



**Ease of use issues with
domestic electronic
communications equipment**
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Research Document

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Section 1

Introduction

- 1.1 This paper summarises the findings of an audit commissioned by Ofcom and carried out by independent consultants. The audit analyses relevant available literature on ease of use issues with domestic electronic communications equipment. This subject is sometimes called usability. The aim of the audit was to produce a report that summarised key usability issues that have been identified for a particular communications platform or service, highlight any research or development work that had been undertaken to address these issues and identify any gaps where issues were not being addressed.
- 1.2 The content and recommendations of this report represent the views of the authors. The audit is intended to stimulate debate and assist Ofcom in further developing its strategy on usability.
- 1.3 The audit found that consumers encounter ease of use issues at every stage of interaction with communications equipment. They may not understand what marketing terminology means and therefore be unsure about what to purchase. They may not feel confident about how to connect and set up devices, or fear “breaking” complex equipment if an error message appears or the device stops working normally. All of these, and more, are usability issues.
- 1.4 Section 10 of the Communications Act 2003 gives Ofcom a duty to encourage others to secure:
 - that domestic electronic communications apparatus is developed which is capable of being used with ease, and without modification, by the widest possible range of individuals, including disabled people;
 - that domestic electronic communications equipment apparatus which is capable of being so used is as widely available as possible for acquisition by those wishing to use it.
- 1.5 In discourse around usability a distinction is often made between mainstream consumer ease of use issues (where products and systems are designed to ensure they are as simple as possible to install and use without presenting unnecessary barriers for all consumers) and accessibility, which is a term that most often describes specific modifications made to equipment so that they can be used by disabled people or those with barriers caused by a particular impairment. However, the focus of this report is on mainstream ease of use issues that benefit all consumers, including disabled people.
- 1.6 The consultants examined academic papers and studies, as well as work by professional organisations, industry, government and organisations representing older and disabled people. They also interviewed a number of people with an interest in usability issues. The authors were asked to carry out this report over a limited time period, so it was not intended to be a fully comprehensive analysis of the field. Instead, the intention was to provide Ofcom with a very strong indicator of the current issues that are attracting research attention and stakeholder comment. The extensive bibliography that formed the basis for this report is set out in Annex 1.

- 1.7 The key findings of the audit on ease of use are set out in this paper along with some recommendations from the authors on where gaps may exist in the available research on usability and what further actions Ofcom could take in fulfilling its role to encourage usability in the communications sector. It should be emphasised that at this stage Ofcom has not reached a decision on what its future work on usability might entail. Following a period of engagement with stakeholders and debate on the issues raised in this report, Ofcom will put forward proposals for consultation as part of our annual planning process towards the end of 2007. As a next step, Ofcom plans to hold an event with stakeholders in the autumn.

Section 2

Benefits of usability

Summary

- Communications equipment is central to people's lives, with mobile and landline telephones considered particularly important.
- Consumers are aware of the benefits of communications equipment, but are put off by the complexity of products on offer.
- The use of inclusive design principles benefits all consumers, but disabled people and older people in particular.
- Research shows that a significant number of people of working age would benefit from improvements in the ease of use of computers. The number of people who would benefit is likely to increase as a higher proportion of older people continue to work for longer in the future.
- It is difficult to estimate the size of the customer base lost to manufacturers due to usability issues, but it is clear that there are significant advantages attached to addressing usability in the design process.
- Although some manufacturers have been trading successfully by focussing on bringing to market new high-tech, high specification and multi-functional products, there is no guarantee that current customer bases will increase as markets for communications products and services mature.
- By addressing ease of use, manufacturers can benefit from better reputations, reduced spend on customer support and training, and increased customer satisfaction.
- Incorporating usability engineering at the start of the design process is particularly beneficial. The return on investment by usability studies is estimated at typically 800 -1200 per cent.

Benefits for consumers

- 2.1 It would be hard to argue that the use of electronic communications equipment and systems was not central to modern life. People's social and work lives almost invariably depend on the ability to communicate with other people over distance, access information and entertainment, and record and store data electronically. However, not everybody is able to easily use new communication technologies.
- 2.2 Examining the importance of various products to consumers can help to identify areas that may benefit the most from work on ease of use. Research by Ofcom's

Consumer Panel (2006)¹ on attitudes towards communications services showed that a significantly higher proportion of landline and mobile phone owners consider that these services are essential, compared with owners of TV and the Internet. The different services attracted higher ratings from different groups of users. For instance, younger males were most likely to attach importance to the Internet, while people aged over 65 were most likely to value TV and landline phone services. Younger adults and those on low incomes were most likely to consider mobile phones as essential.

- 2.3 Looking at the perceived benefits of communications services by people who do not currently have access, the Consumer Panel's research found that around a fifth of non-owners in each of the landline, Internet and digital television markets consider these services would be of benefit to them. These findings raise questions about why some people do not consider that some types of ICT are essential to their lives, for example, whether actual or perceived complexity puts people off.
- 2.4 In one of the few pieces of research that looked specifically at the benefits and the usability of technology, the *Philips Index* (2004)² found that Canadians love technology but are put off by its complexity; 86 per cent believed technology makes life better but 59 per cent lost interest in buying a technology product because it was too complex.

Benefits for disabled and older consumers

- 2.5 It is widely accepted that beyond the benefits to consumers in general, the widespread use of inclusive design principles and practices, also known as "design for all", would particularly benefit older and/or disabled people. For example, Etchell and Yelding (2004)³ maintain that inclusive design:
- leads to increased and prolonged independence for older people;
 - means there will be a delay and reduction in the need for adaptations and assistive products;
 - will ensure that older and disabled people will have a wider choice of accessible and usable products;
 - takes advantage of economies of scale, which means that mainstream products are generally lower-priced than low-volume specialist equipment;
 - takes account of the fact that products that can be used by older and disabled people are easier to use for nearly everybody else⁴.

Computers and the Internet

- 2.6 The importance of accessibility and usability was highlighted in research carried out for Microsoft (2003)⁵. Among a sample of 15,000 people in the USA of working age who use computers, an estimated 57 per cent are likely or very likely to benefit from the improved ease of use of computer technology due to difficulties and impairments.

¹ Consumers and the communications market, 2006

² www.philipsindex.ca, Calibrating the Convergence of Healthcare, Lifestyle and Technology, 2004

³ Etchell L, Yelding D, Inclusive design: products for all consumers, 2004

⁴ Etchell L, Yelding D, Inclusive design: products for all consumers, 2004

⁵ Forrester Research Inc, The market for accessible technology, 2003

- 2.7 The study also pointed out that many more older people are likely to continue to be in work in the future, and that therefore even more are likely to benefit from easily accessible technology. The research concluded that accessible equipment and systems, more associated with use by disabled people, should improve the experience of using computers for all or most. This was exemplified by the finding that built-in accessible technology is used by some 44 per cent of computer users, and that many more could improve their experience of using computers by using inbuilt accessibility features.
- 2.8 In a study on disability and technology, Gregor et al (2005)⁶ rehearse many arguments for inclusive design and overall usability in computing-based services and products. They neatly sum up the major benefits of inclusive design:

“Following principles of inclusive design can also lead to a more thoughtful, considerate and efficient design of technology, with superfluous detail being rejected, which will lead to a reduction in storage and processor power required. Also a web site or software application that follows accessible design principles may well be easier to navigate and easier to use by a majority, and this can also have beneficial effect on the load of the host machine or server.”

Benefits for manufacturers

- 2.9 The most obvious benefit to manufacturers and providers of mainstreaming the usability of communications equipment is the potential to reach more customers, both in the short and long term. However, this is difficult to quantify, as the number of people who do not buy various products and services because of usability concerns is of course unknown. Nor are there substantiated figures for the number of people who bought a product, found it difficult to use, then subsequently didn't use it much or at all, and did not look for or buy another product.
- 2.10 Apart from the financial consequences of not reaching out to markets, manufacturers' reputations can, and do, suffer if they bring to market products and services which are experienced as difficult to use, or which are perceived to be so. Furthermore, while some manufacturers have been trading relatively successfully by being associated with high-tech, high-specification, and multi-functional services and products, there is no guarantee that the size of their current customer base will increase. Indeed, as new technology markets become more mature over time, it is possible that the size of their customer base might reduce. The current, somewhat-frenetic, state of the sector, which is characterised by the continuous bringing to market of new services or products, may not be tenable in the longer term.
- 2.11 For instance, the more 'mature' private road vehicle manufacturing sector, while still emphasising 'the new', has developed a much broader set of customer bases than previously and the companies seek to maintain a service to the various subsets of customers. It is widely accepted that some customers want cheap and cheap-to-run vehicles, others value safety and safety features, others want luxury, some want high performance, others value technical innovations, and so on.
- 2.12 If companies appear less than interested in market opportunities lost, there are more traditional business reasons relating to why and how usability can provide benefits to

⁶ Gregor P, Sloan D, Newell A F, Disability and technology, 2005

them. For example, the usability and accessibility specialists *Bunnyfoot* exemplify many of these, citing the following on their website⁷:

- *Decreased learning time*: Less time is spent learning to operate equipment and more time productively using it. Less money spent in training and customer support;
- *Decreased error rates*: Fewer errors are made and those that do occur are easy to resolve;
- *Increased efficiency*: Customers want to get the job done and get on with their lives; they will reward efficiency. Even small decreases in the time taken for employees of large companies to complete frequently performed tasks can add up to enormous savings;
- *Increased user enjoyment and trust*: People enjoy achieving their goals. They will become your advocates if you provided the system that helped them achieve what they wanted.

2.13 They list a number of benefits to be gained by incorporating usability engineering from the beginning. This speeds up the design process and helps to enable early resolution of debates over which features to include. It should also reduce or avoid expensive modification costs; it is asserted that the majority of errors in finished systems are usability and use-related. Including usability engineering from the start also makes it easier to produce self-help documentation for a usable system. Finally, the return on investment by usability studies is estimated at typically 800-1200 per cent.

⁷ www.bunnyfoot.com

Section 3

Industry attitudes towards usability

Summary

- Marketing strategies and tactics can contribute to the sidelining of usability considerations.
- An assumption often made is that people who do not buy function-rich products are simply not interested, when in fact they may be put off by usability problems.
- When prompted by disability organisations, companies tend to respond with specialist models, rather than mainstream products and services that are easy to use.
- There is evidence that there is a lack of knowledge and awareness around what consumers need and want, and the difficulties that they face, particularly in the case of older people.
- In a fast-moving market, manufacturers are often unwilling to invest time and resources in development work relating to usability early on in the design process. However, it is more cost-effective to address usability issues at the start of the process than later on.
- The role of usability professionals differs widely across organisations.
- Manufacturers and retailers have assumed that children and young adults have few problems in using communications equipment. However, there is evidence that they do in fact experience usability problems.
- There is a growing movement towards the design of products that can be used by as wide a range of consumers as possible.
- Terms such as “universal design”, “inclusive design” and “design for all” reflect this movement. There is a substantial amount of literature on good design principles and a number of standards and voluntary guidelines.

Corporate culture, marketing and short-termism

- 3.1 One of the main apparent reasons why ease of use considerations are often sidelined in the manufacturing process relates to companies' use of marketing strategies and tactics. For example, marketing departments can use overly-simplistic categories, such as 'early adopters', 'late adopters', and 'refuseniks'.

- 3.2 A different, though broadly-related typology, is the adoption, by Orange, of the following typology of customers/customer groups for mobile phones, as outlined below in an article from *Usability News*⁸:

Orange, the UK mobile telecoms company, has introduced a range of services based on users' behavioural characteristics and is using different animals to represent each in the market.

Orange has identified four specific customer types within the mobile market - the highly sociable; those who see their phone as a tool not a toy; those who love to chat; and those who expect extras as standard. The customer types were identified following research into the behaviours of mobile phone users across the UK.

Orange will now be marketing these packages, with each behaviour being represented by a specific animal, allowing mobile users to associate themselves with the package that's right for them.

- 3.3 There are other similar examples, but the key point is that attitudes towards usability issues are developed and maintained within corporate cultures. Yet, in the public domain at least, there does not appear to have been any research to establish whether, or how, corporate marketing assumptions and methods impact on the efforts that companies make to incorporate universal design/usability within their planning, design, engineering and production, and marketing operations. This is an important research gap.
- 3.4 However, this segmentation and targeting of markets might be partly responsible for not mainstreaming use by many older or disabled people of some or all of a company's products. Conventional marketing models may lead to the assumption that those who do not buy the latest function-rich products are simply not interested; instead they may have been put off doing so because of usability problems.
- 3.5 The approach taken by retailers towards the usability of products is also crucial, and it is another area that merits further research. Retailers often concentrate on new features and functionality of products in sales situations, rather than whether they are easy to use. This is frequently compounded by a lack of awareness and knowledge among staff about such issues.
- 3.6 For their part, consumers are often not able to relay usability problems directly to designers and producers. One reason is that non-technical consumers will be unsure about what is possible. However, for consumers to be able to feed back comments about usability of products to providers, they need easy and reliable routes to do so and to feel confident that their comments will be taken seriously by providers and manufacturers.
- 3.7 More broadly, communications markets are frequently characterised as fast moving. Consequently there can be inadequate time when bringing a product or service to market for development work on usability. Companies may be unwilling to make mid to long-term investments because of their focus on the mass market and high-volume sales targets. Building-in usability early in the design process may be perceived as adding to costs. However, experts interviewed for this report, including academic researchers and consumer and disability organisations, generally agreed that it is far more cost effective to ensure usability considerations are addressed from the start of

⁸ Light A, Usability News, 13 April 2006

the design process, as logic dictates that it is more expensive and cumbersome to “retro-fit” features or design changes.

- 3.8 Many communications products tend to be marketed on functionality and features, not on their usability. Some companies fail to understand that they could build long-term loyalty by developing and bringing to market well designed and easy to use products. This is thrown into relief by the fact that there is a short shelf life of many communications products, especially mobile phones.
- 3.9 In their textbook on the design of mobile phones and other handheld devices, Jones and Marsden (2006)⁹ argued that the main reasons for poor design are:
- the perceived (not necessarily actual) financial costs of better design;
 - an overwhelming emphasis on technology over purpose (techno fixation);
 - a lack of user-based ‘debugging’ (people’s needs are seen as less important than software and hardware challenges).

They, and others, point out that while principles of usable design have been around for many years, some companies still apply them poorly.

- 3.10 Manufacturers and service providers may acknowledge that there are consumers with particular needs, such as disabled people, and often because of prompting and pressure from disability organisations, they may produce one or more “specialist” models. However, this does not necessarily lead to mainstreaming features that would make products easier to use for consumers in general. There is in the industry a perception that addressing such user requirements is difficult and costly, whereas in fact developing these kinds of solutions could be of significant commercial benefit (although it is difficult to quantify this benefit as the economic literature in this area is limited). It may also be the case that the perceived higher support costs associated with older and disabled people prevent products being actively marketed to these groups.
- 3.11 In a discussion paper by Goodman and others (2005)¹⁰ on the inclusive design process, these Human Computer Interaction experts conclude that the sector, particularly with regard to older people, frequently knows too little about what older consumers want and need and about the variety, prevalence and nature of the difficulties experienced by older people. The key areas of concern identified in this research include:
- underlying design philosophies meaning that sufficient thought and work has not been carried out on how to incorporate features of assistive technologies into inclusive design, and vice versa, so that the user population of the latter is maximized;
 - not making user involvement as real and as useful as possible;
 - the many cultural, organisational, and other barriers to the widespread uptake of inclusive design in industry;

⁹ Jones M, Marsden G, Mobile Interaction Design, 2006

¹⁰ Goodman J, Gray P, Brewster S, Not just a matter of design, 2005

- a lack of knowledge about how population characteristics affect product use, particularly when it comes to psychological and social characteristics, such as life experience, living conditions and people's emotional states;
 - not knowing what would constitute the characteristics of suitable technologies (for instance, for older people).
- 3.12 It could be argued that such areas of concern arise because so much of the sector is driven by, and drives, a market which is typified by its "newness". For instance, many continue to regard products and services such as personal computers and Internet access as new technology, even though home computing dates back to the early 1980s and home use of Internet services developed in the early to mid-1990s. Set top boxes for TV cable and satellite services similarly date back to the late 1980s. Obviously technological innovations (plus events such as the advent of 3G and the introduction of digital television) continue to characterise the way that designers, manufacturers and retailers sell their products and services.
- 3.13 Similarly, the obvious, though largely anecdotal, evidence on price/function competition in the market (that is, how many features can be sold for £x, and what are competitors offering?) shows its dominance. This is particularly noticeable in the retailing sector, which is itself characterised increasingly by non-specialist organisations, such as supermarket chains, and by warehouses that can only be accessed through the Internet, which are unlikely to be able or willing to provide advice about usability. In effect, there are large and important discontinuities between what the companies can and wish to offer in the marketplace, often on a relatively short term basis, and what a significant proportion of potential and actual customers need and want. There appears to be little or no publicly available research on this subject, nor on the crucial topic of consumers' actual experiences and difficulties in:
- a) being able to specify what they want from a specific product/service or suite of products in terms of functionality and usability; and
 - b) being asked in any scientifically-rigorous way about issues such as:
 - the extent to which equipment that they have purchased, set up and used meets their needs;
 - whether the setting up or operation was problematic; and
 - whether what was ostensibly offered as a consumer benefit in usability terms actually materialised.

Lack of user feedback

- 3.14 The very large body of literature on usability can give the impression that designers and manufacturers take the issue seriously and recognise its importance in market terms. However, what is meant in practice by "usability" is often confusing, and certainly contested. As usability experts have pointed out frequently, usability is not simply a matter involving the design of interfaces (such as website, layout of buttons on a remote control or mobile phone) but can and often does involve the whole "system architecture" within an electronic device.
- 3.15 A critical issue is the organisational context in which usability work takes place. The problematic nature of usability and usability work in organisations is explored by

Boivie et al (2006)¹¹, in their literature and interview-based study, which also involved action research in two organisations (tellingly entitled '*The lonesome cowboy*'). The scale and complexity of the subject is illustrated neatly by the fact that usability professionals operate under many different names, including HCI expert, usability engineer, interaction designer, user experience architect, etc.; the researchers identified no fewer than 52 different names for the usability profession.

- 3.16 Consequently what organisations expect and get from staff whose main role is to examine, advise and work on the usability of products and services is possibly unclear. This lack of clarity may also apply to the extent to which other project teams are expected to prioritise usability, and indeed whether different teams, sections and departments have a common usability framework and purpose, including technical writers and others involved in producing product information for consumers.
- 3.17 The study by Boivie et al found that among the difficulties for usability professionals were resource constraints, organisational attitudes, resistance to user-centred systems design, and a lack of understanding. Citing other researchers, they argued that changes involving IT development are predominantly technology-led, and existing project management methods and tools neglect human and organisational issues, so helping to maintain a technical focus. They also reflected that users are rarely influential in the actual design, and that this fact helps to reinforce system developers' lack of concern about usability.
- 3.18 There is much discussion in the above study about the role within organisations of usability professionals, both in theory and in practice, and about how best to position them within organisations. Somewhat provocatively the authors maintain that such professionals are the "users' advocate" (which may be a common assumption amongst usability experts). This would imply that direct user involvement and feedback is not a priority: however, the authors do not advocate this view actively. Nevertheless, in their report they cite another published interaction designer who took the view that:

"Real people are of great interest as raw data, but they are frequently useless and often detrimental to the design process".

This point illustrates succinctly one of the possible barriers to the adoption of inclusive design by professionals and the organisations within which they work, and the production of products and services that are as universally accessible and usable as is practicable.

- 3.19 If making products and services usable depends in part on how well organisations use usability professionals, it seems likely that such professionals' approaches to usability are also important. In a study by Norgaard and Hornbaek (2006)¹² into "think aloud testing" of usability (an approach widely used by usability professionals to obtain comments from users about product or system design and use) they conclude that:

"We see a tendency that evaluators end up focusing too much on already known problems, and that the questions they ask during a test seem to concern problems that the user expects, rather than problems actually experienced during the test. The tests were to some extent shaped by practical realities and by some evaluators'

¹¹ Boivie I, Gulliksen J, Goransson B, *The lonesome cowboy*, 2006

¹² Norgaard M, Hornbaek K, *What do usability evaluators do in practice?*, 2006

adherence to a strict, laboratory-style procedure. Finally, evaluators seem to prioritize problems regarding usability over problems regarding utility”.

- 3.20 In a discussion paper, livari (2006)¹³ attempts to examine the relationships between organisational cultures and user involvement in software development organisations. One of the key conclusions is that, although some sort of concept of user involvement (often indirectly) is accepted ostensibly, what organisations and individual professions mean by this is widely divergent. Usability work mainly conceptualises it as, at most, informative or consultative user involvement: users may comment on predefined design, or act as providers of information and as objects of observation, but do not actively participate in the design process. Product/service development is often organisationally isolated from users.
- 3.21 Moreover, users’ requirements, when asked for, may be transmitted to developers via marketing departments. How well or badly the marketing function of an organisation communicates with design, development, engineering elements (and the capability and the willingness of the organisation to respond) are important subjects which merit further investigation.
- 3.22 livari also takes the view that usability professionals often occupy a marginal position in organisations, such as only being involved in pre-production product testing (when some users may also be asked, or observed using the product in ‘laboratory’ conditions). livari also shares the view of other commentators that, rightly or wrongly, organisations usually regard more substantive user involvement as expensive and a cause of delays.
- 3.23 So, there appear to be a number of reasons why manufacturers and providers either do not address usability, or do so in attenuated, conditional or generally inadequate ways. Some reasons derive from commercial considerations and/or multi-functionality features of markets for such products and services. Others appear to be related more to corporate culture and organisational structures and shared assumptions.
- 3.24 The situation is further complicated by the broader character of the markets for many communications products and services. Basically the sector has benefited from the willingness of children and younger adults to take up new technologies and products, and in general the market has been buoyant. Manufacturers and retailers have assumed that younger consumers either have no or few problems in accessing and using products and services, or are readily persuaded to trade off difficulty-of-use against the attractiveness of new functions and features. However, evidence suggests that it is worth questioning this assumption. For example, in a study by Bay and Ziefle (2005)¹⁴ of 9-14 year-olds using two different mobile phones, complexity/usability issues did feature. They concluded that:

“Children using the Siemens C35i with 25 per cent higher complexity (with regard to number of required production rules) spent double the time solving tasks and undertook three times as many detour steps as children using the less complex Nokia 3210. A detailed analysis of user actions revealed that the number of production rules to be learned fails to account for most difficulties. Instead,

¹³ livari N, Representing the use in software development, 2006

¹⁴ Bay S, Ziefle M, Children using cellular phones, 2005

ambiguous naming, poor categorization of functions, and unclear functionality of keys undermined performance”.

Design principles

- 3.25 There is a substantial amount of literature on good design principles, and a number of formal standards and voluntary guidelines that are also relevant. Terms such as *universal design*, *inclusive design*, and *design for all* reflect the growing movement towards the design of products that can be used by everyone as far as is possible, without specialist adaptations. In the US, a major driver towards the development of universal design has been growing acceptance of the need to integrate disabled people into society. Similarly in the UK, the movement towards inclusive design came about because of a growing feeling that specialist design of products for disabled people perpetuates stigmatisation and isolation.
- 3.26 According to Etchell and Yelding (2004)¹⁵ inclusive design embraces the principles of universal design and aims to reduce the need for assistive products by catering for a realistic target of products to meet the needs of as many people as reasonably possible. The authors explain that this should mean the need for specialist assistive products is reduced but, where products need to be adapted to suit people who have very specific needs, mainstream products should be designed to take this into account.
- 3.27 The concept of *Design for All* has garnered increasing support in recent years. It is defined by the European Design for All e-Accessibility Network as:
- “... a process whereby designers, manufacturers and service providers ensure that their products and environments address users irrespective of their age or ability. It aims to include the needs of people who are currently excluded or marginalised by mainstream design practices and links directly to the concept of an inclusive society”.
- 3.28 In February 2005 the BSI launched a new standard, BS 7000-6, which provides a guide to managing inclusive design. According to the BSI, it provides a comprehensive framework to ensure that disabled people’s needs are considered throughout the lifecycle of a product or service. Issues covered include top-level responsibility for inclusive design, and the formulation of a business case for adopting an inclusive approach that is tied closely with an organisation’s core objectives, strategies and plans. The BSI also drew attention to the need to involve users of products in the BSI standard on inclusive design.

¹⁵ Etchell L and Yelding D, Inclusive design: products for all consumers, 2004

Section 4

Usability barriers and challenges

Summary

- Legislation on equipment standards is mainly set at European level, limiting the requirements that can be imposed at national level.
- Imposing design requirements can hamper innovation and it is difficult to objectively measure delivery of standards. An imposed set of standards also prevents a range of alternatives for consumers and would not meet the needs of people with one or more impairments.
- Most publicly available research on installation and set-up challenges relate to digital television, and in particular issues of interconnectivity with related equipment.
- Support services, although often vital, are not always adequate, and many consumers find online support services difficult to use for a variety of reasons. Set-up documentations and manuals are often difficult to understand due to the technical language used.
- Additional functionality may add complexity, but good design can overcome barriers to ease of use.
- There are a number of usability barriers affecting television, telephones, computer and the internet.
- Evidence shows complexity affects the ability to use mobile phones for both younger and older adults, although the effect is more pronounced for older adults.
- Digital television allows new services such as audio description and closed signing, improving access for those with sensory impairments. However this is countered by the complexity of products, which makes them more difficult to use.
- Web site design, web browser design and search engine design are areas which need improvement, according to research. Lack of knowledge and familiarity are barriers to access and the effect is made worse by features that are hard to use and understand.
- There are significant numbers of people who are at risk of exclusion due to accessibility barriers. These include those living at home with a limiting long-term condition or disability and those living in care homes. Those with literacy and/or numeracy problems are also at risk, as are those who have little confidence or skill in using new technology.

Regulatory and legislative challenges

- 4.1 Given the benefits of improving ease of use for both consumers and industry, it is difficult to understand what stands in the way of governments or regulators mandating usability features. Much of the regulation relating to equipment specifications is determined at European level. National authorities are not allowed to impose their own requirements on communications equipment and any usability or accessibility features would need to be adopted through European Community procedures. Moreover TV receivers and radio receivers that do not transmit are categorically excluded from European terminal equipment regulation. There have been several attempts to use the European RTTE Directive to impose accessibility requirements but they have all foundered on the inability to provide a range of solutions for consumers; every model of a class of equipment would have to carry the requisite feature.
- 4.2 The aim of promoting inclusive design is to extend the number of consumers who are able to use mainstream equipment. A small increase in take-up of would therefore be regarded as a positive outcome. However, when the aim is to ensure access for people with specific sensory, cognitive or dexterity impairments the obstacle to regulation is that there is no single solution that meets the needs for each of these groups. It has also been recognised that mandating usability standards is not an appropriate solution for people with multiple impairments.
- 4.3 Imposing design requirements by law also has the drawback that if the requirements are over specified, the designer's scope for innovative solutions will be curbed. Alternatively, if general usability and accessibility requirements are set, it is difficult to set objective metrics to determine whether these have been met. The use of public procurement to secure usable devices has been held back by a lack of standards against which the product may be assessed. The European Commission has issued a mandate for a portfolio of accessibility standards but this is expected to represent a long-term project.

Installation and set up of equipment

- 4.4 Most of the detailed published research on difficulties regarding the installation and set-up of domestic communications equipment has been carried out in relation to digital television, notably because of the imperatives of the switchover programme. Otherwise there appears to be little empirical research that is publicly available on this, particularly on barriers to interconnectivity of communications devices.
- 4.5 Installation of proprietary cable and satellite digital equipment is carried out by installers on behalf of the operators. For digital terrestrial television services (DTT) installation is up to the individual consumer. Whilst this is theoretically straightforward, it is still likely to present difficulties for many. The digital television trial in Bolton reported on by DCMS (2006)¹⁶ found that 86 per cent of people aged 75 or over said they expected to need help with installation of a digital set-top box. Although 69 per cent of people aged 75 or over were able to self-install, in reality this was mostly done with the help of relatives or friends.
- 4.6 In addition, despite the welter of research and attention paid to digital television installation in the switchover trials, and the fact that cable and satellite set top boxes

¹⁶ DCMS, Report of the Bolton digital television trial, 2006

are installed by the service providers, it is clear from the queries posted on internet websites that consumers are increasingly experiencing difficulties in connecting additional devices to their digital TV equipment. The problem of inter-connection of communications equipment emerged as one of the main problems that people raised in a recent advice phone-in that the consumer organisation Which? organised. As a result Which? is currently developing a website to provide advice for consumers on connectivity issues.

4.7 Manufacturers and service providers will undoubtedly have information on consumers' problems with the installation and setup of mobile phones and PCs, particularly from complaints and queries to their service centres and questions to their websites. Understandably this does not seem to find its way into the public domain very frequently, if at all. However, some information on common consumer problems is available from Nokia in a 2006 conference presentation based on data derived from experience of online support services¹⁷. These included:

- physical set-up difficulties;
- combinatory problems;
- problems with the online service needed to use the product; and
- local wireless connection problems.

4.8 Power-on problems were considered to be common, and included:

- physical set-up (such as inserting battery and charging);
- pressing the power key;
- doing the initial set-up activities; and
- letting the device complete the start-up process.

Technical problems with personal computers covered connectivity, interoperability, and combinatory issues.

4.9 The Nokia presentation cited above admitted that, on average, online support is difficult to use and requires major effort to find useful answers (for instance, responses may be too general, there may be a lack of search function, or the problem may not be covered). Further research was recommended in order to explore the different ways of providing online support, including informal support methods such as discussion forums, IP telephony, wikipedias and blogs. According to the presentation, design for the first use experience and product support should:

- explain product features and capabilities;
- communicate sources of assistance; and
- give problem solving support in case of difficulty.

It is not clear whether and how Nokia has changed its online support or product design features as a result of identifying such problems.

¹⁷ Ketola P, On out-of-box experience and online support, 2006

4.10 A research study that discusses the challenges people face in starting to use a mobile phone was also undertaken for Nokia by Tuomainen and Haapanen (2003)¹⁸. This was a small qualitative study, carried out in Finland and the USA, with participants aged between 59 and 79. The study looked at the needs of active older people and found that support is crucial when people start to use a mobile phone. Participants in the research expected to get training on basic usage in the shop when buying a phone but, as the study stated, it is hard to get this from sales personnel, or the style of help might not be suitable. Self-learning is not well supported, and user manuals are considered to be too difficult to understand, as the language is too technical. Moreover, relevant information may be hard to find in the manual. In general, people relied on family and friends for help with problems.

4.11 An OFT survey in 2002¹⁹ criticised support services for consumer IT goods:

“Support services are vital for many consumers. However, we found information on these services to be poor, with consumers reporting them the most difficult aspect of the purchase on which to obtain information. Furthermore, the quality of support services was often unsatisfactory, with telephone helplines generating the most dissatisfaction. Better information would help consumers to shop around for the best service and the best product, which in turn would stimulate better support services generally”.

4.12 The effectiveness or otherwise of companies’ online help facilities can be a crucial matter for many, whether they provide installation and set-up help or “troubleshooting”. However, there appears to be little publicly-available research on how effective these are. One exception was an Australian empirical study of online help design by Purchasey et al (2002)²⁰. The results revealed that the more general principles associated with “understandability” (namely, “what’s my question/problem and can I understand the answer?”) are considered the most relevant. The study also found that, while users may complain about the design of existing online help features, they tend to value them more than features with which they are unfamiliar (such as an online prompting question that is unclear or beyond the technical understanding of the user).

4.13 A further critical issue is that of the documentation which is intended to help the purchaser to set up and use a new product. The Plain English Campaign has some trenchant points to make in an e-mail for this report, including the following.

“It is probably true to say that communications equipment is the most complicated electronic equipment that we use on a daily basis. Often, the accompanying user manuals are indecipherable to all but the most technically-minded consumer. Engineers charge huge amounts to install broadband or satellite equipment in our homes which we could quite easily install ourselves, were the instructions clear and easy to understand. We feel comfortable operating the various buttons and switches in our cars, but it takes a lot longer to learn how to program the car radio system!

“We have edited a number of user manuals, mobile phone contracts and other documents relating to communication products. But it does

¹⁸ Tuomainen K, Haapanen S, Needs of the active elderly for mobile phones, 2003

¹⁹ Office of Fair Trading, Consumer IT goods and services, 2002

²⁰ Purchasey H C, Worrill J, An empirical study of on-line help design, 2002

seem that the industry as a whole is still reluctant to change its ways.

“Much of this information is written clumsily, or contains impenetrable jargon and technical language. Older generations find this language much harder to 'learn' than young people. We would like to see companies spending as much time getting their public information right as they do fine-tuning the actual technology.”

As visually impaired people and those with learning disabilities face particular problems in respect of manuals and other set-up documentation, one simple idea is that equipment should be defaulted for start-up with all accessibility features on.

Multi-functionality

4.14 If multi-functionality and interactivity features are offered at little or effectively no extra cost to the consumer, some people will immediately, or gradually, come to regard additional features as part of the basic function; that is, after all, one of the key features of digital technology. Of course there are connections between the number of functions available in a product or service and its potential or actual complexity. The degree to which it is usable to most people will depend on whether good design principles and practices have been employed, such as:

- considering the layout, ergonomics and the ‘labelling’ of controls;
- the cognitive load required to operate the product, and memory requirements to use it again later;
- the use of non-specialist/technical terms when all the user needs to know is what a control does or what a ‘message’ means;
- when navigation or other errors are made, to know how to cope with them or start again;
- the use of readily-understandable feedback; and
- the use of menu-driven systems which are as transparent and explanatory as possible.

Television

4.15 Ofcom has previously published a summary of usability research relating to digital television in March 2006²¹. Ofcom’s audit of viewers’ priorities for digital switchover highlighted the need for the good design of remote controls, set-top boxes, instruction manuals, TV menus and EPGs²². Overall, it concluded that:

“The most immediate requirement ... is for equipment manufacturers to improve the usability of all equipment on the market, which would benefit all viewers.”

²¹ Ofcom, Summary of research on the ease of use of domestic digital television equipment, 2006 www.ofcom.org.uk/research/tv/reports/usability/

²² Ofcom, Digital switchover: an audit of viewers’ priorities, 2006

Towards this end, the summary of research suggested two possible approaches towards improving usability in general, by developing:

- simple products that offer reduced functionality in some respects but are easy to use; and
- products with full functionality that are tailored to the needs of particular consumer groups.

Two prototype checklists were outlined covering:

- the design of easy to use digital television receiver equipment including onscreen guides and remote controls; and
- the provision of easy to use installation and set-up instructions for digital terrestrial television receivers.

- 4.16 Lessiter et al (2003)²³ stressed that usability is of paramount importance for a product like television which has almost universal penetration and is generally perceived as being very easy to use. They pointed out that ease of use of digital TV, together with perceptions about its ease of use, are of particular importance as the sensory, cognitive and dextrous abilities of the general population and their confidence with technology vary substantially.
- 4.17 The paradoxical nature of digital television for older and disabled people was highlighted in research for the DTI by Scientific Generics (Klein et al, 2006)²⁴. The study pointed out that the new technology makes possible the provision of new facilities such as audio description and, potentially, closed signing (the ability to switch the sign interpreter on and off screen), thereby allowing the equipment to offer greater access to television to people with sensory impairments. However, the report also found that this was counteracted by other features (such as the complex user interface and multiple remote controls in many installations, together with the often confusing way of navigating through digital content) that have introduced barriers which could exclude or frustrate people who are otherwise able to use analogue equipment.
- 4.18 The Scientific Generics study also showed that 82 per cent of respondents regarded usability as important or very important in their choice of a new set top box to get digital television on Freeview. According to the study, an estimated 8.2 million households may have difficulty in the transition to digital television and 2 million of these will be excluded from using current set-top boxes (STBs). A number of products were recommended to deal with the difficulties identified in the research. These included a reduced functionality STB. In addition, a STB was proposed which would have the same level of functionality as existing STBs, but which would be easier to use. Total demand addressed by these two types of product was estimated at 7.3 million households. Moreover, an assistive STB was recommended to deal with vision and dexterity loss, with an estimated total market of 600,000 households. Finally, an adapted STB was designed to cater for those requiring specialist features due to combined severe loss or extreme cases of capability loss - with an estimated total market of 300,000 households if all types of capability loss could be addressed.

²³ Lessiter J, Dillon C, Freeman J, Visual acuity, manual dexterity and digital TV design guidelines, 2003

²⁴ Klein J et al, The equipment needs of consumers facing most difficulty switching to digital television equipment, 2006

4.19 Amongst other research carried out in the run-up to switchover, work by i2media research (2006)²⁵ for the DTI focused on the equipment needs of consumers facing most difficulty switching to digital TV. The groups identified were people with various types of physical and cognitive impairments, older people, those who are not confident in using the technology, and people who are not motivated by its benefits. Solutions proposed to address the requirements of people in these groups included providing:

- help with installation;
- easier-to-use remote controls; and
- features such as clean audio²⁶, audio description²⁷, and easily available information about access services.

4.20 Another key finding to emerge from this research was the need for easy to use integrated digital TVs (IDTVs). As the report remarked, these sets currently provide the user with experience closest to that which people have with analogue TV, and require one remote control. High proportions of the survey respondents expressed interest in IDTVs for at least one set in their household. However, this could prove to be a high cost method of switching for households on low incomes.

4.21 A desk research study by Darnton (2006)²⁸ into communicating with people aged 75 and over highlighted an absence of detailed research and said that there is:

“...little direct evidence on the question of whether older people are deliberately refusing to adopt digital TV, or are not making an active choice. Indeed the type of qualitative evidence needed to explore such a question is rather scarce”.

Moreover, the study stressed that many socially isolated older people are missing from research studies and that the quantitative survey data available on those 75 and over tend to exclude those who live in communal establishments, many of whom will fit the definition of vulnerable groups.

4.22 Potential barriers to usability have arisen in relation to the use of video recorders with digital television. For instance, it is not possible to use VCRs to record one programme while watching another unless the VCR has an additional dedicated digital tuner. Installation and use of this kind of set-up to ensure full VCR functionality is likely to be beyond the technical expertise of many viewers. Consequently VCRs will need to be replaced with digital hard drive recorders or DVD recorders with a built-in digital tuner. Ofcom's consumer research indicates that around 25 per cent of VCRs, about 7.5 million recorders, are used at least once a month to record one channel while watching another.

²⁵ Freeman J, Lessiter J, Pugh K, Equipment needs of consumers facing most difficulty switching to digital television equipment, 2006

²⁶ A soundtrack which boosts dialogue over background noise for hard of hearing people.

²⁷ An additional commentary that helps people with a sight problem to picture the onscreen or onstage action, body language and facial expressions.

²⁸ Darnton A, Communicating with the over 75s, 2006

Radio

- 4.23 It has not been possible to look at usability issues in any depth in respect of digital radio within the time available, but according to the RNIB, one of the disadvantages is that information about the stations is usually displayed on a tiny screen with rather poor contrast. There is currently only one radio on the market that can speak the names of stations and guide users through setting it up. This is presently being marketed by the RNIB but the cost (just under £120) may be expensive for some with visual impairments.

Telephones

- 4.24 There are a number of general features that can act as barriers to the use of telephone handsets, whether they are mobile, fixed cordless or corded phones. These range from ergonomic features, such as whether a phone is easy to hold, whether the buttons are easy to find by touch as well as sight, and whether the speaker and microphone work well (for instance, not only in terms of volume but also clarity). Other points that can be overlooked in design include the appearance and feel of connectors such as sockets and jacks.
- 4.25 There still appear to be issues around the usability of digital corded phones and mobile phones, which can cause audible interference for those using analogue hearing aids, and even for those with digital aids. At present the onus tends to be on the consumer to find a hearing aid which does not interfere with the phone.
- 4.26 In Ziefle's and Bay's 2005 work on the ageing effects on the usability of mobiles²⁹, 20-32 years olds and 50-64 year olds carried out four identical tasks on two phones, one more complex than the other. Both age groups performed better with the less complex phone, a result which was more pronounced amongst older users.
- 4.27 In another Ziefle et al study (2006)³⁰ on the usability of mobile phones, the researchers, using three simulated models, and involving two groups (36 aged 9-14 and 45 aged 19-33), keys' meanings and their effect on user performance were measured. Amongst other findings, the complexity associated with keys (keys exerting different functions, and with semantically inconsistent meanings) were found to have the worst effect on performance. Whether such complexity was directly associated with the simulated models' functionality is not known, therefore it would be unwise to draw any overall conclusions except that multi-functionality might require multiple meanings/modes for keys, and therefore affect user performance.
- 4.28 This subject was explored in relation to web phones by Chae et al (2004)³¹, who carried out a laboratory experiment to investigate how screen size and information structure affect user behaviour and perceptions. Although their remit focused mainly on screen size and the amount of information able to be displayed on screens, task complexity, cumbersome input facilities, and complicated sequential navigation were also key factors affecting usability and performance.
- 4.29 Disability experts maintain that it is important not only to have clear and reasonably large buttons and good layout, but also for the operation of keys to be positive rather than 'spongy' and perhaps to be accompanied by an audible 'beep'. People with

²⁹ Ziefle M, Bay S, How older adults meet complexity, 2005

³⁰ Ziefle M, Bay S, Schwade A J, On key's meanings and modes, 2006

³¹ Chae M, Kim J, Do size and structure matter to mobile users?, 2004

arthritis or other fine motor control problems may benefit from voice activation, which allows the use of a spoken name or other word to initiate dialling (or other functions).

- 4.30 There are organisations that provide authoritative and useful guidance for people with sight, hearing, speech and mobility problems, but, it could be argued, however much they try to advertise, it is inevitable that some consumers will be unaware of the availability of such help. Consequently many consumers are likely to rely on what is available in local retail outlets or in catalogues or websites, and there is no guarantee that they will stock, or indeed know of, suitable products. Also it may well not be possible for people to test the suitability of a product whilst in the shop or retail outlet, for example, whether the ring tone is loud enough.

Computers and the Internet

- 4.31 One of the most insightful studies about people's use of the web, including errors and problems, how they occur, and what users perceive to be happening, was carried out by Norcio et al (2004)³². The study involved 78 subjects, whose average age was nearly 48, all of whom were novice users, but each was given basic tuition. The researchers observed and questioned the subjects as tasks were performed and errors made (that is, in order to avoid the distortions which arise when study subjects are asked about tasks in a post-hoc manner). 219 errors occurred while web browsing, and as the authors conclude:

“In many of these errors, users could not complete their tasks, although they acted in a correct manner, and the user's computer hardware and software were functioning properly. This data points to the need for improved design in three areas: Web site design; Web browser design, and search engine design.”

- 4.32 Whilst much continues to be written about website design, it is mainly directed towards the needs of disabled people and many problems still clearly persist in this regard. Yet design issues clearly present problems for other computer users as well. This finding shades into ongoing discussions about such matters as graphics-rich sites and pages which assume some degree of sophistication/experience amongst users. It may also connect with such features as automatic or user-controlled plug-ins, and the appearance of advertising and other pop-ups and banner adverts.
- 4.33 So it might be tentatively concluded that functionality with regard to websites is still problematic, with many commonly-acknowledged problems being associated, in part at least, with additional features.
- 4.34 Some manufacturers appear to be promoting the use of touch-screens instead of keyboards for older people and others who are thought to find keyboards difficult-to-use, especially for hand-held devices. Interestingly, a paper by Wright et al (2000)³³, which cited 3 studies, found that accuracy and speed declined when using touch screen technology. Although some may argue that touch screen technology has improved since the report was written, nevertheless, the paper does raise questions about the ease of use of touch-screen options or features.
- 4.35 One of the key themes of many of the studies reviewed for this research audit is that lack of knowledge and thus of familiarity with computers and the Internet can be in themselves major barriers to access. In these situations in particular, people come up

³² Norcio A, Lazar J, Meiselwitz G, A taxonomy of novice user perception of web errors, 2004

³³ Wright P et al, Text entry on handheld computers by older users, 2000

against a second barrier: namely hard-to-use and hard-to-understand features of both hardware and software. Common usability barriers cited in the research literature include:

- unclear terminology;
- unclear and varied interface conventions;
- cluttered and complicated screen displays, and poor colour combinations;
- small text size that can't be enlarged;
- websites that cannot be used without a mouse;
- unclear navigation within websites;
- the use of graphics without alternatives; and
- confusing presentation of information.

- 4.36 Evidence from numerous research studies demonstrate the barriers to digital inclusion caused by poor design. For instance, a recent multi-disciplinary action research study by Newell et al (2006)³⁴, involving industry, government and academia, revealed the importance of designers and manufacturers developing a better understanding of the range of needs of older people in this regard. The research included the development of prototype e-mail, web search, and navigation systems for users aged over 60, who were inexperienced in computer use and had never used the Internet. User evaluation showed that these simple experimental designs were successful in providing easy to use systems and in increasing the confidence of the participants. According to the authors, this would not have happened had these users only been exposed to commercially available applications.
- 4.37 The academics involved in this study encountered problems in persuading other team members of the specific challenges of designing for and working with older people. The effect of this work on the clients and the developers was reported as dramatic: their views of the characteristics of older users changed significantly, and they came to comprehend the very low level of information technology knowledge of many of the participants. Although a great deal of information about the characteristics of older people was available to the clients and developers, this exposure appeared to have had little impact hitherto:

“It was not until older participants were actually personally observed trying to use the system that the developers and the clients fully realised the technological ignorance and fear of the users”.

Handheld devices

- 4.38 There do not appear to be many published research studies as yet on the usability of handheld computer devices. Given the spread of these devices, this is clearly an area which should be explored further. One of the few pieces of work on this topic was carried out by Darroch et al (2005)³⁵, which considered the small screens of

³⁴ Newell A et al, Designing a portal for older users, 2006

³⁵ Darroch I et al, The effect of age and font size on reading text on handheld computers, 2005

handheld computers. The study looked at the effect of varying font size on reading text on a handheld computer for both older and younger participants. The results showed that there was little difference in reading performance above 6 point, but subjective comments from participants showed a preference for sizes in the middle range. Consequently the authors recommended that, for reading tasks, designers of interfaces for mobile computers should provide fonts in the range of 8-12 point to maximize readability for the widest range of users.

- 4.39 Another US-based piece of research by Leonard et al (2006)³⁶ on handheld devices concentrated on their use by older people who had visual impairments because of age-related macular degeneration (a usually-progressive loss of sight, starting with central vision). Their work highlighted the ways in which mobile computing introduces new challenges by providing powerful computing behind sub-optimal interfaces, for example, small visual displays, poor audio facilities and limited input techniques. People with visual impairments who want to use mobile computing devices, such as mobile phones or handheld computers, encounter these barriers, in addition to those imposed by their functional vision.
- 4.40 More generally the study indicated the need for further research on the characteristics of handheld devices, as it emphasised that small changes in hardware can impose additional dimensions on the assessment of interactions. As the study concluded:

“Controlled empirical research investigations...are necessary to build a framework of interaction thresholds that can anticipate the wide variety of user needs as new interaction paradigms are introduced by the emerging technologies”.

Accessibility barriers

- 4.41 As described earlier, there is a distinction made between usability, which describes how easy to use a piece of equipment or service is for all consumers, and accessibility, which describes specific adaptation made to ensure equality of access for particular groups of people.
- 4.42 The headline Government figure of 10.3 million adults living in their own home who have a limiting long-term condition or disability, plus over half a million living in communal establishments such as care homes, gives an idea of the proportion of the population who might face potential barriers to access to communications services. Obviously some disabled people will not be at particular risk, for example those with mobility impairments, though it seems likely that many of the over-60s (who comprise over half of the total) are at risk of exclusion as a result of accessibility problems. The term “disability” covers a very wide range of impairments and conditions, and the potential accessibility barriers vary widely depending on the type of impairment(s) or the nature of the condition an individual has. For example, a significant proportion of the 8 million people who have arthritis, many of whom are under 60, are likely to find it difficult to operate equipment which requires fine motor skills. Nearly nine million people, of all ages, who are deaf or hard of hearing may encounter barriers in using some communications technologies where sound or speech is involved³⁷.

³⁶ Leonard V et al, An investigation of handheld device use by older adults, 2006

³⁷ The numbers given for particular groups of disabled people should be seen as a subset of the headline government figure. Many people suffer from multiple impairments, which explains why the cumulative total of disabled groups is greater than the overall number of disabled people.

4.43 There is also a substantial number who might be at particular risk, but who do not have a sensory impairment or physical disability. For instance, for a variety of reasons, seven million adults³⁸ have literacy and/or numeracy problems and these adults also tend to have low levels of information technology skills. 1.5 million adults and children have learning disabilities. Then there is an unquantified number of older people without any particular disability or condition who, because of personal and circumstantial reasons, have little confidence or skill in using new technology-based products which have emerged over the last 20-25 years.

4.44 This audit has identified some particular access issues relating to fixed and mobile telephony, personal computers and the Internet, and handheld devices³⁹. The reason these barriers exist are partly due to the failure of manufacturers and designers to consider fully accessibility for all as products and services are developed, a situation that was explored by Gregor et al (2005)⁴⁰:

“There is... strong anecdotal evidence that some companies either do not wish to sell their products to less able customers and or that they believe that disabled people are undesirable customers. The reasons given include insufficient time and resources to produce accessible software, coupled with the company’s inexperience in dealing with users and inadequate understanding of the needs and wants of disabled people. The final and, to many, the conclusive reason, is that they believe that there is a lack of demand for accessible technology and this will not change.

“Designers often believe that it is very difficult and expensive to design accessible systems, and thus do not make any attempt to reduce exclusion...: Older and disabled people are less well represented in the work force than their statistical presence in the community, and those with mobility and communication difficulties are not very visible.”

4.45 Another potential barrier that was raised in discussions with some disability organisations for this report is a problem arising from the location of parent companies in countries where issues around disability discrimination may not be recognised or as developed as they are in the UK.

³⁸ The Skills for Life Survey, DfES, 2003

³⁹ These are not covered exhaustively in this report, but are focused on those that crossover with ease of use concerns.

⁴⁰ Gregor P, Sloan PD, Newell A F, Disability and technology, 2005

Section 5

Recommendations for future work

Introduction

- 5.1 The authors of this audit on usability issues have suggested a number of areas where they felt there may be gaps in the available research on ease of use. They also have considered recommendations on how Ofcom might be able to further encourage the availability of easy to use domestic electronic communications equipment, in line with its duty under the Communications Act. This section sets out their views: Ofcom has not yet reached a decision on what its future work on usability might entail.
- 5.2 Following a period of engagement with stakeholders and debate on the issues raised in this report, Ofcom will put forward proposals for consultation as part of its annual planning process towards the end of 2007.

Consultants' recommendations of areas for future research

- 5.3 Independent systematic research is required to examine the extent to which the major communications technology companies have incorporated ease of use features in their products, including finding examples of good practice. This should include an investigation into the role usability professionals play in these companies. Although it is accepted that this would involve a substantial research effort, it could be carried out in phases.
- 5.4 The involvement and participation of users and non-users of communications technologies in design has been covered to some extent in existing research. Further work is needed that would build on these findings and, in particular, to investigate whether there are any relationships between different approaches to user involvement and outcomes in terms of the usability of products.
- 5.5 Installing and setting-up ICT equipment raises a host of usability issues which merit further research, including the interconnectivity of devices. As the report has illustrated, these can present significant barriers to usability.

Consultants' recommendations for future work

- 5.6 Ofcom should bring together a range of experts from academia, consumer and voluntary organisations, including those directly involved in current usability-related initiatives. The aims should be:
 - to explore and identify the most pressing usability issues faced by consumers in general as well as consumers with particular needs;
 - to exchange information about current research and other relevant activities; and
 - to consider the development of an ongoing network of groups, individuals and industry, with a commitment to improving usability of communications equipment and services.
- 5.7 Ofcom will need to develop a systematic approach to the relevant industry players to present evidence on the need for comprehensive action by the industry to improve

the usability of communications equipment, and for Ofcom to gain a deeper understanding of the reasons why usability problems persist. Similarly, Ofcom should engage with providers about the role, status and influence of usability professionals in their companies, and the ways in which usability testing is carried out. Ofcom should also develop a programme of discussions with organisations representing usability professionals both in order to discuss evidence about ongoing problems with usability, and to gain a better understanding of their work and roles.

- 5.8 Once Ofcom is able to assess the effectiveness of these types of activities and the outcomes, it may need to consider whether any legislative changes are required to allow for direct regulatory intervention to ensure that it is able to fulfil its duty to promote ease of use.
- 5.9 Ofcom should actively pursue opportunities to promote ease-of-use and compliance with relevant standards and guidelines at EU and other international levels.

Annex 1

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