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Developing Government objectives for broadband

Welcome

I hope you enjoy our tenth Vodafone Policy Paper. Our aim in these papers is to provide a platform for leading experts to write on issues in public policy that are important to us at Vodafone. These are the people that we listen to, even if we do not always agree with them. These are their views, not ours. We think that they have important things to say that should be of interest to anybody concerned with good public policy.

Vittorio Colao, Chief Executive, Vodafone Group

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David Lewin

Principal Consultant
PLUM

David Lewin is a principal consultant at Plum where he specialises in the area of telecommunications policy and regulation in a competitive environment. David is one of the founders of Plum Consulting. He previously worked at Ovum, which he helped found in 1985. During his 20 years there he was Director of Consulting, Chief Executive and then Chairman, before deciding to concentrate on directing and managing major consulting projects for clients.

Demand-side measures to stimulate Internet and broadband take-up

Executive Summary

What can governments do to get non-Internet users online and how can it be done as cost-effectively and quickly as possible?

Current levels of Internet use vary substantially by age, educ ation, income, and work force participation in developed countries. In the EU15[1] 90% of young people are Internet users but fewer than 30% among the 65 to 74 age group use the Internet. There are also substantial variations among countries.

These differences largely reflect demand-side rather than supply-side effects. The supply-side factors most likely to influence Internet use - the price and availability of broadband - have had only a modest impact on cross-country variation in levels of Internet use, while there is continued Government interest in setting targets for broadband roll out rather than internet adoption.

Today there are still a large number of non-users in Europe. On current trends, and with current demand-side policies, we are unlikely to see significantly reductions. For ex ample in the EU 15 we expect that:

- The 60 million non-Internet users among poorly educated older people will decline by only 8 million between 2009 and 2014
- It will take nearly 30 years to reduce this population of non-users from 60 million to 20 million
- It will take eight years for the 25-54 year old group, who make up most of the workforce, to reach 90% penetration of Internet users.

On current trends, most of these changes will come about because of cohort effects[2] rather than because of effective demand-side measures by Government.

There is a large number of existing Government-funded demand-side measures in the study countries. But it is difficult to draw any firm conclusions about their effectiveness becaus e of a lack of rigorous ex -post analysis of their impacts. It appears that much of the public money currently spent in this way is wasted.

Policy changes are needed to accelerate internet usage amongst key groups in European society and to provide a better return on the public funds that are invested in this area. In particular, we recommend that:

- Governments should target incentives in a more systematic and rigorous way. Above all they need to make rigorous, ex -post evaluations of effectiveness a condition for funding programmes of demand-side measures.

- They should look critically at programmes of demand-side measures aimed at the over 25s who are poorly educated before funding them. When based around traditional technologies such programmes are costly and slow to take effect.
- In dealing with this group Governments should take advantage of current market trends such as the take-up of mobile broadband and smartphones, the introduction of Internet access via televisions and e-book readers, the move from browsers to applications, and the trend towards cloud computing. These all reduce the skills needed to use the Internet and the cost to end users of doing so. They should refuse to fund programmes which fail to take account of these trends
- In general they should give the 25 to 54 year age group higher priority than the over 55s. The former group will be Internet users for longer and, once users themselves, can potentially support their parents to become Internet users
- To deal with affordability barriers, governments should design universal broadband policies which allow non-users to choose appropriate broadband packages from fixed and mobile offerings. This may mean switching subsidies from the supply-side to the demand-side
- Governments should encourage the development of services which allow those currently without debit or credit cards to carry out e-transactions.

Introduction

The Internet is now used by the majority of people in most developed countries. As countries have reached this milestone, governments have turned their attention to the goal of full e-inclusion[3] and to the measures which are required to reach this goal. Measures to stimulate demand for the Internet are increasingly the focus of public policy on both sides of the Atlantic[4] and it is likely that governments in the developed world will invest significantly in such measures over the next decade. Given this situation we seek to answer five basic questions in this report:

- Who does and does not use the Internet?
- What are the main barriers to Internet use?
- What have governments done so far to stimulate demand?
- What will happen if nothing more is done?
- What should governments do now to stimulate demand in a cost-effective way?

The aim of the study, commissioned by Vodafone, is to provide an independent and critical examination of available data and studies before reaching evidence-based answers to these questions.

We focus our analysis on ***Internet use by individuals*** rather than on ***Internet access*** or ***broadband take-up by households***. There are two main reasons for this:

- The economic and social value of e-inclusion comes from getting everyone (or nearly everyone) online. Internet use by individuals measures how far we are from achieving this goal. Household Internet access does not always accurately reflect use by individuals. Nor does it measure the extent to which people use the Internet outside the home (eg on mobiles) or in cafes
- The rate at which the penetration of Internet users grows gives a better measure of how quickly we are moving towards full e-inclusion than the rate of broadband take-up. Much of the growth in consumer broadband take-up observed over the past few years reflects a switch by existing Internet users from dial-up to broadband access rather than a growth in new Internet users.

What does existing data tell us about Internet use?

Key findings

In this section, we examine patterns of Internet use[5] by region for the EU15, the US and South Korea and by population segment. We consider segments defined by age, education, income, employment status, household composition, location and gender.

From our analysis, we identify the following key points:

- There are common significant variations by demographic segment – most prominently by age, education, income, and employment status – in the levels of Internet use across the studied developed world.
- There are also significant differences between countries in these patterns of Internet use. For example, the gap between the young and old in Korea is much larger than that in the US. Even within the EU15, there are big differences between the Mediterranean and Nordic countries in levels of Internet use across all age groups.
- These cross-country differences are less marked for younger people. But even here they can be substantial, especially when we look at those who received little education.
- Many of these cross-country differences can be partially explained by historic differences in education and literacy levels and in participation and ICT use in the workforce.
- The supply-side factors most likely to influence Internet use - the price and availability of broadband - appear to have had only a modest impact on cross-country variation in levels of Internet use.
- English literacy levels and cultural differences may have some impact on Internet use, but the extent to which they do so is difficult to quantify and most likely not hugely significant.
- There are three main barriers to Internet use identified by surveys. Non-users do not see its relevance, do not have the skills to use it, and/or cannot afford to do so.
- There is an additional significant barrier unidentified by surveys, which is the lack of a bank account or credit/debit card. Up to half of current non-Internet users may not be able to carry out transactions on the Internet because they lack a debit or credit card, although there are some alternatives such as prepaid cards.
- Market trends will lower these barriers to Internet use. For example, requirements for digital skills will lessen as users switch from using PCs and browsers to using *apps* on smart phones and tablets to view information on the web. At the same time affordability barriers should reduce as LTE-based mobile packages offer significantly lower broadband prices to people with modest download requirements.

We set out the analysis on which these tentative conclusions are based below

Common patterns of Internet use across countries

Our analysis of levels of Internet use, set out in detail in Annex A, suggests that the patterns of Internet use by population segment are common across all developed countries. We find that, in all the study regions:

- There are big variations in Internet use by ***age, education, income,*** and ***employment status.*** It is important to recognise that there are correlations between all of these categories and that variation can reflect a combination of reasons.
- There are much smaller variations by ***location, gender*** and ***household composition.***

Figure 2-1

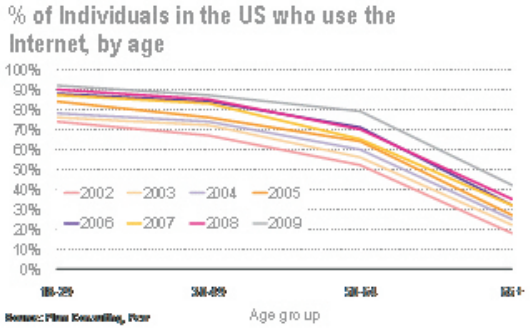


Figure 2-2

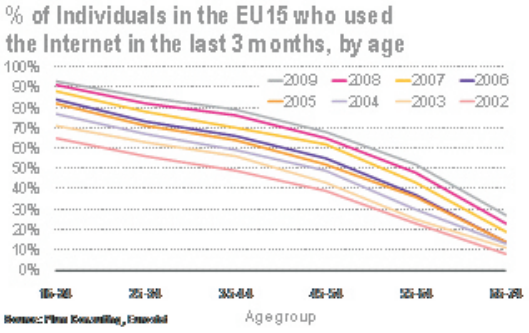


Figure 2-3

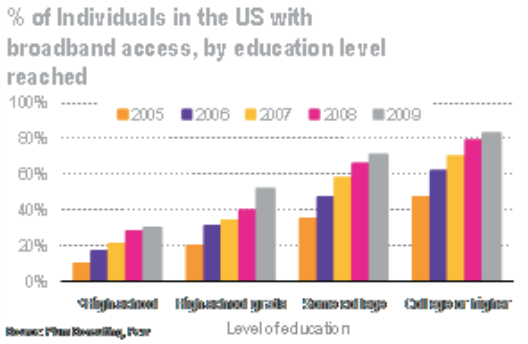


Figure 2-4

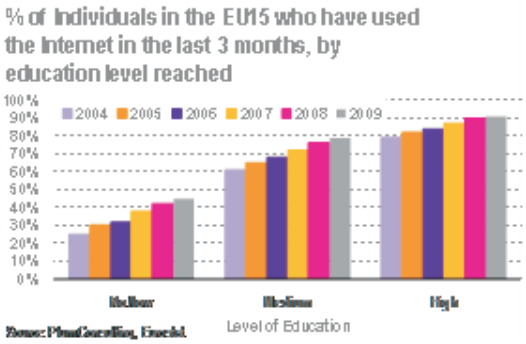


Figure 2-1 to Figure 2-4 illustrate the variation by age and education for the EU15 and the US.

Income and education are strongly correlated and it is uncertain which does more to explain variations in levels of Internet use. On balance, published econometric studies which focus on Internet use rather than broadband take-up suggest that education is more important than income.[6]

In practice it makes sense for governments to analyse national levels of Internet use by age, education,

Figure 2-5

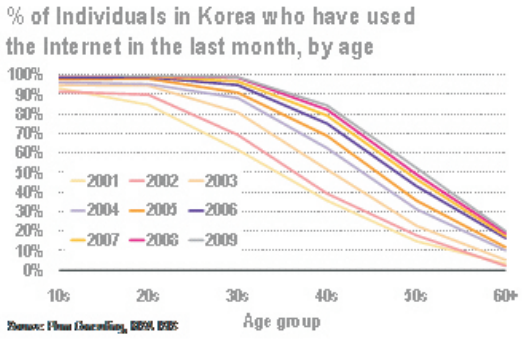
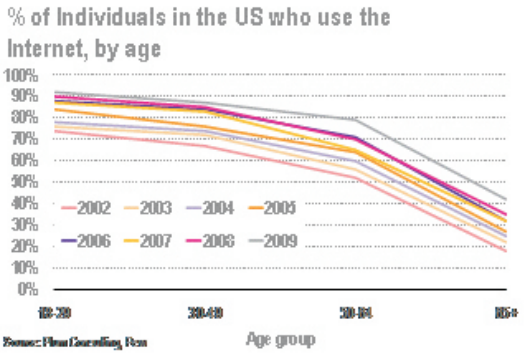


Figure 2-6



employment status ***and*** income[7] before setting priorities for targeted funding of demand-side measures. It is also important to analyse Internet use by combined categories such as age and education,[8] as the analysis set out below demonstrates.

What can we learn from cross-country differences in Internet use?

There are common patterns in the levels of Internet use by age, education, income, and workforce participation across developed countries, but there are also significant differences among countries in these patterns of use. Why do these differences exist and what do they tell us about the drivers for, and barriers to, Internet use? Our analysis is as follows.

Finding 1 *The level of Internet use across ages varies significantly from region to region.*

In both Korea and the US, Internet use is consistently higher for young people than for older people, but there are significant differences. Use by younger people is higher in Korea than the US but use by older people is higher in the US as Figure 2-5 and 2-6 illustrate. Within Europe, the level of Internet use across all ages is much higher in the Nordic countries than in Mediterranean countries. Figure 2-7 illustrates.

Finding 2 *These cross-country differences are less marked for the 16-24 age group than for those over 25.*

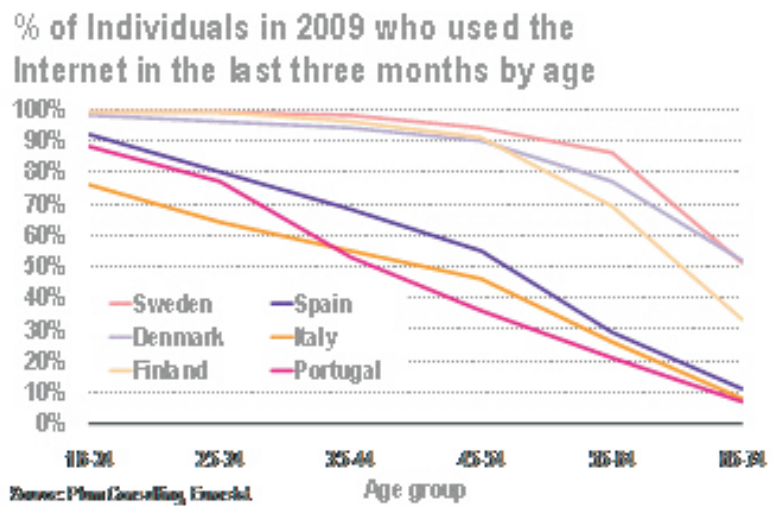
Figure 2-7 illustrates. But, even for people under 25, there are big differences between some countries - especially when we consider young people with little education. Figure 2-8 and 2-9 illustrate these differences for Denmark and Italy.

We can see that education makes no difference to levels of Internet use among young people in Denmark but has a significant effect in Italy. This difference may indicate variations in the way ICT skills are taught in Denmark and Italy.

Finding 3 *The level of formal education and literacy is not necessarily a barrier to Internet use for young people.*

Figure 2-8 and Figure 2-10 illustrate. From Figure 2-8 we can see that, in Denmark, there is almost 100% Internet take-up irrespective of educational attainment for this age group. We can see from Figure 2-10 that, while there is a general distinction between literacy test scores for

Figure 2-7



15 year olds between Nordic and Mediterranean countries,[9] Denmark's young people have relatively low literacy levels – with 15% of its 15 year olds scoring at Level 1 or below.

Finding 4 *Some cross-country differences may relate largely to historic differences in levels of education.*

As Figure 2-5 and Figure 2-6 show, older people in the US are twice as likely to use the Internet as older people in Korea. Figure 2-11 provides a possible explanation. The level of education of older people in the US is significantly higher than in Korea. This effect could explain a substantial proportion of the differences in Internet use by older people in the US and Korea.

Finding 5 *Workforce participation may be a significant factor in explaining cross-country variations in Internet use.*

Figure 2-12 illustrates. It shows that:

- Some of the lowest rates of workforce participation occur for women and seniors
- In the high Internet-use Nordic countries, over 60% of 55 to 64-year-olds, and nearly 75% of women are in employment
- In contrast, in the Mediterranean countries, where Internet use is low, these proportions drop to just over 40%, and just under 60%, respectively.

This finding is also supported when we look at gender differences in Internet use. Internet use is virtually identical for males and females in Denmark, where female workforce participation approaches that of males. In contrast female Internet use is 10% points below that of males in Italy, where female workforce participation is only half that of males.

Finding 6 *The intensity of ICT use within a country's workforce may also help explain cross-country differences in Internet use, but evidence is mixed.*

The theoretical argument is as follows. Workforce participation acts as a stimulus to Internet adoption when workers are exposed to ICT in the workplace. So in those countries which have high levels of ICT use in the workplace, we might expect to see high levels of Internet use in the population as a whole - as those who use ICT skills in the workplace are likely to also use the Internet at home and to transfer their skills to friends and family.

Figure 2-8

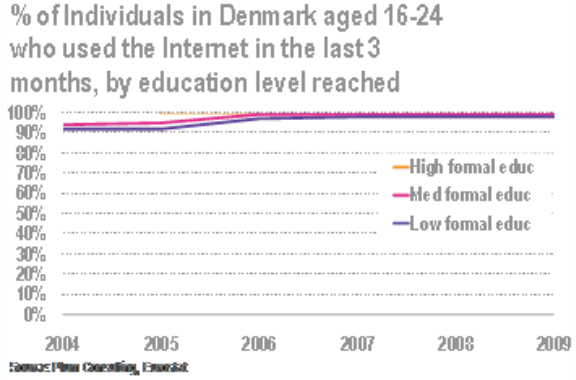


Figure 2-9

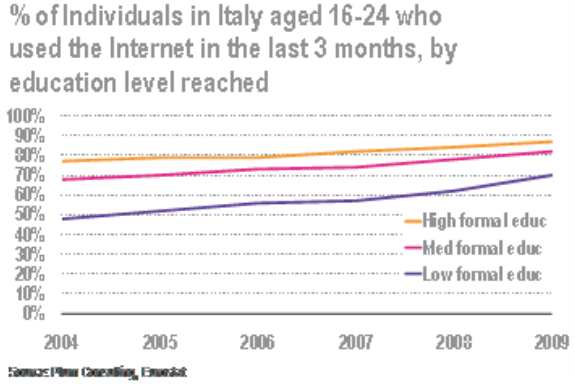


Figure 2-10

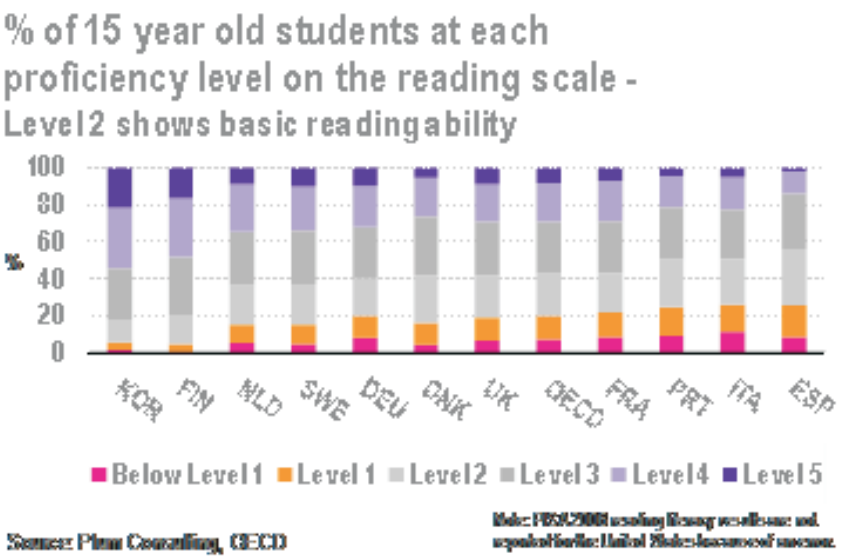
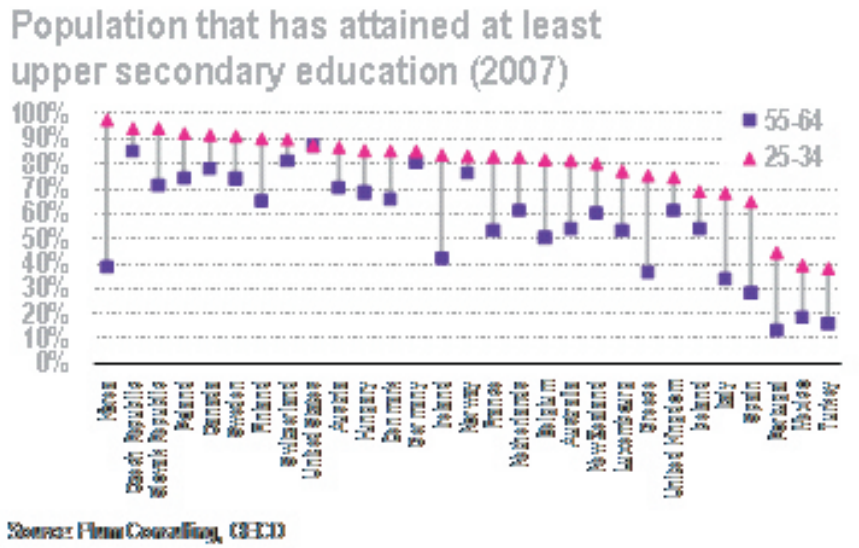


Figure 2-11



The empirical evidence is presented in Figure 2-13, with mixed results. The graph plots the proportion of persons employed with ICT user skills[10] and shows that this proportion is generally higher in the Nordic countries than in the Mediterranean countries. However, there are exceptions: Italy has high percentages of people with ICT user skills, on par with the Nordic countries, while it has much lower levels of Internet use, as demonstrated in Findings 1 and 2.

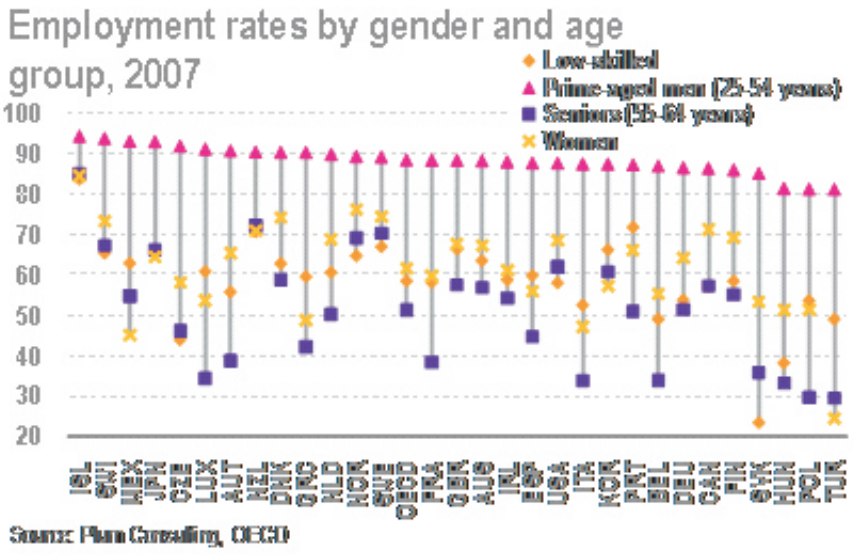
Finding 7 *The supply-side factors most likely to influence Internet use - the price and availability of broadband - appear to have had only a modest impact on cross-country variation in levels of Internet use.*

Figure 2-14 plots the ratio of the price of broadband to GDP per head - a reasonable measure of the affordability of broadband – against broadband penetration[11] for OECD countries and for some EU member states from central Europe. This price to GDP ratio appears to bear little relationship to broadband take-up (or levels of Internet use) for the wealthier countries[12] but to have a significant impact on the poorer countries.

It is more difficult to analyse the impact of ***broadband availability*** on levels of Internet use because the reported data do not include reliable measures of broadband availability.[13] But we note that:

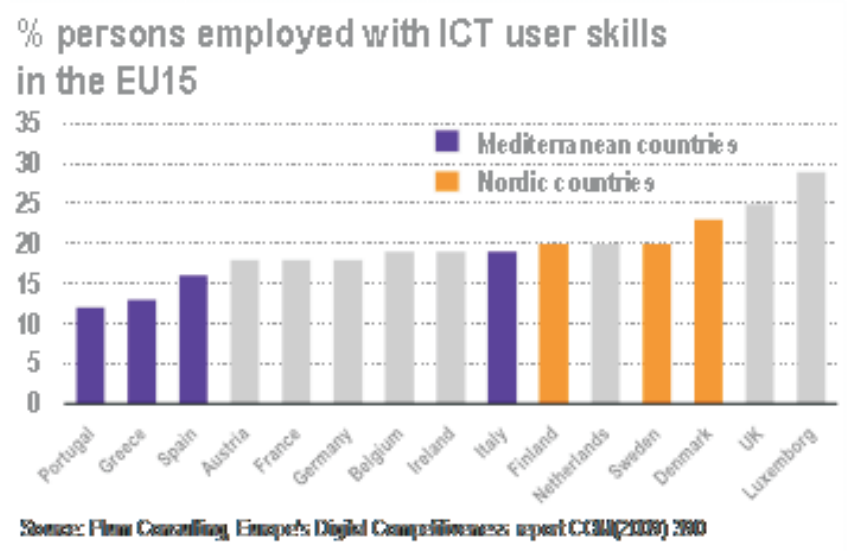
- Internet use is relatively high in the US where surveys report that the lack of available broadband is the main barrier to take-up for 16% of non-users.
- Internet use in Korea is below Nordic levels despite significantly higher levels of broadband take-up,[14] which we understand are the result of intensive supply-side measures by the Korean government from the mid 1990s on.

Figure 2-12



Source: Plum Consulting, OECD

Figure 2-13



Source: Plum Consulting, Europe's Digital Competitiveness report COM(2009) 390

Together these observations suggest that the relationship between the level of Internet use and broadband availability or price is relatively weak – at least for the wealthier countries of the OECD and EU.

Finding 8 *The proportion of the population who speak English may have played a role in shaping the level of Internet use in the past. But English language capability as a factor determining Internet use is now likely to be diminishing fast.*

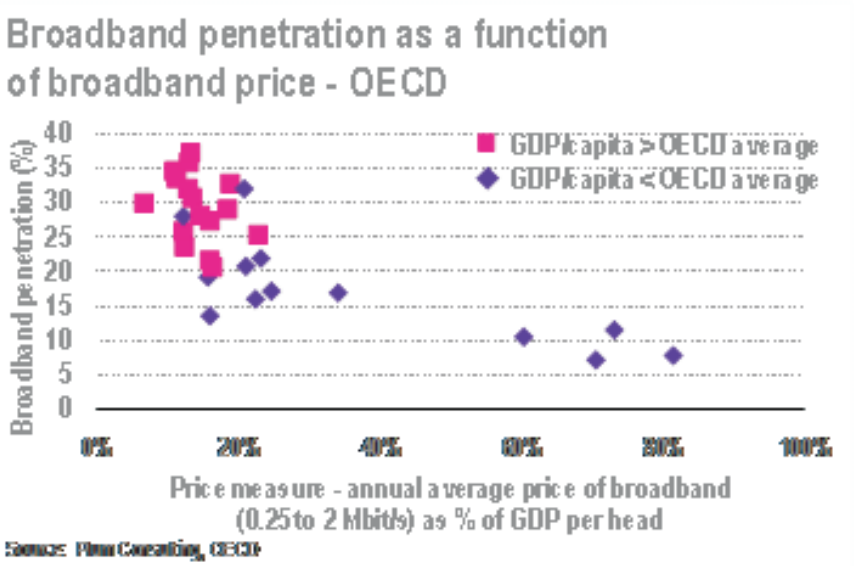
English language capability might in part explain historic differences in Internet use given the relatively large amount of material in English on the Internet. English is more widely understood in the US than in the EU15 and, within the EU, in the UK and Ireland followed by the Nordic countries. In contrast English is less widely spoken in Italy and Spain.[15] These differences fit some of the observed variations in levels of Internet use, but English language capability is diminishing quickly as a determinant of Internet use for two main reasons:

- While there may be a lag in localising new applications which originate in English to other languages, those that are successful tend to be localised first. So the base of local language content is growing quickly.
- Social websites with user generated content, like Facebook and YouTube, allow participation by all language groups. Such social networking websites are now in the top five most popular websites in virtually every developed country.[16]

Finding 9: *There are a number of other cultural factors which might affect levels of Internet use.*

The Internet is a global phenomenon, but its take-up and use, rather like that of mobile phones, is influenced

Figure 2-14



by the cultural values of individual countries. In the case of the Internet, an obvious candidate is the extent to which the society is based around the home or around public meeting places such as cafes, bars or restaurants. Such differences may account for some of the differences in level of Internet use between the North European and Mediterranean countries. But there are counter arguments.[17] And there may now be a trend towards a common digital culture which reduces differences in levels of Internet take-up by country - especially amongst the young.[18] For example, Portugal is a country with relatively low levels of Internet use overall, but its young people are moving quickly towards the 100% Internet take-up already achieved in many countries of northern Europe.

Why do some people not use the Internet?

Surveys of non-users

There are surveys of people who do not use the Internet in the EU, US, and Korea.[19] It is difficult to interpret and compare the surveys, given that they do not offer a comprehensive list of barriers to Internet use.[20] But the surveys suggest that there are three main demand-side barriers to Internet use:

- Non-users do not see the relevance of the Internet to their lives (*Not needed*).
- Non-users do not have the skills to use the Internet (*Lack of skills*).
- Non-users cannot afford the equipment and/or telecommunications connection charges required to use the Internet (*Expense – Equipment and Access costs*).

Not needed is currently the biggest barrier. But, as - shows for the EU15:

- *Expense* and *Lack of skills* grow as reported barriers to Internet adoption as incomes fall.
- *Expense* is probably the most important barrier to Internet use amongst those in the poorest households. This group also tends to have the lowest education which, as we show later, is the population segment which makes up the biggest group of persistent non-Internet users.

The survey finding that *Expense* is a significant barrier to Internet use appears to contradict Finding 7 in Section 2.3 that the price of broadband as a % of income has little impact on current levels of Internet use. This apparent contradiction is, at least partly, resolved when we note that these findings apply to different groups. Current Internet users are not as affected by the price of broadband as they tend to be the wealthier members of the population. In contrast, expense may be a significant barrier for non-Internet users who tend to be the poorer members of the population.

We might reasonably expect the barriers to Internet use to change over time as the population of non-users shrinks. We can observe such changes already in the data. In the US for example the frequency of the response *Not needed* fell from 45% to around 30% between 2007 and 2009, as the proportion of non-users shrank from 29% to 21% of the population. In the EU it fell rather less. Over time *Expense* might also grow in importance as a barrier, given that the proportion of non-users on lower incomes – where *Expense* is a more important barrier – will tend to grow over time.

Literature on adoption of Information Communication Technologies (ICTs)

It is useful to compare the barriers to Internet use with the findings from the literature on how consumers and businesses adopt ICT. For example Davis (1989)[21]

developed the Technology Acceptance Model (TAM) and subsequent work by Mathieson (1991)[22], and Szajna (1996)[23], which evaluated the TAM against rival theories, concluded that the TAM was superior. The TAM predicts that, within the workplace, ICT adoption depends primarily on:

- *Perceived usefulness* - the extent to which an ICT enhances performance.
- *Perceived ease-of-use* - the extent to which using an ICT is free of effort.

Later work also shows that *Enjoyment* has a significant impact on consumer ICT adoption. In 2004 Pagani[24] considered consumer, rather than workplace, ICT adoption for mobile broadband services. She reached conclusions which are consistent with the TAM while adding *Price* and *Speed of use* as subsidiary determinants of adoption.

In combination, the findings of this literature are broadly consistent with the Internet barriers to use identified in the surveys. *Not needed*, *Lack of skills*, and *Affordability* map across as the opposite of *Perceived usefulness*, *Perceived ease-of-use*, and *Price* respectively.

Financial exclusion as a barrier to Internet use

Although not considered in the surveys, lack of a debit or credit card is also likely to be a significant barrier to Internet use. An important driver of Internet use is the ability to make purchases over the Internet. Some analysts,[25] and some of our interviewees, even argue that such transactions can generate savings which more than offset the equipment and service costs incurred in using the broadband Internet.

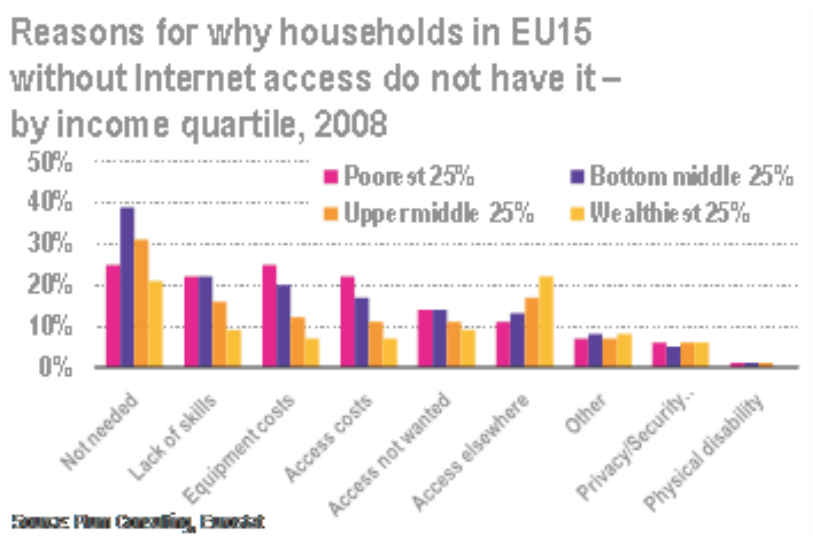
Such e-transactions are currently difficult without the use of a debit or credit card. According to a European Commission report,[26] around 18% of the EU15 population did not have such a card at the end of 2003. Moreover these people are, according to the Commission's report, *"very often in a vulnerable position in society - living on low incomes, unemployed, single people, recipients of social assistance, retirees, or immigrants."* These are precisely the groups most likely to be in the 35% of the EU15 population who currently are not Internet users. In other words, a substantial minority of current non-Internet users are unable to carry out e-transactions on the Internet because they lack a debit or credit card. This significantly reduces the value of the Internet to many potential users and makes it more likely that demand-side measures will be ineffective.

How market trends are changing barriers to Internet use

After a relatively long period of stability, in which the Internet was accessed through a fixed connection and on a PC using local software and a browser, we now appear to be in a period of rapid change in the way consumers use the Internet. The following changes, which are now clearly evident but not yet widespread, may fundamentally change what it means to adopt broadband, use a computer and go online:

- A proliferation of devices with Internet connectivity, including smartphones, netbooks, tablets and single purpose devices such eBooks and Skype all-in-one video cameras, are changing what it means to "go online".
- New interfaces and operating systems provide relatively simple, intuitive and powerful means of interacting with devices/services.
- Mobile broadband adoption, whilst still limited as a substitute for fixed broadband, is growing rapidly in a number of countries and now dominates new additions in countries such as Finland and Austria.

Figure 2-15



- Cloud computing is moving software and software updates away from the user to a server on the Internet, thereby reducing the skills required. Cloud computing is also lowering the processing power and memory requirements of devices.
- Applications (Apps), such as those provided by Apple, Google and Nokia, are making the Internet easier to use. End users no longer need to navigate via a browser and URL but can go directly to a specific application whose function is transparent.
- Accessibility barriers by those with disabilities are also reducing. In particular, the addition of Braille readers, sign language, touch screens and voice recognition features to mass market devices and software is improving access for those with visual, hearing, physical and motor skill impairments; and for those with low literacy levels .

Other market trends are making it possible for those who are financially excluded to carry out e-transactions. For example:

- Credit card companies such as Visa, Maestro, Paypal and Mastercard have begun to offer prepaid credit/debit cards which do not require a bank account or credit check and can be used the same way as a standard credit/debit card for online or regular shopping
- Mobile phone companies now offer subscribers with prepay credits the opportunity to use them to pay for goods and services on-line

These changes may significantly improve the prospects for achieving high levels of Internet use among particular population segments. For example:

- In future it may not be necessary to teach people computer skills or even how to go online in order for them to benefit from online services. Some prospective Internet users might go online using an e-book reader while others might use a smartphone to access applications directly - rather than using a PC and browser to access the Internet.
- Market players might raise awareness of the benefits of using the Internet amongst non-users. For example, current advertisements in the press stress the applications which smartphones offer, rather than their general functionality.
- Affordability barriers might be significantly reduced. For example:
  - Open source software, including Linux and Google Chrome Operating System, will lower the overall costs of devices.
  - The move towards WiFi in hotels, cafes and public places offers an opportunity for free broadband access.
  - The costs of mobile broadband per Megabyte will reduce very substantially as LTE-based networks are rolled out.
  - Given their different cost structures mobile operators can offer substantially lower prices than fixed operators to people who want low volume broadband Internet use but have a restricted budget.

These trends have important implications for how governments spend money on programmes to stimulate Internet take-up, which we consider further below.

What have Governments done so far to stimulate demand?

Key findings

There are a large number of existing government-funded demand-side measures in the study countries.

There are relatively few measures which specifically aim to raise awareness of the relevance of the Internet to non-users, even though this is currently the biggest barrier to Internet use.

It is difficult to draw any firm conclusions about cost-effectiveness or effectiveness in stimulating take-up of government- funded measures because of a lack of rigorous ex-post analysis of their impacts.

When we look at specific government-funded programmes, the evidence is mixed. Some measures, such as the *Million Housewives* programme in Korea and measures in Portugal to stimulate Internet use among younger age groups, appear to have had a significant impact. Others have not.

Targeted, multi-measure programmes with strong local involvement are more likely to be effective in increasing Internet use than demand-side measures which do not exhibit these characteristics. However, they may not necessarily be the most cost-effective programmes.

The different types of government-funded measures

Alongside measures undertaken by market players, a large number of government-funded demand-side measures are already in place to stimulate Internet take-up. Annex B provides a partial list of recent demand-side measures in the study countries. These measures fall mainly into three categories:

- Measures to raise ICT skills through ***digital literacy*** initiatives. One recent study[38] identified 464 such initiatives in Europe, the US, Canada, and India.
- Measures to make services, equipment and training more ***affordable***. The focus is on providing cheap or free equipment to individuals and/or communities, and on improving the affordability of broadband access at schools, libraries and community centres. So far, there are very few measures to deal with the affordability of broadband services at home.
- Measures to increase the ***relevance of the Internet***. Most frequently this involves governments providing new e-services

Although surveys show that the biggest barrier to Internet use is *Not needed* (Section 2.4), we struggled to find many demand-side measures designed specifically to raise awareness and demonstrate the relevance of the Internet to non-users.

Evidence of effectiveness - existing studies

We started our assessment of the effectiveness of existing demand-side measures with a review of the literature. We quickly focussed on four studies that provide recent reviews of government initiatives in this area:

- The Berkman Centre for Internet and Society at Harvard University (October 2009) study.[39] This project looks at both demand-side and supply-side measures to stimulate broadband Internet use, and it is an input to the National Broadband Plan being developed by the FCC.
- The Danish Technological Institute (2008-2009) study for the European Commission[40]. This project focuses on assessing best practice in digital literacy programmes across the developed world.
- A study by Hauge and Prieger (October 2009)[41] which is also an input to the FCC's National Broadband Plan. Here the authors focus on government-funded demand-side measures intended to stimulate broadband take-up in the developed world.
- A study commissioned by the European Commission on e-Inclusion public policies in Europe (September 2009)[42]. The objectives of the study were to illustrate "where and how public intervention has made a clear difference in terms of reducing digital divide" and to classify the "ways for a public authority to design, launch and follow up e-Inclusion policies".

In summary, these studies conclude that:

- There is virtually no evidence on the effectiveness of demand-side measures - primarily because there has been no proper evaluation of the measures. **Most programmes e**valuate the measures in qualitative terms or assess how well a programme was ***implemented***. But there is almost no attempt to quantify ***effectiveness*** in terms of ***outcomes*** achieved. And when such assessments are made, costs are typically incomplete[43], benefits ignored and the counterfactual is not properly defined.
- Targeted rather than general programmes are more likely to meet the divergent needs, attitudes and adoption processes of non-users.
- Local[44] rather than national programmes are more likely to be effective. They may be better supervised, have a better understanding of the

needs of the target group, be better able to reach the target group and make it easier to establish a control group.

- Multiple-measure rather than single-measure programmes[45] are more likely to be effective given that non-users often face multiple barriers to going online.

We note that the last three conclusions help identify programmes which may be more effective in promoting take-up, but do not necessarily point to programmes that are most cost-effective

However, there is no clear evidence that the Avanza programme resulted in faster rates of adoption in Spain (Figure 3-2) than in Finland, except among young people where Internet use is already close to 100% in Finland.

Demand-side measures in Korea

We have also looked at initiatives in Korea. Here there is reasonably good evidence of effective demand-side measures. An early period of rapid growth in Internet adoption followed a series of demand-side stimulation initiatives by the Korean government. Two specific initiatives in the period 2000 to 2002 were the *Million*

Figure 3.1

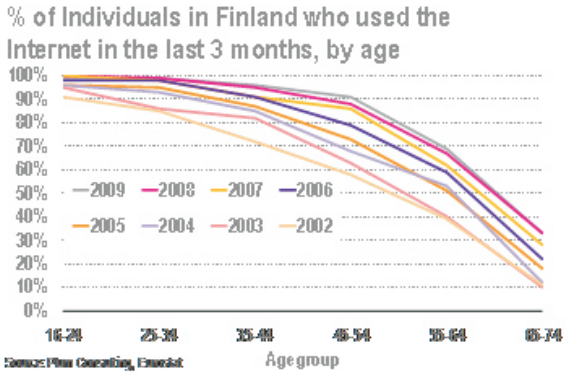
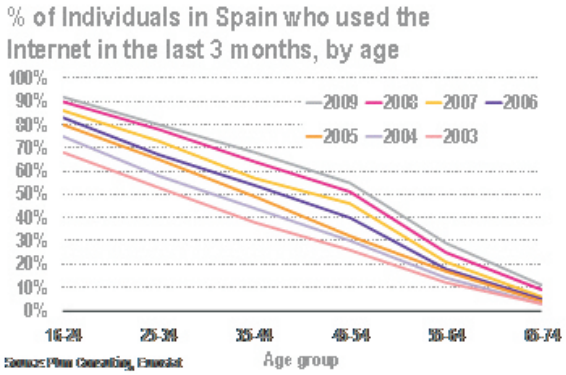


Figure 3.2



Evidence of effectiveness from specific countries

Spain versus Finland

We have also looked at how known country initiatives might impact Internet adoption. We found that the Finnish government has spent very little on demand-side measures and, in particular, on measures targeted at older people. Despite this, Internet adoption in Finland, including adoption by older users, is relatively high and increasing (Figure 3-1). In contrast the Spanish government has reportedly spent over €5 billion[46] under the first Avanza programme between 2005 and 2008 in order to stimulate Internet and broadband use, with much of the expenditure on demand-side measures, and is embarking on the second stage of the programme.[47]

Housewives project and the *PC for Everyone* initiative which was targeted at low income earners. These initiatives are indicated in Figure 3-3 and 3-4. When compared with take-up of the Internet across the population as a whole, the *PC for Everyone* initiative appears to have had no impact at all. In contrast, the *Million Housewives* initiative coincided with increased Internet take-up by housewives in the period 2001 to 2003 which was more rapid than take-up by other groups.

The case of Portugal

Finally, we consider Portugal, which in contrast to Italy, has seen a rapid and sustained increase in Internet use by the young. Figure 3-5 and Figure 3-6 illustrate

The Portuguese government had completed

Figure 3.3

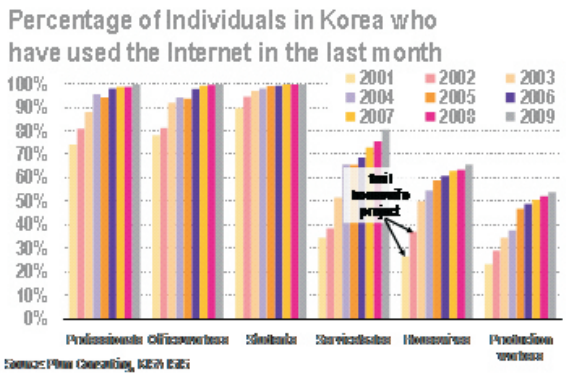


Figure 3.4

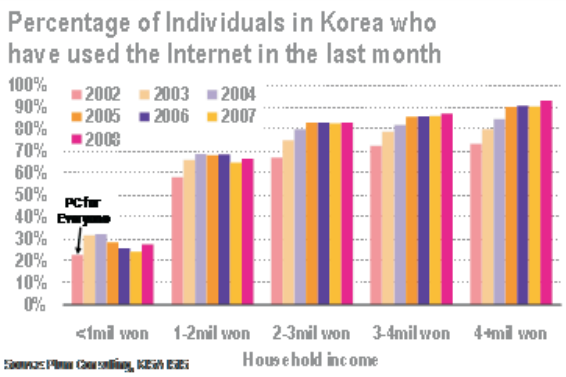


Figure 3.5

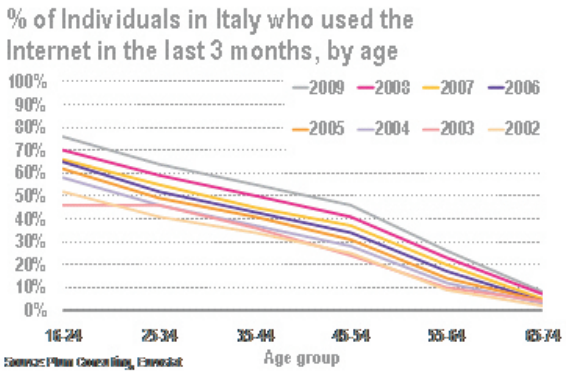
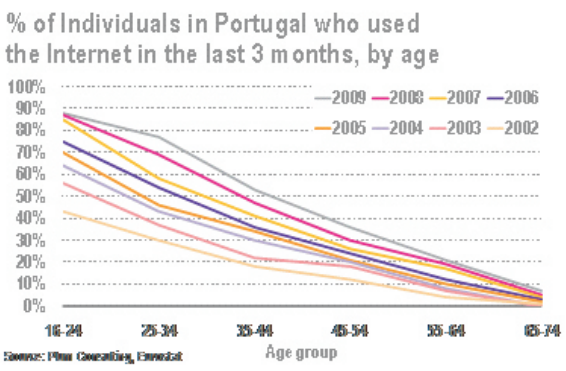


Figure 3.6



implementation broadband connectivity to schools by January 2006, and in addition there is a relatively high level of public WiFi provision and mobile broadband adoption in Portugal.[48] These factors, perhaps alongside others, may explain the difference in outcomes between Portugal and Italy. We note that the Portuguese outcome was achieved even though Portugal has the lowest proportion of 25-34 year olds, among all the study countries, to achieve at least upper secondary education. This example shows that significant change can occur relatively quickly, at least for young people.

What will happen if there is no change of policy?

Key findings

If policymakers believe that current policies will lead to significant progress towards inclusion over the next five years, then they could be disappointed. On current trends:

- The population of non-Internet users among poorly educated older people will decline only from 60 million to 52 million in the EU15 between 2009 and 2014.
- It will take nearly 30 years to reduce the percentage of non-users among poorly educated 55-74 years old to 10%.
- It will take eight years for the 25-54 year old group, who make up most of the workforce, to reach 90% penetration of Internet users.

Figure 4.1

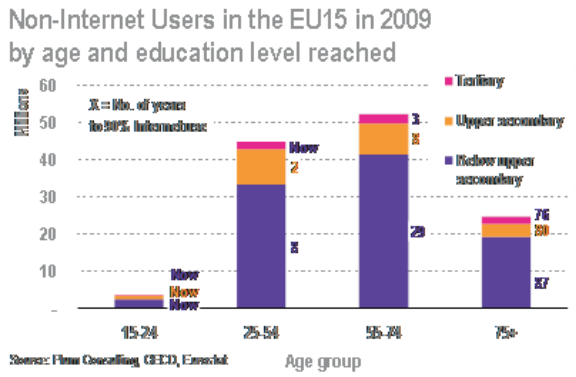
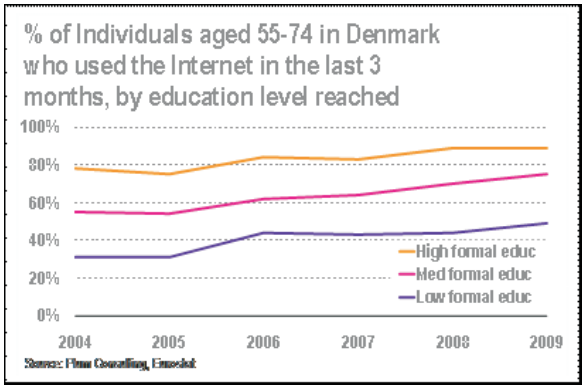


Figure 4.2



Almost all of this change will occur because of cohort effects rather than because of effective demand-side measures. The analysis which leads us to this conclusion is set out below.

How quickly is the level of Internet use growing?

How quickly is the level of Internet use growing? Will market forces combined with current policies close this gap relatively quickly, or is it appropriate to consider additional government-funded demand-side measures to stimulate Internet use?

Figure 4-1 shows the number of non-Internet users in the EU15 by age and education. It also shows how quickly each age/education group will reach 90% Internet use on current trends. For example, it shows that around 42 million 55 to 74-year-olds with only minimal education are non-users and that this group will take 29 years to reach 90% Internet use on current trends (ie Italy is five years behind Finland).[49]

This graph raises a number of issues for policymakers:

- What should be done to stimulate Internet use among 55 to 74-year-olds with little formal education? As the biggest group of non-users in the EU, they will take around 30 years to reach 90% use if nothing more is done to stimulate take-up. - shows the slow pace by which this age group begins to use the Internet, even in a country with high Internet use like Denmark.
- Is there a need for demand-side measures to stimulate Internet take-up among poorly educated 25 to 55-year-olds? In the average EU member state this group, a key part of the labour force, will reach 90% use after eight years on current trends.
- Should governments aim demand-side measures at the over 75s or should they rely on the aging of younger people with higher levels of Internet use to deal with low use by this age group?

Figure 4-1 highlights the main problems in the EU15. But will a corresponding analysis for individual member states highlight similar problems and priorities? Figure 4-1 suggests that there is virtually no problem of Internet use amongst young people. But if we look at individual countries like Italy, rather than the EU15 as a whole, we find that there are problems. Figure 4-3 illustrates. It shows that young Italians with basic education will take another five years to reach 90% Internet use on current trends.

Figure 4.3

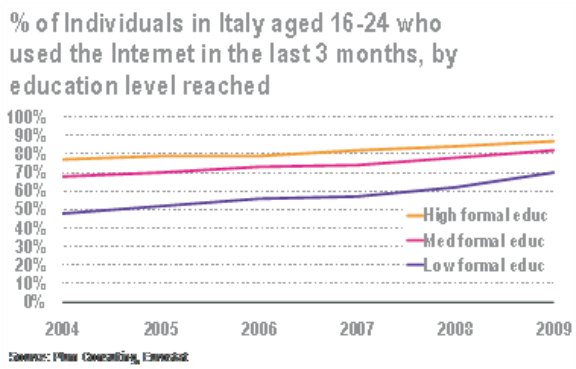
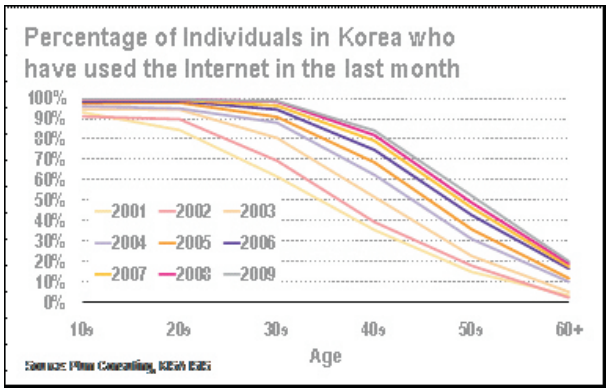


Figure 4.4



How much of this change is due to cohort effects?

Figure 4-1suggests that the biggest challenge to increasing broadband take-up to 100% lies in persuading older people with only basic education to use the Internet. In this group there are two main effects driving increased Internet use:

- ***Cohort*** effects. With each year that passes, an annual cohort leaves a younger age group to join an older one. This cohort has a higher average level of Internet use than the age group it joins, and this raises the average level of Internet use in the older age group.

- ***Diffusion*** effects. These arise through some combination of word-of-mouth recommendation, on-the-job transfer of ICT skills, market initiatives by private suppliers, and government-funded demand-side measures.

Our analysis indicates that the bulk of the increase in the level of Internet use amongst older people is currently generated by cohort rather than diffusion effects. Figure 4-4 the age profile of Internet use over time in Korea - illustrates this point.

When we look at this figure we can see that:

- The level of Internet use by the over 60s in Korea has risen by 20 percentage points over the last eight years, i.e. by an average of 2.5 percentage points each year.

- The level of Internet use falls by two percentage points for each successively older annual cohort over the age range of 40 to 60-years-old.

If we assume that, once they become Internet users, people do not give it up, then this tells us that 80%[50] of the annual increase in Internet use by the over-60s is driven by cohort effects, and only 20% by diffusion effects (which include demand-side measures). When we repeat this analysis for the EU15, we find that around 65% of the increase in Internet use by older people is driven by cohort effects, with the balance driven by diffusion effects.

This analysis shows that demand-side measures so far have done very little to increase Internet use among older people, a conclusion which policymakers need to keep in mind when considering how to design and fund demand-side measures aimed at older people.

What should Governments do now?

Key findings

We have identified four main ways in which governments might make the demand-side measures they fund more effective. They might:

- Set funding priorities in a more systematic way.
- Establish a rigorous funding and evaluation process.
- Take advantage of recent market trends.
- Address specific known barriers to Internet use.

Our analysis also indicates that the level of Internet use may be related to workforce participation and the use of ICTs within the workforce. This suggests that governments might take steps to improve these aspects of their economies - for example through changes to retirement policy and reform of labour and product markets. Such measures will take time and will be pursued (or not) to improve economic performance in general, rather than to increase Internet take-up per se. Hence we do not consider them further.

5.2 Set funding priorities in a more systematic way

The appropriate way to target demand-side measures will vary by country. It is therefore important for governments to carry out analyses, similar to those set out in Section 2, before establishing priorities for funding. To do this, governments will need to continue to undertake surveys to monitor broadband take-up, Internet use, and barriers to use.

This requires adaptations to the surveys to take account of changing consumer behaviour. There will be increasing measurement challenges which will require modified survey approaches. Changes that surveys will need to take into account include:

- Use of mobile broadband. This is now growing rapidly and may in future be bundled with services such as eBooks
- Use of WiFi in many locations
- Use of many different devices to access the Internet including smartphones, TVs, games consoles, netbooks and so forth
- Access to the Internet in different ways. Internet users may no longer need to consciously "go online" but instead may access specialist online applications directly.

Governments can then analyse the trends revealed by survey data on Internet use and barriers so as to assess the scale and persistence of low Internet use among different socio-economic groups before deciding on overall spending priorities.

There is also the bigger question of how much governments should spend in future on supply-side measures, such as subsidising broadband provision in rural areas, rather than demand-side measures. Serious consideration of this issue is beyond the scope of this report. But there does seem to be a strong case for governments to now consider explicitly the balance between the funding allocated for demand-side and supply-side measures in a way which takes account of the following factors:

- While availability of broadband is approaching 100% in many countries, take-up of broadband Internet remains well below this level
- Cross-country variations in levels of Internet use appear to be more strongly related to demand-side than supply-side factors
- Demand-side measures have had limited impact to date
- Market trends could have a significant impact on both the availability of, and demand for, broadband Internet over the next few years.

Establish a rigorous funding and evaluation process

Setting funding criteria

Evidence on the cost-effectiveness of past and current demand-side measures is poor. As Hauge and Prieger note (October 2009):[51]

> *"What we do is examine how well policymakers have evaluated the many current and past programs designed to advance broadband adoption. Unfortunately, the answer is that this has happened all too infrequently."*

A priority in future, and potentially a condition attached to funding, should be that programmes incorporate rigorous appraisal of effectiveness. Further, programmes should be designed around a clear view of the process by which a target group might adopt the Internet. They should also consider how technological and market change may be altering existing barriers. This can be seen as a three step process.

- Step 1: Develop guidelines for assessing applications for government funding and fund the demand-side stimulation programmes which best meet these guidelines.

Table 5-1: A checklist for programmes of demand-side measures which are likely to be cost effective

Question
Does the proposed programme demonstrate a good understanding of the motivation, needs and adoption processes of its target group?
Is that understanding consistent with the available statistics on gaps in Internet use and stated barriers to Internet use?
Has the applicant attempted to learn from others offering demand-side measures to the same target group and, in future, from published evaluations of the effectiveness of previous demand-side measures programmes?
Is the proposed programme scalable and/or replicable?
Has the applicant committed to (say) an ex post evaluation of effectiveness? Is that evaluation sound?
Does the proposed programme complement rather than compete with market initiatives?
Has the proposed programme taken account of the changing context of Internet use – as set out in Section 8.2?

Table 5-2: A sound evaluation process

Question
Is an ex-post evaluation of effectiveness built into the proposal?
Are its objectives clearly specified?
Is a credible proportion of the budget allocated to the evaluation?
Before recruiting them will the applicant seek a commitment from programme participants to cooperate in a long-term follow-up?
Do the evaluators have the necessary skills?
Is the proposed process rigorous and independent?
Does the evaluation show how the outcomes will be compared with a valid control group?

- Step 2: Analyse and disseminate evaluations of the effectiveness of the funded programmes.
- Step 3: Revise priorities and guidelines in the light of these evaluations.

The guidance described in Step 1 might look like Table 5-1 and the evaluation process might have the characteristics of Table 5-2.

Using the Internet adoption process to decide on funding

We suggest that governments should only fund demand-side measures which are consistent with the likely adoption process of the target group. The analysis of Section 2.4 suggests that policymakers need to consider the following questions before designing or funding measures to increase Internet take-up:

- Is the potential user aware of the Internet and its relevance to his or her life? Such awareness lowers the *Not needed* barrier identified in the surveys of non-users. There is evidence that there is still widespread ignorance of the Internet amongst non-users. For example, according to a recent Ofcom survey[52] "*Only 3% of respondents said they had never heard of the Internet*" but, among those who gave *Not needed* as the main barrier to Internet use, "*knowledge of the Internet was low, with 95% confessing little or no knowledge of it*". Demand-side measures to overcome this lack of awareness could be an important first step towards adoption or use
- Is the potential user in frequent contact with someone who can provide support when needed? People who are in frequent contact with regular Internet users - whether in education, at work, or simply through ICT-literate friends or family members - are more likely to take up the Internet
- simply through ICT-literate friends or family members[53] - are more likely to take up the Internet than others. The FCC refers to the need for a social infrastructure to support Internet use. Demand-side measures which create this social infrastructure may be more effective than those which do not.
- Does the potential user have the skills and confidence to use the Internet? Appropriate digital literacy initiatives may be important here. Access to and use of the Internet outside the home could give non-users a good way to assess its value and to give them confidence in their ability to use it before they commit to a broadband subscription and the possible purchase of a PC or other device. In a recent UK survey[54] for example, over seven in 10 (72%) of those who intend to get the Internet at home over the next six months are already Internet users outside the home.

Table 5-3: The possible cost of an older person becoming a regular Internet user

Cost item	Now	Future	Why the difference?
Internet access device	€400	€250	Falling device and software prices
Broadband service for three years	€700	€350	Switch from fixed to mobile broadband package for a low volume Internet user
One-to-one tuition[55]	€300	€50	Simpler use of the Internet via applications rather than browser
Support service for three years	€150	€0	Simpler use of the Internet via applications rather than browser
Total	€1550	€650	

Plum estimates for illustrative purposes only

- Can the potential user afford the equipment, broadband subscription and digital literacy training required to be able to use the Internet at home?

Only if the potential user has positive answers to these four questions is the probability of Internet adoption at home high. But the answers to these questions will vary - especially by age and level of education. So demand-side measures will need to be tailored to specific target groups to meet their particular needs. We consider this point further in the sections which follow.

It is especially important to carry out research to understand the adoption processes of older and poorly educated people for becoming regular Internet users. This group is currently the largest and most persistent group of non-users in the developed world.

Take advantage of recent market trends

In Section 2.4 we discuss current market trends and their impact on barriers to Internet use. This analysis suggests that governments should:

- Avoid putting obstacles in the way of these market trends wherever possible.
- Refuse to fund programmes which fail to take account of changing market trends such as the move from Internet browsers to Internet applications, from PCs to tablets, e-books and smartphones, and from fixed to mobile broadband.
- Design universal broadband policies which allow non-Internet users to choose between fixed and mobile broadband services, so as to match their requirements in terms of speed, download volume per month and budget. Such policies might best be achieved by focusing subsidies on the end user, rather than by following the traditional universal service route and subsidising the supplier.

Consider the option of waiting for these trends to become clearer and then leveraging them so as to fund more cost-effective demand-side measures. Delaying implementation by one or two years, during which Internet devices and services become more user-friendly, might lead to more cost-effective measures. Table 5-3 shows how the cost of getting many older people to become regular Internet users might fall substantially over the next five years from current costs of well over €1000 per person to €650.

Address specific known barriers to Internet use

There are four main barriers to Internet use – lack of affordability, lack of awareness of relevance, lack of appropriate skills, and lack of the means to conduct online transactions.

Lack of affordability

Here governments might focus on enabling markets to work effectively by implementing the measures which respond to market developments as set out in Section 2.5.

Lack of awareness of the relevance of the Internet

We have struggled to identify many demand-side measures which demonstrate the relevance of the Internet to non-users. To date governments have focused efforts largely on funding the development of new e-public services so as to make the Internet more relevant. Yet our interviews reveal general scepticism about the effectiveness of such measures in stimulating Internet use. In addition, the evidence on ICT adoption suggests that most e-government services exhibit few of the qualities required to drive Internet adoption – such as perceived usefulness and enjoyment. According to Hauge and Prieger:[56]

> *"The extent to which such initiatives [for Government provided e-services] by themselves actually entice potential adopters to begin broadband service in their household is likely to be minuscule, particularly if the content is already available in other forms"*

This suggests that governments should not spend significant public funding on launching e-public services solely as a way to stimulate broadband take-up. Instead they should launch only those services which are valuable in their own right.

Governments might use their resources more effectively if they:

- Open up their data for third-party use. This action exploits the fact that market players are generally better able to develop online services which people want than civil servants. Both the US and UK have initiatives along these lines.[57 58] The review of the European Commission Public Service Information Directive in 2012 will provide an opportunity to strengthen initiatives towards open information across Europe.[59]
- Ensure that existing and frequently used e-government services work effectively on mobile devices as well as on PCs in future. Many of today's non-Internet users may not use PCs for online access in future.

They might also raise awareness of the relevance of the Internet through social marketing initiatives. For example, TV companies might develop storylines which involve Internet use in drama programmes which are popular with the main groups of non-Internet users. In the UK, the government has given Ofcom £12 million to fund a Social Marketing Campaign which includes such ideas.[60]

Lack of appropriate skills

There are a large number of existing government-funded initiatives designed to improve the digital literacy of those who do not use the Internet. Many of these are focused on enabling people to use a PC and web browser. The likely effectiveness of these initiatives varies by the age of the target group.

In the case of ***young people***, effective ICT education in schools and universities has a number of beneficial effects:

- It can raise levels of Internet use among the young (as illustrated by Portugal).
- It then can subsequently increase Internet use among older age groups through cohort and diffusion effects.
- It can provide a more ICT-skilled workforce which may improve economic performance.

So there are strong reasons to implement traditional digital literacy initiatives for young people in those countries where Internet use for this age group is still some way short of 100%.

The case for improving the digital literacy of non users ***over 55*** is less clear-cut. To be effective, such initiatives should be delivered in an environment where older people feel comfortable and in a manner which is designed to overcome the fear of failure. But such initiatives, especially when they aim to provide traditional PC and browser skills, are expensive. Governments need to assess the effectiveness of such measures with special care and to consider instead digital literacy courses which are reoriented so that they are based around the simpler and more robust devices for Internet use which are now coming to market.

Those in the 25 to 54 year age group who are currently non-users are likely to have basic education, and to be unemployed or to work in jobs which neither use ICT nor give them access to colleagues who do. Given these characteristics it may cost as much to get this group on line as the over 55s.[61] But members of this group will use the Internet for longer than the over 55s and, once they are on-line, can potentially help their parents become Internet users. So it makes sense to give this group higher priority than the over 55s. But again governments should consider funding courses which are reoriented so that they are based around simple and robust devices for Internet use rather than around PCs.

Some public bodies have suggested putting resources into improving the digital literacy of regular Internet users so that they are capable of carrying out more advanced Internet applications. Without evidence to demonstrate their value, we believe such funding initiatives may be misplaced. Our research suggests that the biggest step in adopting the Internet is for non-users to commit to buying broadband service and an Internet access device and to then maintaining this system. Once consumers have taken this step, they have access to a wide range of online training products to improve their Internet skills, should they wish.

Lack of a means to transact online

A serious impediment to Internet use, and one which is not picked up in surveys, is the lack of any debit/credit card with which to make e-transactions. The market is beginning to respond to this need already. But governments should encourage the development of services which allow those currently without debit or credit cards to carry out e-transactions. A significant minority of non-Internet users lack such cards, even though e-transactions are a powerful incentive for Internet use.

Recommendations to Governments

It is clear from our analysis so far that, for certain segments of the population, progress towards 100% Internet use is painfully slow and existing demand-side measures are not effective. If governments want to fund effective demand-side measures which will accelerate Internet take-up among non-users, then we recommend that they implement the following measures.

Governments should ***set priorities*** for future demand side measures in a more ***systematic way***. They should:

- Review explicitly the balance between the funding allocated for demand-side and supply-side measures.
- Analyse the trends revealed by survey data on Internet use and barriers so as to assess the scale and persistence of low Internet use among different socio-economic groups before deciding on overall spending priorities.
- Continue to undertake surveys to monitor broadband take-up, Internet use, and barriers to use, but modify the surveys to take account of changing consumer behaviour. For example, the surveys should include questions that capture mobile broadband use, Internet use outside the home and the move from a general purpose browser to specific applications when consumers use the Internet.
- Give top priority to measures which stimulate demand among young people if survey analysis reveals this is a problem. Such measures produce a more ICT literate future workforce. Survey data shows that it is possible to achieve near 100% Internet use among young people (Denmark) and it is possible to make a significant difference quickly (Portugal).
- Give second priority to non-users aged 25 to 54
- Carry out research to understand better the process by which poorly educated people over 55 might become regular Internet users. This group is currently the largest and most persistent group of non-users in the developed world.
- Make rigorous, ex-post, evaluations of effectiveness a condition for funding programmes of demand-side measures from now on. Governments then need to disseminate the findings of these evaluations and learn from them before funding subsequent programmes.

Governments should ***take advantage of market trends*** to make demand side measures as cost effective as possible. They should:

- Refuse to fund programmes which fail to take account of changing market trends such as the move from Internet browsers to Internet applications, from PCs to tablets, e-books and smartphones, and from fixed to mobile broadband.
- Look critically at programmes of demand-side measures aimed at poorly educated people over 25 before funding them. There is considerable evidence that such programmes could be costly and slow to take effect. Reorienting such programmes to use the more robust and user-friendly Internet access devices which are now becoming available might lead to more cost-effective measures for this group.
- Ensure that existing, frequently used, e-government services work effectively on mobile devices as well as on PCs in future. Many of today's non-Internet users may not use PCs for online access in future.

To deal with the growing problem of ***affordability*** governments should design universal broadband policies which allow non-users to choose the appropriate broadband package from fixed and mobile offerings. One way to do this is to move any government subsidies from the supply-side to the demand-side.

In terms of ***removing other specific barriers*** to Internet use, governments should:

- Encourage the development of services which allow those currently without debit or credit cards to carry out e-transactions. A significant minority of non-Internet users lack such cards, while e-transactions are a powerful incentive for Internet use.
- Encourage social marketing campaigns by media companies to raise awareness of the benefits of the Internet. For example TV companies might produce more dramas which involve Internet use.

Governments ***should not***:

- Spend significant funds on launching e-public services as a way to stimulate broadband take-up. Instead they should launch only those services which are valuable in their own right.
- Fund measures which attempt to increase the digital literacy of those already online without specifying clear goals for this policy and collecting evidence that such measures are likely to be effective.
- Fund programmes which are not consistent with an evidence-based adoption model for each target group.

Notes

1. The 15 EU member states before expansion in 2004
2. With each year that passes an annual cohort leaves a younger age group to join an older one. This cohort has a higher average level of Internet use than the age group it joins, and this raises the average level of Internet use in the older age group
3. Getting the full population online
4. For example the FCC is developing a series of government-funded demand-side measures as part of its National Broadband Plan, due for publication in March 2010. The European Commission is carrying out similar analysis
5. The data comes from the Pew Institute for the US, Eurostat for the EU, and the Korea Communications Commission and the Korea Internet and Security Agency (KISA) for Korea. In addition to measuring Internet use across different population segments, these surveys also provide analysis on why people do not use the Internet. Annex A describes the data sources in more detail.
6. See for example the findings of econometric studies published in *Europe's Digital Competitiveness Report*, the European Commission, COM (2009)390, 2009, for the EU, in *Internet un quotidien: un Francais sur Quatre*, Y Frydel, May 2006. INSEE Premier no 1076 for France ,and in *Communications Usage Trends Survey*, Minister of Internal Affairs and Communications of Japan, 2006 for Japan
7. They might also want to monitor progress in their own country against other benchmarked countries or regions on each of these factors
8. Data on level of Internet use by age ***and*** income does not exist because, while age and education are associated with individuals, income is associated with households
9. OECD. PISA 2006 Results. Note that whilst comparable US data is not available, the US appears comparable with the OECD average. http://www.pisa.oecd.org/document/2/0,3343,en_32252351_32236191_39718850_1_1_1_1,00.html
10. Basic and advanced skills combined as defined by the OECD. There are other measures of ICT use, such as the contribution of ICT investment to GDP growth, which lead us to the same finding with less ambiguity.
11. We use *Broadband penetration* rather than *Household broadband penetration* or *Internet use* because we then have access to a substantially bigger data set
12. Countries with an annual GDP per head in excess of the OECD average of US$32,000
13. Most countries report the proportion of people served by DSL enabled exchanges. This measure significantly overestimates the proportion of the population for whom broadband is available at download speeds of (say) 0.5 Mbit/s or more
14. In the Nordic countries there is over 80% Internet use while household broadband penetration is at around 70%. By contrast Korean Internet use is at 78% despite household broadband penetration being at 94%
15. http://en.wikipedia.org/wiki/List_of_countries_by_English-speaking_population
16. *Europe's Digital Competitiveness Report*, 2009, which covers the EU plus US, Japan and China
17. For example people in Mediterranean countries have less leisure time than people in Nordic countries and the Internet might be of greater value to them (see OECD http://www.sourceoecd.org/pdf/societyataglance2009/812009011e-02.pdf)
18. Most research on this effect is focused on mobile phones rather than use of the Internet. See for example *The Apparatgeist calls*, the Economist, 30/12/09
19. For example by the Pew Institute in the US, by Eurostat in the EU, and KISA in Korea
20. In addition the EU survey asks for ***reasons*** for non-Internet use which sum to well over 100%, rather than asking for the ***main reason*** for non-use, as in the US, or asking respondents to rank or scale reasons for non-use
21. *Perceived usefulness, perceived ease-of-use, and user acceptance of information technology*, Davis, FD, 1989, MIS Quarterly, 13(3), 319-340
22. *Predicting user intentions: comparing the technology acceptance model with theory plan behaviour*, Mathieson K, 1991, Information Systems Research, 2(3), 192-222
23. *Empirical evaluation of the revised technology acceptance model*, Szajna B, 1996, Management Science, 42(1), 85-92
24. *Determinants of adoption of third-generation mobile multimedia services*, Pagani M, Summer 2004, Journal of Interactive Marketing, 18(3), 46-59
25. See for example *The Economic Case for Digital Inclusion*, Price Waterhouse Coopers, October 2009
26. *Financial inclusion: ensuring access to a basic bank account*, European Commission, MARKT/H3/MID(2009), February 2009
27. For example to maintain software for use on a PC
28. The Apple Snow Leopard OS which includes support for those with visual impairment including brail le support. http://www.apple.com/macosx/universal-access/
29. *YouTube videos which will include automatic captioning*. http://news.bbc.co.uk/1/hi/technology/8369941.stm
30. iPhone"voice over" gesture based screen reader and 3rd party applications including sign-language. http://www.apple.com/accessibility/iphone/vision.html
31. http://www.visaeurope.com/personal/choosing/payinadvance.jsp
32. http://www.splashplastic.com/
33. http://www.mycashplus.co.uk/
34. The FCC has recognised these trends in developing its national broadband plan. According to FCC Commissioner Meredith Attwell Baker, 4 December 2009 "*Encouragingly, there are signs that mobile devices—smartphones and increasingly netbooks—are empowering people, particularly older Americans, lower income households and other underserved communities, to go online for the first time.*"
35. Anticipated in 2010
36. Entertainment in the UK in 2028, Plum for Ofcom, February 2009, http://www.ofcom.org.uk/research/technology/research/sectorstudies/entertainment/entertain2028.pdf
37. The costs of fixed broadband are dominated by the fixed costs of installing and maintaining the line to the user's home. The costs of mobile broadband are dominated by the traffic volumes generated by the end user. So it is possible to offer a low volume user a cost based price which is significantly lower with mobile than with fixed broadband
38. Supporting Digital Literacy Public Policies and Stakeholder Initiatives, Danish Technological Institute. Centre for Policy and Business Analysis.. 2008-2009. http://www.digital-literacy.eu/20776
39. The Berkman Centre for Internet and Society at Harvard University. *Next Generation Connectivity: A review of broadband Internet transitions and policy from around the world*. October 2009. http://www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf
40. Danish Technological Institute. Centre for Policy and Business Analysis. *Supporting Digital Literacy Public Policies and Stakeholder Initiatives*. 2008-2009. http://www.digital-literacy.eu/20776
41. Hauge and Prieger. *Demand-Side Programs to Stimulate Adoption of Broadband: What Works?* October 2009. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1492342

42. Guyader, Herve le. *e-Inclusion public policies in Europe.* September 2009. http://ec.europa.eu/information_society/activities/einclusion/library/studies/docs/einclusion_policies_in_europe.pdf
43. For example the time of volunteers is not included as a cost
44. Or national programmes which leverage local knowledge and expertise
45. For example the FCC's e-rate programme to provide cheap broadband to schools
46. http://www.planavanza.es/InformacionGeneral/Executive/Paginas/ExecutiveSummary.aspx
47. We understand that not all of the expenditure attributed to the Avanza programme necessarily represented additional expenditure – though it may have been reprioritised
48. Broadband experience in Portugal José Amado da Silva (Anacom). October 2009. http://www.anacom.pt/streaming/Amado_da_Silva_present_broadband_experience.pdf?contentId=987561&field=ATTACHED_FILE EC. Overview on eExclusion policies in Portugal. http://www.einclusion-eu.org/ShowCase.asp?CaseTitleID=1665 Ministry of Science Technology and Higher Education. Mobilizing the Information and Knowledge Society. http://www.infosociety.gov.pt/

    Re WIFi see: The Berkman Centre for Internet and Society at Harvard University. October 2009. "Next Generation Connectivity: A review of broadband Internet transitions and policy from around the world." http://www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf
49. The current levels of Internet use for individual Member States is tabulated for the 15-24 and 25-54 age groups in Annex C
50. 2%/2.5%
51. *Demand-Side Programs to Stimulate Adoption of Broadband:: What Works?* Hauge and Prieger. October 2009. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1492342
52. Accessing the Internet at Home, Ofcom, June 2009
53. In the UK there are also cross-generational schemes in which schoolchildren pair up with old people to transfer their ICT skills.
54. Accessing the Internet at Home, Ofcom, June 2009
55. Our research suggests that many older people require up to 10 one hour one-to-one sessions (at €30 each) to become competent users of the PC and browser. They then require significant support to continue as regular users
56. Demand-side programs to stimulate adoption of broadband: what works? Janice Hauge and James Prieger, October 2009
57. http://www.data.gov/
58. Data.gov.uk initiative (under development and currently requires authentication). It is proposed, for example, that Ordinance Survey mappin and postcode data be made freely available.
59. http://ec.europa.eu/information_society/newsroom/cf/itemlongdetail.cfm?item_id=4891
60. See for example http://www.ofcom.org.uk/media/news/2009/10/nr_20091015
61. There may of course be exceptions to this rule - for example digital inclusion of those over 55 who require telecare at home