Mobile inclusion - a digital future for all

A report for **EE**

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About Plum

Plum offers strategy, policy and regulatory advice on telecoms, spectrum, online, and audio-visual media issues. We draw on economics, our knowledge of the sector and our clients' perspectives to shape and respond to convergence.

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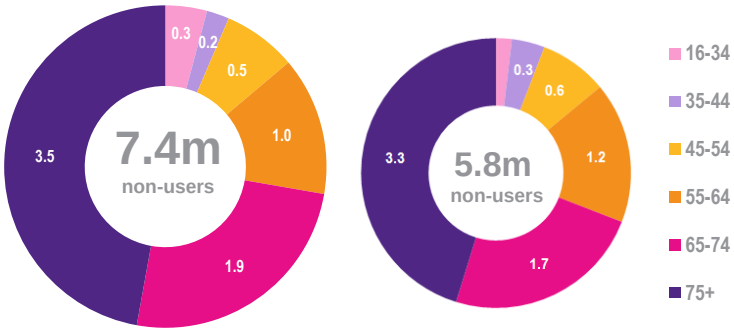
Table of Contents

Executive Summary

Steady progress has been made in terms of the population online in the UK, though we estimate 7.4 million people remain effectively offline (they have not used the internet in the last three months). Of those who remain offline 86% are aged over 55. In future, progress in getting people online will become harder as the proportion of younger people online reaches close to 100%.

We estimate that 50% of progress in getting people online over the past decade is due to demographics alone; those already online stay online as they age (estimated using the Plum cohort model – see Figure 1-2 for details). Demographics alone will continue to reduce the offline population, but only slowly - from 7.4 million today to 5.8 million by 2020.

Internet non-users by age group, 2014 vs. 2020



Source: Plum Consulting, Eurostat, ONS

Existing programmes are contributing to getting people online. The question we consider is whether greater progress could be made if mobile devices – smartphone and tablets – were used as the gateway online for many of those who are offline. This might prove more cost effective given the ease of use of such devices and the immediate relevance of applications (versus 'going online').

Mobile devices, applications and data connectivity may also be necessary in future for genuine digital inclusion. Important classes of applications, including emerging applications related to health and personal wellbeing, will only be developed for mobile; for example the Apple "HealthKit" software platform is mobile only. The NHS has also proposed integration of such apps into the health care system. These applications may be particularly relevant to those who are currently offline.

In assessing the potential role of mobile in getting people online and supporting genuine digital inclusion we considered evidence regarding who is offline and why they are offline, device adoption, the ease of use of the PC versus mobile devices and trials and anecdotes regarding the online journey utilising different devices.

We complemented existing evidence with evidence from a survey EE commissioned from Ipsos MORI and a small scale pilot study of online adoption utilising tablets supported by EE in cooperation with the Tinder Foundation. Drawing on the evidence we propose policy actions to ensure that progress in getting people online is sustained and that those going online are able to benefit fully.

Our findings and recommendations are summarised in the following box.

Evidence, findings and recommendations

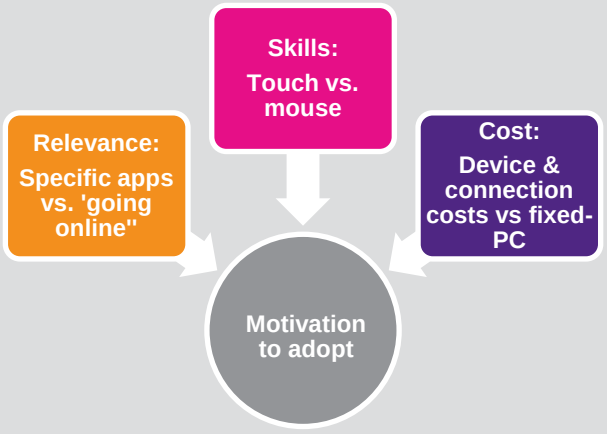
We found that amongst those aged 55+ mobile adoption – including basic phones and smartphones – is almost 80% and that tablet adoption has grown rapidly and now exceeds smartphone adoption. The proportion of internet users only using a mobile device to access the internet is also higher amongst those aged 55+ than for any other age group.

The above evidence provides grounds for optimism regarding the potential to get people online by leveraging mobile. However, it also points to a growing gulf between initiatives and funding focussed on the PC and revealed preferences.

A trial conducted by CitizensOnline also points to the potential of tablets to get, and keep, people online:

"Tablet courses may hold key to success: We have started to run tablet courses across some of the Get IT Together projects. The first cohort of these learners has taken part in the study and all of them are still online 3 months later."

Across the areas identified as barriers to getting online - relevance, skills and cost – mobile has the following potential advantages.



The pilot trial involving tablets lent support to this hypothesis. Participant comments included the following:

"It can be much easier, just touch, you can use it. I was quite biased against it before but now I'm having second thoughts"

"Having had a laptop, and learning for 18 months how to use it, and it dying, and needing to replace it – I'm looking at this as a cheaper, lighter alternative"

One of the authors of this study has personal experience of his father in law, who had never used a computer, getting online for the first time via a tablet. The learning curve was fast, and he particularly valued access to news, Chinese opera via Spotify, photo sharing with family and video calling. Readers of this study may have similar experiences – yet online initiatives tend still to focus on the PC.

If everyone who has already adopted mobile - smartphone or basic phone - could be brought online then 95% of people over 16 could be online by 2023 (allowing for demographics). In contrast, we estimate that demographics alone would only achieve 95% online adoption by 2032. Achieving 95% adoption earlier rather than later will require a change in policy approach:

- The emphasis of digital inclusion programmes needs to be reoriented towards mobile, with more trials of different approaches to learn what does and doesn't work and to prioritise the allocation of funding.
- Online training should include mobile and touch interfaces.
- Government services should be adapted to ensure services and apps are compatible with mobile, and the balance of levies and funding between fixed and mobile networks should be reassessed in view of digital inclusion goals.

1 The online adoption gap today

1.1 The adoption gap dominates the availability gap

In the past, a contributing factor to digital exclusion has been the lack of availability of fixed or mobile broadband (or at least broadband of reasonable quality). In the UK broadband is now widely available, though still not universal: approximately 3% of UK households are currently receiving speeds less than 2Mbit/s.[1]

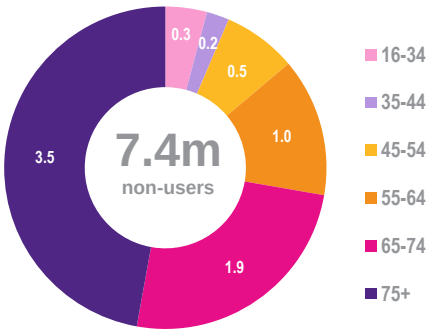
The extension of mobile 4G coverage is providing a broadband alternative to fixed access. EE plan to extend coverage from around 80% to 98% by the end of 2015[2] (a deferral versus the original plan to achieve coverage of 98% by the end of 2014 due to spectrum fees proposed by Ofcom). Other operators, who had planned to achieve 98% coverage by the end of 2015,[3] have also indicated that they will defer their plans. Satellite broadband is also an option for consumers. Whilst broadband coverage is important, in the future it is unlikely to be a prominent barrier to achieving digital inclusion.

1.2 86% of non-internet users are over 55

While age is not the only factor related to internet non-use, it is highly significant: over 86% of non-users are over 55 (Figure 1-1).

Figure 1-1

Internet non-users by age group, 2014



Source: Plum Consulting, Eurostat, ONS

The estimate of 7.4 million non-users, and references elsewhere in this paper to the number of people who are offline in 2014 and future years, are based on the Plum cohort model described in Figure 1-2.

[1] Ofcom. October 2013. "Infrastructure report." http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/infrastructure-report/IRU_2013.pdf

[2] http://ee.co.uk/our-company/newsroom/2015/01/09/ee-reaches-7-7-million-4g-customers-as-network-expansion-continues

[3] Ofcom. August 2014. "The Communications Market Report." http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

Figure 1-2: Plum cohort model

The Plum cohort model combines data on internet use (use in the past 3 months) from Eurostat[4] with population projections (for each age group) from the ONS5 to predict the number of internet non-users. From the data, we estimate that today there are 7.4 million in the UK who have not used the internet in the past 3 months.

In the model we assume that internet adoption among a given cohort remains constant, i.e. if 50% of 60 year-olds are internet users today, 50% of 66 year-olds will be internet users in 2020. While we would expect internet use among a given group to increase over time, by holding this constant we can isolate the demographic effect alone. We assume anyone below 16 today will become an internet user.

Some users may also stop using the internet, becoming ex-users. The 2013 Oxford Internet Survey (OxIS) suggests that ex-users comprise 3% of the total population. This number has steadily declined over the past 10 years, and for modelling purposes we assume that once someone is online they stay online.

We utilise the model to estimate the number of non-users in 2014 based on 2014 internet use data, to estimate the proportion of online adoption over the past decade due to demographics alone (50%) and to estimate future internet adoption.

1.3 Age is linked to other factors related to internet non-use

Surveys by the Oxford Internet Survey (OII)[6] and others find that categories other than age, (such as income, education and disability) are also correlated with non-use. However, these categories are likely to be correlated with age, and may not therefore necessarily explain non-use after age is taken into account. For example, a study by Communication Chambers found that those with a disability are generally older, and that for those under 35 disability does not meaningfully increase the likelihood of being offline.[7] We therefore focus on age in considering internet adoption.

1.4 The UK is doing well by European standards, could do better

Figure 1-3 shows that internet adoption across all age cohorts in the UK is higher than the European average, far higher than in Mediterranean and Eastern European countries (e.g. Romania), but lower than in Scandinavian countries (e.g. Denmark).[8]

[4] Eurostat. December 2014. "Internet usage by individuals in 2014".
http://ec.europa.eu/eurostat/documents/2995521/6343581/4-16122014-BP-EN.pdf/b4f07b2a-5aee-4b91-b017-65bcb6d95daa

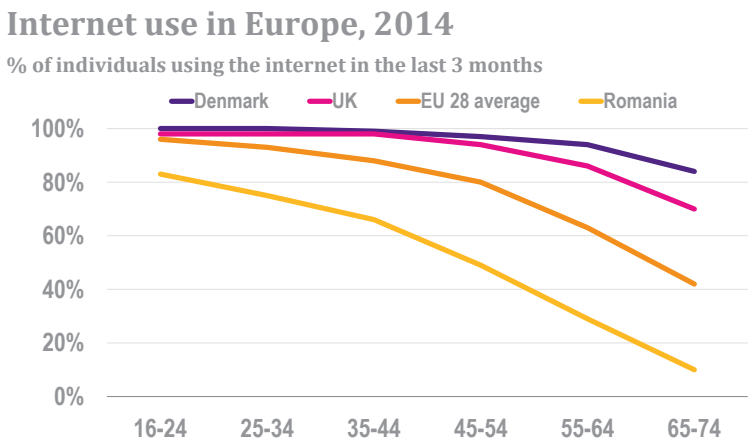
[5] http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=National+Population+Projections

[6] http://oxis.oii.ox.ac.uk/

[7] Kenny and Milne. May 2014. "Mobile: A powerful tool for Digital Inclusion."
http://www.commcham.com/pubs/2014/5/12/mobile-as-a-tool-for-digital-inclusion.html

[8] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ci_ifp_iu&lang=en

Figure 1-3



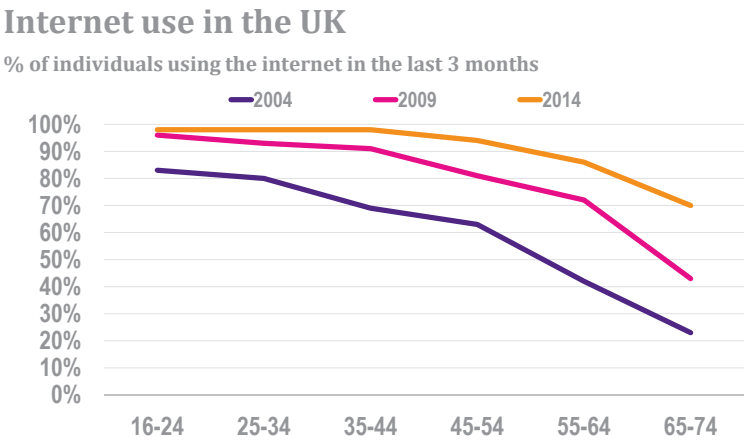
Source: Plum Consulting, Eurostat

2 Changes in online adoption over time

2.1 Half of historical online growth is due to the ageing of those already online

We estimate, utilising the Plum cohort model, that half of the progress in online adoption in the UK is due to those who are already online getting older. In other words, half of the improvement in internet usage shown in Figure 2-1 below is due to internet-using individuals moving into older age brackets, as opposed to the level of adoption growing for a given cohort.

Figure 2-1

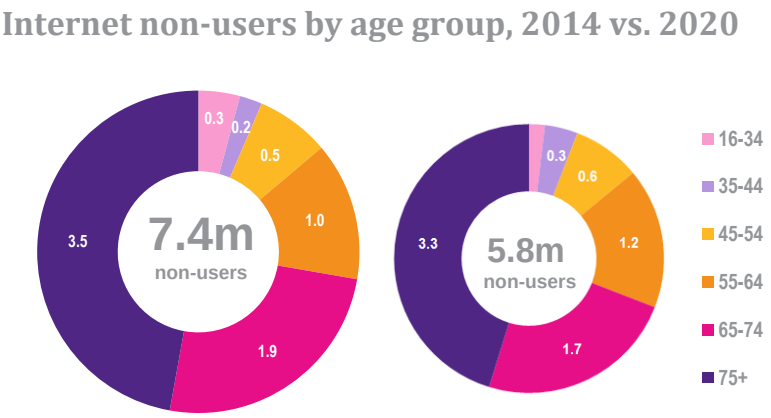


Source: Plum Consulting, Eurostat

2.2 Demographics alone will increase adoption, but only slowly

It follows that overall internet adoption will continue to improve even in the current level of adoption stays constant for each cohort. Figure 2-2 shows the projected decline in internet non-users due to demographic factors alone, calculated using Plum's 'cohorts' model.

Figure 2-2



Source: Plum Consulting, Eurostat, ONS

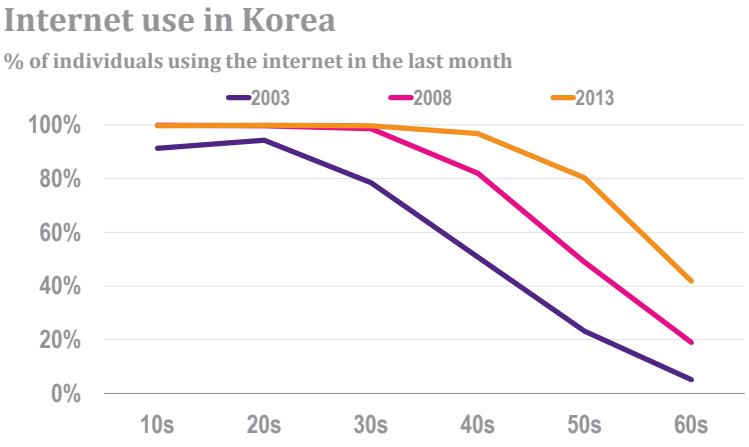
We also calculated that it would take until 2032, via demographics alone, to increase the proportion of those aged 16 and over who are online to 95%. Demographics alone therefore help overall progress to digital inclusion, but only very slowly. If the UK is to catch up with the international leaders in internet use then more action is needed.

2.3 International differences in adoption over time

We consider internet use in the UK in relation to age and compare outcomes with those in South Korea and Denmark.

In South Korea internet use by younger cohorts is near universal, but drops off sharply with age (Figure 2-3; note that South Korea also uses different age cohort groups).

Figure 2-3

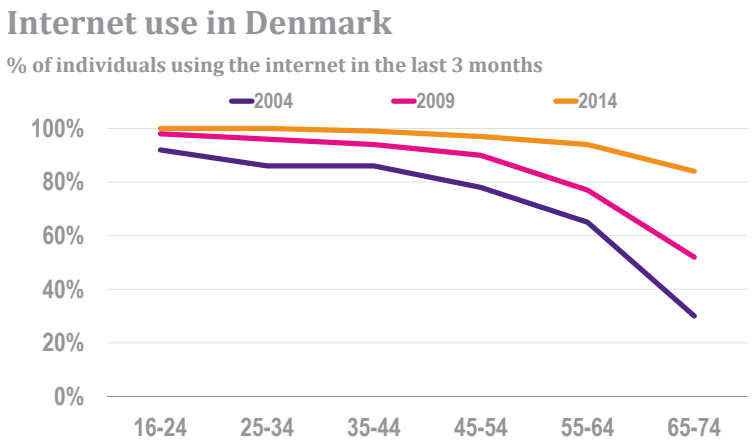


Source: Plum Consulting, KISA ISIS

Internet adoption by older Koreans is comparatively low, particularly given near-universal broadband adoption by households.[9] The availability and take-up of broadband does not of itself necessarily result in high levels of internet adoption.

As shown in Figure 2-4, Denmark has comparatively good outcomes across the board, and higher internet take-up than in the UK. This provides an indication of the potential for improved outcomes in the UK.

Figure 2-4



Source: Plum Consulting, Eurostat

2.4 Explaining differences in adoption

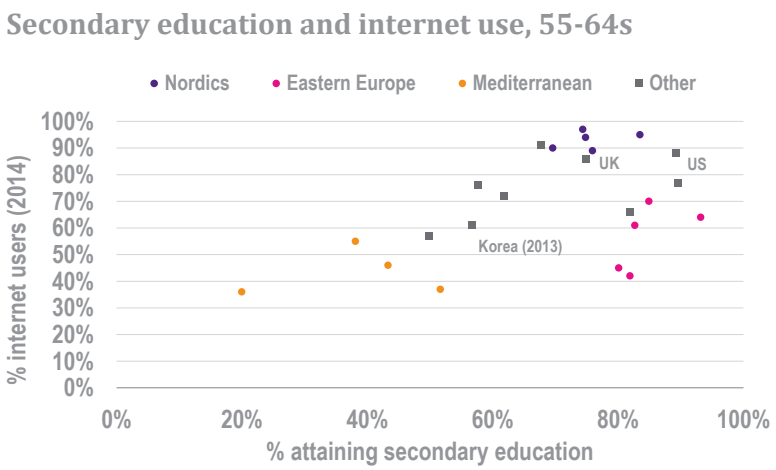
We focus on differences in adoption by older cohorts since this dominates differences in overall adoption (given that almost all younger people are online). A factor that correlates with observed differences in internet use by 55-64 year olds is the levels of education they attained when young.[10]

Mediterranean countries and, to a lesser extent South Korea, had comparatively low levels of education historically, when their relative GDPs were low. Other countries, including the UK, US and the Nordics, had comparatively high levels of education amongst the over 50s, and correspondingly high levels of internet adoption by this age group. Possible explanations for Eastern Europe's comparatively low levels of internet usage include broadband availability and income.

[9] http://isis.kisa.or.kr/eng/board/index.jsp?pageId=040100&bbsId=10&itemId=325&pageIndex=1

[10] Plum. March 2010. http://www.plumconsulting.co.uk/pdfs/Plum_March10_Demand-side_measures_to_stimulate_Internet_and_broadband_take-up.pdf

Figure 2-5



Source: Plum Consulting, Eurostat, OECD, KISA, Pew

The potential surely exists for the UK to close the internet adoption gap with the US and the Nordics for the older age cohort. The UK has a similar historic level of education as the Nordic countries but has lagged behind in digital inclusion. In the next section we consider the potential role of mobile in helping to close this gap.

3 Can mobile help close the gap?

In this section we first consider some of the factors that help explain internet non-adoption, how mobile devices (smartphones and tablets) and connectivity (cellular and Wi-Fi) might help overcome these barriers and the magnitude of difference this could make to the offline population by 2020.

3.1 Barriers to adoption

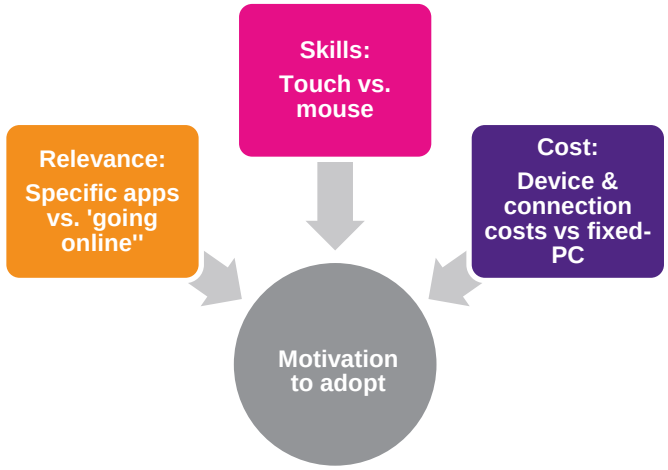
A number of studies in the UK[11] and elsewhere[12] have sought to establish why some people choose not to go online. These studies find that lack of interest (or awareness of benefits) and skills and cost barriers account for non-adoption. Whilst lack of interest is a key stated reason for not going online for those who are offline, for ex-users (those who were online and are now offline) lack of access and high cost are given as reasons for having stopped using the internet.[13]

Rightly or wrongly, those who are not online judge the overall 'costs' of going online to exceed the overall benefits. We now consider how mobile might help increase the benefits and reduce the costs – perceived and real – of going online.

3.2 How mobile might help overcome adoption barriers

Focussing on relevance, skills and cost Figure 3-1 shows how mobile – smartphones and tablets plus mobile connectivity – could help reduce these barriers.

Figure 3-1: Potential contribution of mobile in overcoming barriers to going online



[11] William Dutton and Grant Blank. 2013. "Cultures of the Internet: The Internet in Britain." http://oxis.oii.ox.ac.uk/sites/oxis.oii.ox.ac.uk/files/content/files/publications/OxIS_2013.pdf

Various sources cited in Kenny and Milne. May 2014. "Mobile: A powerful tool for Digital Inclusion." http://www.commcham.com/pubs/2014/5/12/mobile-as-a-tool-for-digital-inclusion.html

[12] Pew Internet. April 2014. "Older Adults and Technology Use". http://www.pewinternet.org/2014/04/03/older-adults-and-technology-use/

[13] Helsper and Reisdorf. 2013. "A quantitative examination of explanations for reasons for internet nonuse." Cyberpsychology, behavior, and social networking, Volume 16(2). http://eprints.lse.ac.uk/49171/1/Helsper_Quantitative_examination_reasons_2012.pdf

Mobile devices and connectivity have a number of potential advantages in getting and keeping people online, as discussed below.

3.2.1 Interest and perceived relevance

Apps put functionality such as reading[14], maps, communication and music first rather than 'going online' *per se*. Apps may also have active functions, for example: pushing content such as shared photos to the user, thereby removing the need to actively open and check an app, and reinforcing active online participation.

The importance of relevant applications is illustrated by the comment below following a London event run at the Central & Cecil Sheltered Housing scheme where participants were learning to use tablets, many for the first time[15]

> *"Some of the residents were amazed you could use an app to find out the next bus, or book tickets to the ballet. And even Skype. The impact it can have using a tablet, instead of a computer – that seems pretty daunting and locked away in another room, is far greater."*

Learning might therefore be more focussed on what the learner wants to do, as opposed to following a generic learning programme. For example, Friends of the Elderly and Barclays Digital Eagles are working together to identify the particular apps and websites that resonate with older people.[16]

A growing range of applications will also be accessible only via a mobile device. For example, health platforms Apple HealthKit and GoogleFit, wearable health and fitness tracking devices, future NHS services where app-based support is proposed[17] and some assisted living technologies.[18]

3.2.2 Skills

For many, a touch interface is easier to learn than a mouse and keyboard, as exemplified by the rapid adoption of touchscreen devices by young children and older users (and globally by those with limited skills). For example, in a pilot study designed to support older clients with life-limiting illnesses, Sylvia described how surprised she was at how easily she is learning to use a tablet device: [19] *"I've seen them. But I never thought I could use one. I never, ever thought I could."*

Friends of the Elderly have also undertaken a pilot study:[20]

> *"Last year, we undertook a pilot study which showed that the use of tablet computers can have incredible benefits for older people, especially those with dementia. It is the advent of*

[14] The ability to change the font size of books and the contrast can be particularly important for people with poor eyesight.

[15] David Wilcox. April 2014. "A tasty intro to digital – Tea, Toast and T'Internet." http://socialreporter.com/?tag=digital-inclusion

[16] The Telegraph. June 2014. "Tablet training for the elderly." http://www.telegraph.co.uk/sponsored/finance/your-bank/10890358/tablet-training-for-seniors.html

[17] NHS. November 2014. "Personalised Health and Care 2020." https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/376886/NHS_England_NIB_report.pdf

[18] Including, for example, hearing aid support: https://www.apple.com/accessibility/ios/ https://www.apple.com/ios/accessibility-tips/

[19] Ranald Richardson and Angela Abbott. June 2013. "The Role of Social Intermediaries in Digital Inclusion: The Case of Social Housing." http://www.ncl.ac.uk/curds/publications/documents/RR2013-10.pdf

[20] The Telegraph. June 2014. "Tablet training for the elderly." http://www.telegraph.co.uk/sponsored/finance/your-bank/10890358/tablet-training-for-seniors.html

tablet technology that is really moving things along for older people. Traditional desktop or laptop computers require a great deal of precision and are often in a fixed position or heavy to move around. For someone who has poor eyesight, poor mobility or perhaps arthritis, the portability, lightness and ease of use of touch-screen devices are much more user friendly."

Mobile devices also keep the primary focus on one app at a time and allow the user to return readily to a 'home' screen where the set of available applications is on display. Mobile devices also enable peer-to-peer learning since they are readily used in a location where the user is most comfortable, and experiences can be shared within a social context.

The portability of these devices means that digital inclusion initiatives can also be taken to an individual in their own home, for example Age UK Leeds' Take a Tablet initiative.[21] An initiative by Breezie also offers tablets with pre-installed apps chosen for relevance and the ability of a friend or family member to remotely configure and manage the tablet on behalf of a new user.[22]

A lack of consistency between the operating system people learn on and the operating system they own can be a barrier to adoption. For example, in a learning centre that Plum visited, the centre's laptops all ran Windows 7 or XP, however many of the centre's learners had purchased their own laptops running Windows 8. Mobile operating systems, which are free and generally easy to update, may reduce this discontinuity between online skills acquisition and ongoing use.

3.2.3 Cost

The combined cost of mobile devices and mobile connectivity can be lower than a PC and fixed broadband. This is particularly likely to be the case over the device lifecycle, given the availability of free operating system upgrades and the growing range of free or low-cost applications for mobile.

Considering connectivity costs alone, basic fixed broadband (allowing for the cost of line rental) typically has a price range of £20 to £30 per month.[23] Mobile broadband packages are available at lower cost, though typically come with monthly data caps. For example, Three offer a £15 data package with an allowance for 10 GB per month.[24]

Device costs vary considerably, though tablets tend to be cheaper than laptops. Mobile devices are also offered as part of monthly packages, effectively financing the purchase of a device. For example, EE offer a tablet and data plan for an up-front cost of £29.99 and ongoing cost of £20 for 2 GB of data per month over 24 months – a lower overall cost than typical fixed broadband access, even excluding a PC.

Therefore whilst mobile (and tablet) plans typically come with data caps they offer a lower cost alternative to fixed broadband and a PC. They also provide an option involving much lower up-front payment. Pay as you go is also attractive for those who need to manage their expenditure on a monthly basis, and who may not pass a creditworthiness check required for a mobile or fixed contract.

[21] http://www.ageuk.org.uk/leeds/our-services/take-a-tablet-it-project/

[22] http://www.breezie.com/

[23] Ofcom. 2014. "Communications Market Report". Figure 5.67. http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

[24] All mobile packages were as at 9 December 2014.

3.3 Qualitative evidence

Whilst a good evidence base is still lacking (a point we pick up in our policy proposals) there is growing body of evidence that suggests mobile may have an important role to play. Research by Citizens Online suggests a role for tablet-based digital inclusion courses.[25]

> *"Tablet courses may hold key to success: We have started to run tablet courses across some of the Get IT Together projects. The first cohort of these learners has taken part in the study and all of them are still online 3 months later. Almost all of the learners were over 65 years old and almost all had home internet access before the course. The sample is still very small, but this is a promising start for our tablet training."*

The 100% continued use by those on the tablet initiative after 3 months is higher than the 80% after 12 months in the overall sample, which included PCs. In addition, almost all of the tablet learners were over 65, compared to around 60% in the overall sample. Further studies of this type would be a valuable addition to the evidence base (CitizensOnline plan to continue their longitudinal study over 2 years and with an expanding sample size).

To expand the evidence base, Plum and EE, in cooperation with Tinder Foundation, conducted a pilot study to see learners experience tablets first-hand. The study involved a dozen learners with varying degrees of experience of PCs and tablets. Five of the participants owned their own tablets; the remainder used tablets supplied for the day by EE. The study consisted of a learning session (lasting approximately 90 minutes) in which the participants were given basic instruction and allowed to experiment with the tablets, and a focus group (lasting an hour) where the participants were invited to share their experiences of the learning session. In in Figure 3-2 we relate feedback from the session to the three adoption barriers we identified - relevance, skills and cost.

Figure 3-2: Quotes from participants of the pilot study regarding online adoption via tablets

Relevance	*"I can look at BBC programmes, look on John Lewis…I think it's wonderful"* *"It [tablet] would be great for taking and sending photos of my bees"* *"It doesn't matter where you are…you don't need to go in to a separate room to use it"* *"It's great to go visiting your friends with your own tablet"*
Skills	*"It can be much easier, just touch, you can use it. I was quite biased against it before but now I'm having second thoughts"* *"Why can't we get the same things – like the enlarging [pinch to zoom] – on a laptop?"* *"At first I kept pressing two keys at once – but the pen [stylus] made it easier"*
Cost	*"Having had a laptop, and learning for 18 months how to use it, and it dying, and needing to replace it – I'm looking at this as a cheaper, lighter alternative"* *"If I did get a computer, I'd probably go for a tablet…it seems an easy way in"* *"How much does this [tablet] cost compared to a PC?"*

[25] CitizensOnline. March 2014. "Get IT Together". http://www.citizensonline.org.uk/wp-content/uploads/March-14-Study1.pdf

We propose that further pilots of this kind be undertaken and that online centres increase the availability of tablets as an option. Figure 3-3 includes a number of qualitative anecdotes about using tablets to get people online.

Figure 3-3: Tablet journeys online

EE's Techy Tea Parties, informal events where guests are supporting in using mobiles and tablets, have shown that tablets are an accessible way for older people to get connected. One guest bought a tablet as a result of attending an event and said "I'm using it for my emails and I take it with me when I go out as it's much more convenient. I'm a volunteer and I get documents sent to me so I can read them relaxed in my bed or I can take the tablet with me to meetings."

Another pilot study designed to support older clients with life-limiting illnesses noted the following:[26] *"As the pilot proceeded, a preference emerged for some more recent technology products such as the iPad. It is not clear what factors lie behind the trend, though our research suggests clients found these easer to operate, more portable, and had a more attractive user-interface."*

One of the authors of this study also has personal experience in seeing people get online utilising a tablet.

In the first instance, on Christmas Day 2010, soon after the release of the first iPad, my brother in law's mother said, after being shown my new iPad, that she had tried using a PC but given up because she tended to get lost. I explained that if she got lost she should push the home button, and gave a very brief explanation of touch and showed her a few apps. After around ten minutes with the iPad she said quietly to me that she was thinking of getting one for her husband's 70th birthday. They haven't looked back since and use their tablet for reading newspapers, staying in touch with family via video calls and viewing family shared photos.

In the second instance in 2013 my father in law's children gave him a tablet for Christmas. He and his wife, both in their 70's, had never used a computer or smartphone but did have Wi-Fi – though they had never used it - as part of an IPTV package. The basic journey - learning to use the interface and apps - was rapid, with occasional help from their grandchildren. We had also set them up an email account and enabled photo sharing via shared photo streams. Within days they were watching YouTube videos, using Spotify to listen to Chinese opera, reading the China Daily and 'liking' shared photos. They also used video calling and were amazed that it was free to anywhere in the world. They have continued to use their tablet with their skills reinforced via social interaction with others.

3.4 Quantitative evidence

Mobile has played a significant role in extending adoption of voice services. Mobile is now playing a substantial role in extending internet access globally[27] and there is growing evidence that mobile is contributing to internet adoption in the UK.

Regarding smartphone adoption, Ofcom noted in August 2014 that:[28]

> *"Take-up of smartphones has continued to increase rapidly over the past year, with six in ten adults now claiming to own one (61%), while household take-up of tablet computers has almost doubled over the past year to 44%."*

Regarding tablet adoption, Ofcom noted in April 2014 that:[29]

[26] Ranald Richardson and Angela Abbott. June 2013. "The Role of Social Intermediaries in Digital Inclusion: The Case of Social Housing." http://www.ncl.ac.uk/curds/publications/documents/RR2013-10.pdf

[27] November 2014. "Ericsson mobility report." http://www.ericsson.com/res/docs/2014/ericsson-mobility-report-november-2014.pdf

[28] Ofcom. August 2014. "Communications Market Report." http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMR.pdf

[29] Ofcom. April 2014. "Tablets help drive increase in older people going online." http://consumers.ofcom.org.uk/news/tablets-help-drive-increase-in-older-people-going-online/

"The number of people aged 65 and over accessing the internet has risen by more than a quarter in the past year, driven by a three-fold increase in the use of tablet computers to go online, new Ofcom research reveals."

Evidence in the US also indicates that mobile may play a particularly important role in getting people online (see Appendix B.1). For example, African Americans are less likely to use the internet or have broadband at home[30], but have higher smartphone ownership than white Americans and are more likely to have a smartphone but not broadband at home (see Appendix B).

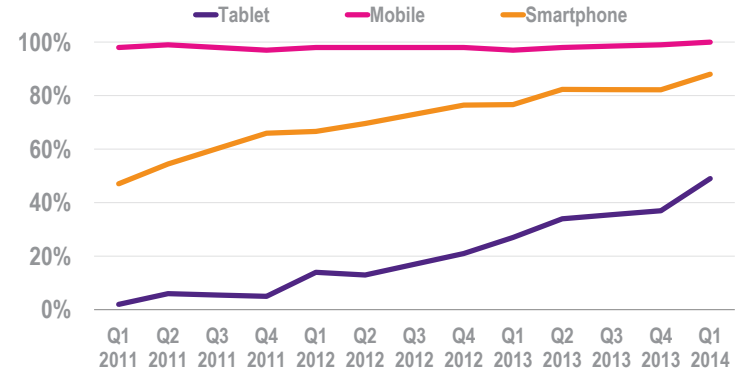
Device familiarity, operating system familiarity and the continuity of a relationship to a provider of mobile connectivity may make the transition from basic phone to smartphone, (and then potentially to tablet), more straightforward than the transition from telephone to PC and voice-only to fixed broadband (including installation of a router). We therefore consider trends in device ownership in the UK, and then consider what impact closure of the gap between mobile use and internet use would have on overall levels of internet use.

3.4.1 Ofcom Technology Tracker

Utilising Ofcom Technology Tracker data[31] and looking first at early adopters in the 16-24 year old range, we see that mobile ownership is near universal and that smartphone adoption is close to 90% whilst tablet ownership has risen rapidly to reach 50% by the first quarter of 2014.

Figure 3-4

Device ownership, 16-24 age group



Source: Plum Consulting, Ofcom Technology Tracker

Amongst those aged 55+ adoption is lower (Figure 3-5). However for this group, mobile adoption is higher than internet adoption (60%[32]) and tablet adoption has increased rapidly to overtake smartphone adoption by the first quarter of 2014.

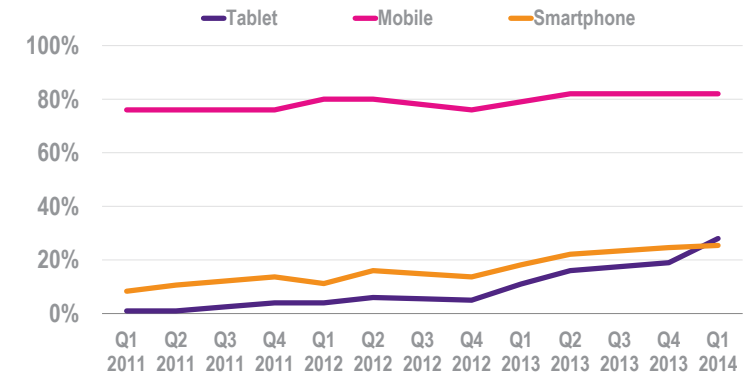
[30] Pew Internet. January 2014. "African Americans and Technology Use". http://www.pewinternet.org/2014/01/06/african-americans-and-technology-use/

[31] Ofcom Technology Tracker releases are referenced here: http://stakeholders.ofcom.org.uk/market-data-research/statistics/stats14/

[32] Computed by Plum using Eurostat and ONS data.

Figure 3-5

Device ownership, 55+ age group



Source: Plum Consulting, Ofcom Technology Tracker

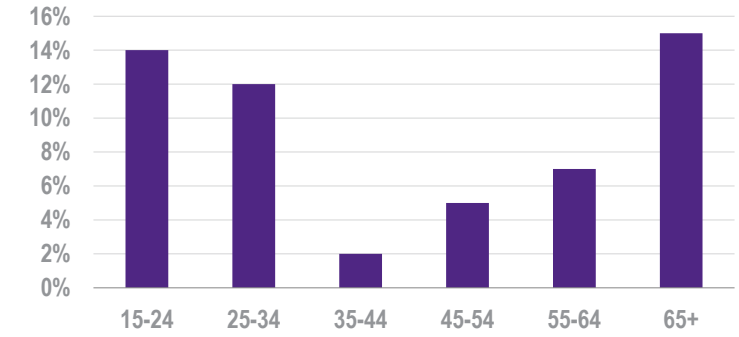
There is also evidence that mobile internet access is a substitute for fixed access, at least for some market segments. Eurobarometer data (see Appendix B) show that households with mobile internet access and no fixed connection are growing in Europe as a whole, and in four of the Big 5. In the UK, 10% of households are now mobile-only (up from 5% in 2011).

3.4.2 Ipsos MORI survey

To further investigate the role of mobile (and mobile connectivity) in getting people online, EE commissioned Ipsos MORI to include additional questions in their Techtracker survey (which covers 1000 consumers). We explore the results below. In relation to devices, we found that the proportion of internet users only using a mobile device (a smartphone or tablet) to access the internet is high not only among the young but among the oldest age group (see Figure 3-6). This suggests that there is a preference for mobile devices among some segments of the population.

Figure 3-6

Internet users who only use a smartphone or tablet to access the internet

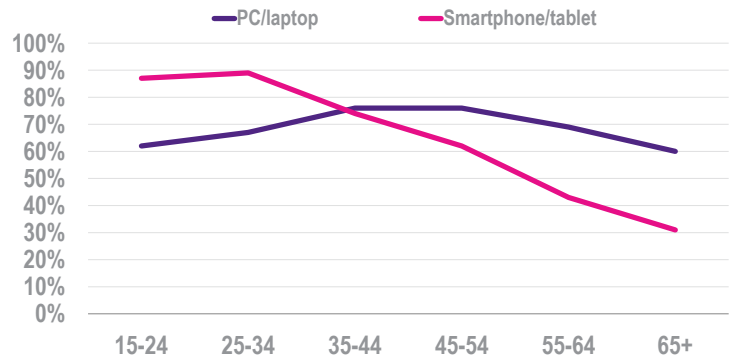


Source: Plum Consulting, Ipsos MORI

Intensity of daily mobile device use is higher than use of PCs amongst younger age cohorts (Figure 3-7). This is a development that may migrate across age cohorts over time. Smartphones and tablets may be a useful tool for facilitating regular use of the internet, and in ensuring that digital 'newcomers' stay online.

Figure 3-7

Daily use of devices to connect to the internet

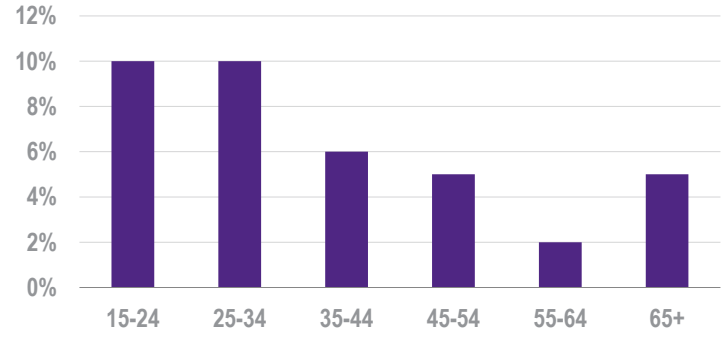


Source: Plum Consulting, Ipsos MORI

Young adults are the most willing to forego a fixed broadband connection at home in favour of mobile connectivity. However, 5% of over-65 internet users also rely solely on mobile connectivity to get online. The numbers using only mobile internet may grow with the rollout of 4G and extension of data coverage.

Figure 3-8

Internet users who never use a fixed connection at home to access the internet



Source: Plum Consulting, Ipsos MORI

3.5 What if internet use converged on mobile use?

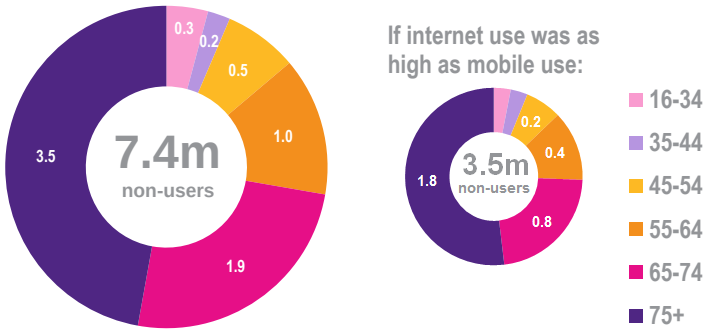
Based on Eurostat data and utilising the Plum cohort model (discussed in Figure 1-2) there are 7.4 million people in the UK who are effectively offline (have not used the internet in the past 3 months), a number that is steadily but slowly declining, in part due to demographics alone. Demographic changes will reduce the number of non-users to 5.4 million by 2020, but strong digital inclusion initiatives could surely do better.

To obtain an estimate of how big a reduction in internet non-users is realistically achievable, we have taken mobile adoption today (smart or basic phone) as a basis for projecting potential internet adoption. The reason for this that existing adoption of mobile amongst those aged 55+ is an indication of flexibility to adoption of new technology; and because the transition from basic phone to smartphone and/or tablet maximises familiarity at each step.

For modelling purposes we assume that by 2020 everyone under the age of 55 who has a mobile phone today will be online. For the over 55s, we assume that internet use in 2020 will be 90% of mobile phone use today. Allowing for demographic changes utilising the Plum cohort model we obtain the following forecast for 2020 (Figure 3-9).

Figure 3-9

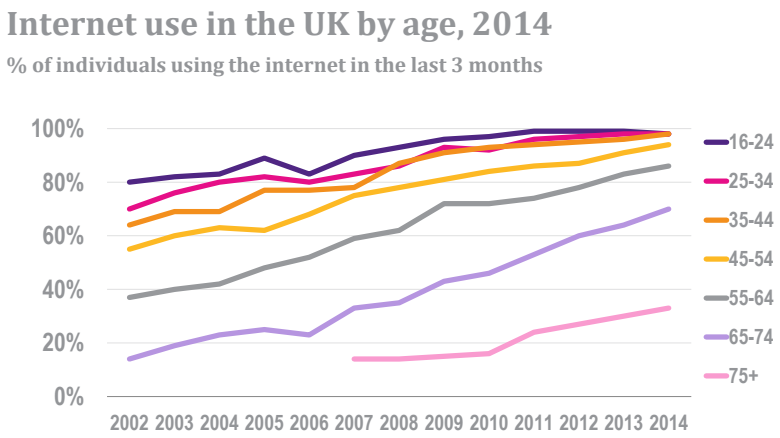
Internet non-users by age group, 2014 vs. 2020



Source: Plum Consulting, Eurostat, ONS

Achieving a reduction in internet non-use from 7.4 million today to 3.8 million by 2020 would be a significant achievement. As time passes the cohort effect reduces, since, as shown in Figure 3-10, the younger age groups are already at saturation.

Figure 3-10



Source: Plum Consulting, Eurostat, ONS

Our scenario involves a reduction in the offline population by around 17% by 2016 and around 50% by 2020. The government target is to reduce the number offline by 25% by 2016.[33] Our envisaged scenario would mean that 95% of the over-16 population will be internet users by 2023. Demographics alone would not achieve the same outcome before 2032.

[33] https://www.gov.uk/government/publications/government-digital-inclusion-strategy/government-digital-inclusion-strategy

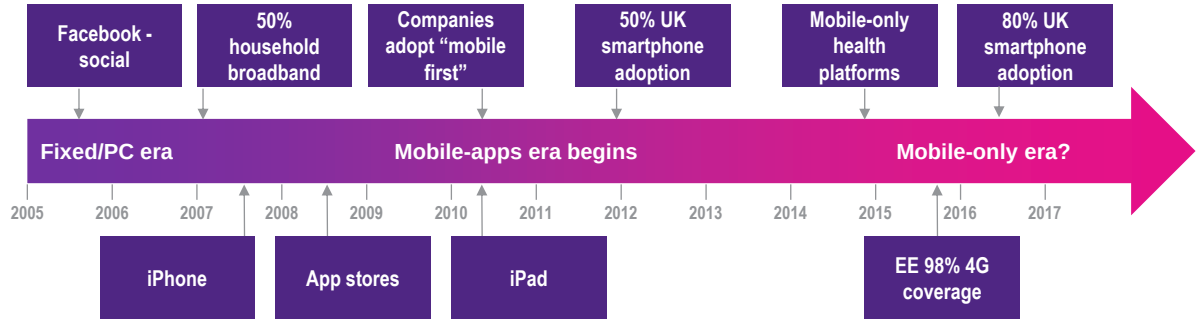
4 Benefits of online will increasingly depend on mobile

After a sustained period in which fixed connectivity and the PC have dominated, online mobile devices, apps and connectivity have grown rapidly. Ericsson estimate that globally over 85% of all broadband connections will be mobile connections by 2018.[34] In the UK the adoption of mobile devices and mobile connectivity is in turn driving a shift in the focus for applications development. This has resulted in:

- "Mobile first" strategies announced by services including Google and Facebook from 2010.
- Mobile-only applications, including applications that exploit features unique to mobile including mobility and location awareness, and which relay on sensors built into mobile devices.
- Mobile-only apps and software development platforms e.g. some messaging apps and Apple "HealthKit" and "Google Fit" platforms announced in June 2014.[35]

These shifts are summarised in Figure 4-1.

Figure 4-1: The rise of mobile globally and in the UK



4.1 Mobile only application benefits

Some applications offer greater benefits when used on a mobile device, for the following reasons:

- Some applications are unique to mobile devices (where we refer to apps we include web apps utilising HTML5 as well as native apps).
- Some rely on sensors built in to mobile devices.
- Some are intended to take advantage of the portability of mobile devices to be used while out and about, or are reliant on always being close to the user.

While some apps are usable on a PC or laptop, a mobile device may be required to capture the full benefit. A rapidly expanding number of applications derive some or all of their value uniquely from mobile. For example:

[34] Ericsson. June 2014. "Ericsson mobility report." http://www.ericsson.com/res/docs/2014/ericsson-mobility-report-june-2014.pdf

[35] http://www.theverge.com/2014/7/22/5923849/how-apple-and-google-plan-to-reinvent-healthcare

Google Maps

Provides maps and directions

Uber

Orders a private driver to the user's current location

WhatsApp

Popular messaging app (not available on fixed)

WheelMate

Locates the nearest accessible public toilet or disabled parking space

Food Diary

Logs calorie intake & exercise to help users keep track of their weight (incudes bar code scanner)

Glucose Buddy

Assistive tool and logbook for diabetics

Speak For Me

Reads out typed text - useful for those who cannot speak

Ariadne GPS

Provides a 'vocalised' map of the vicinity to help the visually impaired navigate

Google Maps and other mapping and navigation apps exploit location awareness and become more useful when the user is out of the home. Applications for those with disabilities are often reliant on sensors built into mobile devices (i.e. camera, microphone, orientation and movement). For other apps, it is the portability of mobile devices that is useful – for instance, Glucose Buddy and Food Diary allow users to calculate their calories or energy intake while dining out (or even in other locations in the home).

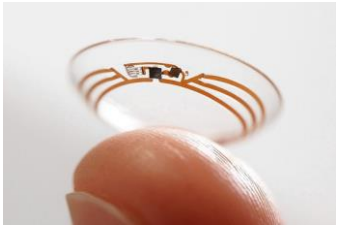
4.2 Mobile only health and fitness development platforms

In June 2014 the shift to benefits of online unique to mobile gained further momentum when Apple and Google announced health and fitness platforms for mobile-only third party software and devices (Figure 4-2).

Figure 4-2: Apple HealthKit and Google Fit plaforms announced in June 2014

Health software platforms linked to wearable sensors and data analytics could support people in achieving health and fitness goals and monitor health status, thereby providing early warning of developing conditions and supporting appropriate medication (for example the non-invasive monitoring of blood glucose for those with diabetes, see Figure 4-3).

Figure 4-3: Contact lens blood glucose sensor



The above developments may be particularly important for the over 55s, who account for 80% of those currently offline. This group could also benefit disproportionately from applications which support healthy and independent living.

We note that the NHS proposes the incorporation of data from mobile apps into the health system in future:[36]

> *"In 2015, all citizens will have online access to their GP records and will be able to view copies of that data through apps and digital platforms of their choice. But it is essential that citizens have access to all their data in health and care, and the ability to 'write' into it so that their own preferences and data from other relevant sources, like wearable devices, can be included."*

An illustration of the use of an app and wearables to manage epilepsy is provided in Figure 4-4.

Figure 4-4: Use of bracelet and smartphone app to monitor epilepsy[37]

"…four out of five people living with epilepsy can lead seizure-free lives, according to Dr Rupert Page, a neurologist who set up the Dorset Epilepsy Service in 2009. The key is prompt specialist intervention to ensure that medication is adjusted to the patient's individual needs."

"In the Epilepsy Networks Project…patients believed to be at risk will be equipped with "seizure detection bracelets" linked to their smartphones. If the bracelet's accelerometers and other sensors detect that the wearer is having a seizure, a whole set of communications can be triggered. The phone's screen could be locked with a message telling first responders what to do and the wearer's location texted to a next of kin."

"Most significant from a long-term treatment point of view, the seizure can be recorded immediately in the patient's electronic medical record, to be flagged up the next time someone from the epilepsy care team logs in. Dr Page stresses that all this is with the patient's consent. Recording exactly when a patient has had a seizure is vital, he says, because it shows the medication is not working and that complex doses need to be adjusted."

Digital inclusion may therefore rapidly become synonymous with smart mobile inclusion.

[36] NHS. November 2014. "Personalised Health and Care 2020."
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/376886/NHS_England_NIB_report.pdf

[37] http://raconteur.net/technology/nhs-on-new-information-pathway

5 How policy needs to change

The role of mobile devices and connectivity both in helping people get online and enabling them to benefit fully from being online is neither well measured nor seen as a core element of digital inclusion initiatives.

Digital inclusion programmes have tended, for historical reasons including an installed base of PCs, to have a 'PC centric' focus. Emphasis is first and foremost on mouse, keyboard and software skills which relate to the PC environment rather than mobile (though with growing instances of experimentation with the use of tablets).

Online centres may also benefit from diversifying their resources. Plum visited a centre that had 20 laptops but no tablets. Learners who did not own tablets therefore did not have the opportunity to engage with the technology, or make an informed choice about which device best fit their needs. While for some requirements (e.g. writing a CV) a PC will be a better choice, for other users the tablet may be a better fit. The costs, and cost effectiveness, of greater reliance on mobile devices including tablets compared to maintaining the status quo approach should be assessed.

Availability and use of tablets to help get people online is however increasing. For example, the Barclays Digital Eagles initiative builds on 10,000 iPads which were distributed to branch staff to introduce customers, particularly those over 65, to the internet.

Broader government policy has also yet to fully adjust to the changing reality. Whilst online resources have been adapted to be compatible with mobile use, apps development is discouraged in Action 6 of the Government Digital Strategy:[38]

> *"Stand-alone mobile apps will only be considered once the core web service works well on mobile devices, and if specifically agreed with the Cabinet Office."*

Whilst native apps are not always appropriate they are increasingly common in the corporate sector, a reflection of the fact that they offer deeper device integration and may offer users greater consistency in terms of the user interface.

This may reflect the pace of change: the iPad did not exist prior to 2010 and smartphones have only recently passed 50% adoption. This paper sets out why mobile should play a greater role in efforts to get people online and to enable them to benefit fully from going online.

The role of mobile is not yet well measured, but available evidence and anecdotes from experience are sufficiently strong to warrant a conscious redirection of focus, and experiments to better understand what works and what doesn't. We set out proposals for what could be done below.

5.1 Outcomes need to be measured and assessed

The effectiveness, and therefore the cost effectiveness, of digital inclusion initiatives is not well measured. Age UK noted that:

> *"More consistent and robust evaluation of DI [digital inclusion] interventions is needed as a matter of urgency, so that we can have a clear picture of benefit, including cost-effectiveness,*

[38] http://digital.cabinetoffice.gov.uk/2013/03/12/were-not-appy-not-appy-at-all/

quality of life and health improvements. Current evaluations generally fail to give the evidence necessary to prove the benefits of prevention and social engagement claimed"[39]

Age UK also identify the role of new technology as one of the gaps in the current evidence base:

"What new technologies are in the pipeline? Are there, for example, any user- and age-friendly devices which will soon be available to potential internet users which will produce a step-change in the number of older people online?"

Further, Seale and Dutton (2012) state that:

"If we are unsure about what empowerment is, we are even less sure about what empowering practice is. This problem is confounded by the fact that there is little incentive for digital inclusion practitioners to critically evaluate their practices in a meaningful way."[40]

"Overall, there is not enough clearly evaluated and robust evidence on the general theme of what works in combatting digital exclusion to draw many conclusion from this body of work, and some of the evaluations are now too old to be of relevance. The main conclusion which comes out of these studies is that better evaluation, built into the project plan at the beginning, is now urgently needed."[41]

More systematic testing of alternative approaches in terms of the time required to get people online and comfortable with a core set of skills, the likelihood they stay online and the benefits they derive from being online is required. Specifically, the pros and cons of utilising tablets rather than PCs should be evaluated. Indeed, there is a sound argument for making such evidence a condition for funding.

In addition to a lack of evidence in relation to devices and approaches to getting people online, evidence of mobile-only connectivity is limited. A key consideration is that Ofcom surveys are based on an outdated view of technology. Ofcom defines mobile broadband to exclude smartphones and SIMs that are sold with a voice service:

"Mobile broadband includes the use of USB modems ("dongles"), datacards, mobile Wi-Fi devices and embedded cellular SIMs in tablets and PCs, or in other words a cellular data service that is not sold with a voice service. Mobile broadband excludes smartphone use because smartphones are usually sold with a voice service." Ofcom, CMR13

Other data sets use a wider definition of mobile access, for example Pew Internet and Eurobarometer. Ofcom should adapts its surveys to include the full range of ways people can go online via mobile (particularly given that other devices may be tethered using via a smartphone).

5.2 Digital skills should be adapted to reflect mobile

Historically, courses tended to emphasise mouse and keyboard skills, and whilst touch interface skills may be offered, they tended to be viewed as a follow on to core PC skills. In January 2015, Go ON

[39] Marcus Green and Phil Rossall. 2013. "Digital Inclusion Evidence Review". Age UK http://www.ageuk.org.uk/Documents/EN-GB/For-professionals/Research/Age%20UK%20Digital%20Inclusion%20Evidence%20Review%202013.pdf

[40] Jane Seale and William Dutton. 2012. "Empowering the digitally excluded: learning initiatives for (in)visible Groups", Research in Learning Technology, Vol 20. http://www.researchinlearningtechnology.net/index.php/rlt/article/view/20214

[41] Green and Rossall. 2013.

UK published a definition of Basic Digital Skills[42] which encompasses five categories of activity: managing information, communicating, transacting, problem solving and creating (with security a cross cutting issue across all activities). The revised approach is more neutral across device types including PC, tablets and mobile. A shift to a broader overall approach to skills definition is welcome.

Over time, there may be other considerations in relation to digital skills which will need to be addressed:

- First, the optimal learning journey for a given device type can be expected to differ and the approach to meeting a particular skill requirement may need to differ. For example, virus checking software might receive little if any mention for those going online via a tablet, whilst the use of apps and apps stores might receive particular attention. The approach adopted for a given device cannot be entirely technology neutral in practice. Supplementary guidance, conditional on device choice, may be required.
- Second, the approach to getting people online is likely to be more successful if it focuses (at least initially) on things that the participant values. One person might want to listen to Chinese opera and use video calling whilst another might want to utilise maps and real time public transport information. More generally, Pew Internet in the US found that older adults value the internet most for communicating with family and friends.[43] An individualised learning journey may be more effective at getting people online.
- Third, if key applications are made available on only one platform then an approach that is strictly technology neutral may be incompatible with achieving genuine digital inclusion. For example, some applications such as maps offer their full value when used with mobile, whilst others such as some health and fitness applications have been made available for mobile only. Over time, if benefits are increasingly tied to a particular platform, then a strictly neutral approach may no longer be consistent with digital inclusion.

Given the rapid pace of change in devices and applications the overall approach to digital inclusion and skills should be kept under review.

5.3 Government policy should be rebalanced to reflect mobile

Government has provided subsidies to fixed network extension, but in general applies levies to mobile (in particular proposed spectrum annual licence fees[44]). Levies can be expected to discourage investment and potentially harm digital inclusion.[45]

Government should also continue to work towards ensuring that services are accessible and work well on mobile devices. The government might also adopt a more permissive approach to apps, which currently require Cabinet Office approval:[46]

Action 6 of the Government Digital Strategy states:

[42] Go ON UK. "Basic digital skills." http://www.go-on.co.uk/basic-digital-skills/

[43] Pew Internet. April 2014. "Older Adults and Technology Use." http://www.pewinternet.org/2014/04/03/older-adults-and-technology-use/

[44] Ofcom. August 2014. "Notice of Ofcom's proposal to make regulations to revise the fees payable for 900 MHz and 1800 MHz licences". http://stakeholders.ofcom.org.uk/consultations/notice-proposal-fees/

[45] Plum. January 2014. "Annual licence fees – you cannot have your cake and eat it." http://www.plumconsulting.co.uk/pdfs/Plum_Jan2014_ALF_-_you_cannot_have_your_cake_and_eat_it.pdf

[46] http://digital.cabinetoffice.gov.uk/2013/03/12/were-not-appy-not-appy-at-all/

"Stand-alone mobile apps will only be considered once the core web service works well on mobile devices, and if specifically agreed with the Cabinet Office."

Apps have a role to play offering deeper integration with mobile device sensors, greater responsiveness and potentially improved discoverability (for example, in the US app development in relation to disaster relief has been encouraged).[47] The role of apps is recognised in the government open data initiative which seeks to open up government datasets for app developers who are then able to provide new and enhanced services to users.

In conclusion, mobile's growing role in how people get online (and stay online) and in the benefits of being online mean that it should be a central plank of the Government's digital strategy.

[47] http://www.whitehouse.gov/blog/2014/07/07/announcing-white-house-innovation-disaster-response-and-recovery-initiative-demo-day

Appendix A: UK data sources & data gaps

Table A-1: UK data sources regarding internet use and device adoption

	Earliest	Frequency	Description
Oxford Internet Surveys (OII)[48]	2003	Biannual	Detailed survey covering attitudes towards the internet in Britain, and trends in the use of the internet
ONS[49]	2006	Annual	UK statistics on internet usage
Eurostat[50]	2002	Annual	Country-level European data covering some quantitative aspects of internet use
Eurobarometer[51]	2006	Annual	Detailed survey covering e-communications across European countries, covering (among others) internet adoption fixed and mobile connectivity
Pew Internet Research[52]	-	Some annual statistics	Produces internet research and data on internet/technology trends for the US
Ofcom Adults Media Literacy Tracker[53]	2005	Annual	Surveys the access, usage and understanding of internet, television, mobile and other platforms among the adult population of the UK. Covers usage of the internet as well as regularity of use and connectivity
Ofcom Tech Tracker	2008	Three waves per year	Tracks the behaviour of the public in relation to technology, covering device ownership and use and connectivity
Ipsos MORI Tech Tracker[54]	2010	Quarterly	Survey data on device ownership and use, and the use of the internet

Data gaps include:

- Mobile-only internet (Eurobarometer collect data on mobile-only households – See Appendix B.2).
- Ofcom definition of 'mobile internet' which is excludes use of smartphones.
- Cost effectiveness of digital inclusion initiatives.
- Learning journey by device.

[48] http://oxis.oii.ox.ac.uk/

[49] http://www.ons.gov.uk/ons/rel/rdit2/internet-access-quarterly-update/index.html

[50] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ci_ifp_iu&lang=en

[51] http://ec.europa.eu/digital-agenda/en/news/special-eurobarometer-414-e-communications-household-survey

[52] http://www.pewinternet.org/

[53] http://stakeholders.ofcom.org.uk/market-data-research/other/research-publications/adults/adults-media-lit-14/

[54] http://www.ipsos-mori.com/researchspecialisms/ipsosmediact/customresearch/technology/techtracker.aspx

Appendix B: International data

Table B-1: Pew Internet Research: Internet use in the US[55]

	Home broadband	Home broadband or smart phone	Difference i.e. smart phone only	Internet users	Mobile phone owners	Smart phone owners	Tablet owners
All adults	70%	80%	+10	87%	90%	58%	42%
Ethnicity							
White	74	80	+6	85	90	53	35
Black	64	79	+15	81	90	59	24
Hispanic	53	75	+22	83	92	61	45
Age							
18-29	80	95	+15	97	98	83	48
30-49	78	89	+11	93	97	74	52
50-64	69	77	+8	88	88	49	37
65+	43	46	+3	57	74	19	25
Education							
No high school diploma	37	52	+15	N/A	N/A	N/A	N/A
High school grad	57	70	+13	N/A	N/A	N/A	29
Some College	78	87	+9	91	93	67	45
College +	89	93	+4	97	93	71	59
Income							
<$30,000	54	67	+13	77	84	47	26
$30,000 - $49,999	70	79	+9	85	90	53	45
$50,000 - $74,999	84	91	+7	93	99	61	47
$75,000+	88	95	+7	99	98	81	65

[55] Pew Internet: February 2014. "The Web at 25 in the US." http://www.pewinternet.org/2014/02/27/the-web-at-25-in-the-u-s/
August 2013. "Home Broadband 2013". http://www.pewinternet.org/2013/08/26/home-broadband-2013/
January 2014. "Tablet and E-reader Ownership" http://www.pewinternet.org/2014/01/16/tablet-and-e-reader-ownership/

Table B-2: Eurobarometer household internet use in Europe[56]

	Households with internet connection at home and no mobile internet access		Households with internet at home and mobile internet access		Households with mobile internet access and no internet connection at home		Households without internet access	
	%	**vs. 2011**	%	**vs. 2011**	%	**vs. 2011**	%	**vs. 2011**
EU28	24%	-11	41%	+12	7%	+3	28%	-4
UK	18%	-8	57%	+5	10%	+5	15%	-2
France	26%	-12	51%	+17	3%	=	20%	-5
Germany	30%	-12	46%	+14	3%	+1	21%	-3
Italy	18%	-19	26%	+10	17%	+12	39%	-3
Spain	8%	-21	47%	+24	13%	+10	32%	-13

[56] Eurobarometer. 2014. "E-Communications and Telecom Single Market Household Survey" http://ec.europa.eu/public_opinion/archives/ebs/ebs_414_en.pdf