreted and used to inform future initiatives.

8.1 Aggregating the potential benefits

Finally, we consider the overall magnitude of the potential benefits of bringing all those who are currently digitally excluded online. In doing this, it is important to recognise that our analysis has not been comprehensive: we have only been able to consider those areas of potential benefit which we expect to offer the greatest potential benefits. Furthermore, our estimates of the benefits in some key areas are necessarily subject to significant margins of uncertainty. We have sought to take a cautious view of the potential benefits.

We estimate that the overall potential economic benefit of getting everyone online is in excess of £22 billion. The derivation is shown in Table 17. Our estimates of the benefits from enhancing education, skills and employment reflect the expected lifetime benefits for the current cohort of digitally excluded. In contrast, the estimated benefits of government efficiencies and online shopping are annual estimates which can be expected to persist for as long as some people remain offline. We have assumed that these benefits will persist for two years. Effectively, we are assuming that all digitally excluded individuals will be online in two years.

Table 17: Aggregate potential economic benefits of digital inclusion

	Annual benefits (£ billion)	Lifetime benefits (£ billion)
Home access for children		10.80
Improved ICT skills for the employed		0.56
Improved access to employment for the unemployed		0.56
Government efficiencies	0.90	1.77
Online shopping	4.50	8.85
		22.54

Source: PwC analysis

8.2 Interpretation of the evidence

This report has identified the considerable potential economic benefits from improving digital inclusion. The next step is to consider how best to help those who are digitally excluded and to assess the potential value for money of alternative interventions.