

**ANALOGUE TO DIGITAL SWITCHOVER:  
HUMAN ASPECTS OF ADOPTION**

**A SCOPING STUDY FOR THE DIGITAL  
TELEVISION PROJECT**

**CRSP456**

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# **ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION**

## **A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT**

### **OVERVIEW**

In December 2000 the White Paper 'A New Future for Communications' set out the government's vision and objectives for communications in the 21<sup>st</sup> century. A key part of the vision included radical changes in spectrum management and the switchover from analogue to digital broadcasting.

The White Paper addresses issues of fundamental importance relating to promoting the right market conditions, ensuring inclusive access and safeguarding the interests of citizens. The outline plan for the implementation process emphasises regulatory, technological and business aspects of the switchover. However, in addition to these crucial requirements there is a pressing need to develop and implement a rigorous process of change management for the human aspects. Such a process will be essential if the vision is to be realised in the proposed timescale.

In order to prepare for this process, the Digital Television project has commissioned an initial (35 day) scoping study to examine management of the key human aspects of the switchover to digital broadcasting. The objective of this study is to outline the issues to be taken into account over the next few years and to indicate, from state-of-the-art knowledge, the critical success factors and relevant expertise for achieving successful transition to DTV. The study consists of six position papers listed below:

**Position paper 1 – Mapping stakeholders and their requirements**

**Position paper 2 – Promoting successful public uptake/adoption**

**Position paper 3 – Designing for inclusion**

**Position paper 4 – Human issues for e-business and the economy**

**Position paper 5 – Managing the transition process**

**Position paper 6 – Identification of existing knowledge resources**

The final paper summarizes the actions required in the transition programme:

### **Paper 7 - Action plan/recommendations for the transition**

This paper suggests three stages in the timescale for the transition. Actions, including consultative exercises, participative processes, research, information-gathering and preparatory work are identified for each stage.

It should be clear from the content of the papers that the scale of social change involved in the analogue to digital switchover will be significant. A coherent change management strategy to address the human issues will be essential. It will need to be related closely to the highly complex technological planning activity already in progress.

The scoping study also suggests that, while the challenges posed by the requirements of the switchover are on an unprecedented scale, there is extensive, established best practice in change management and inclusive design upon which to draw to ensure a successful adoption process.

This scoping study is thus the first step in what will need to be a much larger project to ensure that the human aspects of the adoption process are dealt with effectively.

# ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION

## A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT

### POSITION PAPER 1 – MAPPING AND REVIEW OF STAKEHOLDER ISSUES

#### 1.1 Introduction

Government plans to change from analogue to digital transmission of TV services at some time between 2006 and 2010 are in line with its policy to encourage the take-up of information and communications technologies in the UK. The analogue to digital switchover has a vital role to play in achieving the Government objectives of enhancing communication and relationships in society and maintaining Britain's global economic status. The success of the analogue to digital change programme depends to a great extent on the willingness of consumers to adopt digital television (DTV), but there is an extensive range of agencies or organisations that also have a part to play in enabling and promoting adoption.

In order for the Government to meet its objectives with respect to the analogue to digital switchover and manage the transition effectively, it is necessary both to identify the numerous stakeholders involved and to understand the nature of their 'stake' in the process. This paper aims to provide an overview of the main stakeholder groups and their likely needs and concerns.

#### 1.2 Stakeholder Mapping

The core, or primary group of stakeholders, who have an ultimate interest in this process, are consumers, whether as individuals or community entities, such as in schools, hospitals and prisons, and users with special needs. Secondary stakeholders include Government, service providers, equipment retailers and manufacturers, equipment suppliers and installers, content providers and legal and regulatory bodies.

From the primary stakeholder perspective, the main issue concerns take-up of DTV. The literature on the uptake and acceptance of new interactive technologies suggests that there are four key factors which will underpin the voluntary adoption of DTV: perceived ease of use, perceived usefulness, perceived entertainment value, and perceived attractiveness (van der Heijden, 2000, after Davis, 1989). In the case of DTV, it could be argued that the last of these, attractiveness, is actually a product of public perceptions of the preceding factors. Two further and fundamental prerequisites need to be added to this list - information and access. Consumers and users need information about the switchover process, digital television equipment and services, and potential costs and benefits, in order to make informed choices. Equipment and services need to be available, affordable and easy to use in order to be accessible.

An analysis of those who are in a position to influence the factors that will determine primary stakeholders' perceptions and attitudes to digital television, and therefore influence the success of the switchover, helps to identify the principal **secondary** stakeholders (Table 1):

**Table 1 Analysis of Secondary Stakeholders**

<b>Success factors in take-up of DTV for primary stakeholders:</b>	<b>Influenced by these secondary stakeholders:</b>
Awareness/Information	Government; service providers; equipment retailers and manufacturers; consumer representative bodies;
Access	Service providers; equipment retailers; equipment manufacturers; equipment suppliers and installers; legal and regulatory bodies;
Ease of use	Service providers; equipment manufacturers;
Usefulness	Service providers; content providers; equipment manufacturers;
Entertainment Value	Content providers;
Attractiveness/Desirability	All of the above.

An assessment of the influence and importance of these stakeholders helps to identify those who are key to the success of the programme, and to identify risks that must be managed for the programme to succeed. “Influence” here refers to how powerful a stakeholder is in terms of influencing the process by which DTV will be introduced; “importance” refers to those stakeholders whose needs, concerns and interests are central to the success of the programme.

Table 2 below is a matrix diagram presenting an analysis of the relative influence and importance of the stakeholder groups listed above. For the analogue to digital switchover, the service users are considered to be the primary, and therefore the most important, stakeholders; an estimation has been made of the relative importance of the secondary stakeholders.

**Table 2 Stakeholder Importance and Influence Matrix**

<b>A = high importance/low influence</b>	<b>B = high importance/high influence</b>
<ul style="list-style-type: none"> <li>• Service users (consumers)</li> </ul>	<ul style="list-style-type: none"> <li>• Service providers</li> <li>• Content providers</li> <li>• Policy and standards setting bodies (including Government)</li> <li>• Consumer representative bodies</li> <li>• Equipment manufacturers</li> </ul>
<b>C = lower importance/low influence</b>	<b>D = lower importance/high influence</b>
<ul style="list-style-type: none"> <li>• Equipment suppliers and installers</li> </ul>	<ul style="list-style-type: none"> <li>• Legal and regulatory bodies</li> <li>• Equipment retailers</li> <li>• Special interest groups</li> </ul>

The implications of this classification are as follows:

Box A - Stakeholders of high importance to the project - that is, most of the citizens of the UK -but with low influence: will require special initiatives for their interests to be protected.

Box B - Stakeholders of high importance to the project, and with high influence: Government will need to work closely with these stakeholders to ensure that the project meets the objectives of Government and business.

Box C - Stakeholders with lower importance to the project, and with low influence: are of low priority for Government (but may require monitoring).

Box D - Stakeholders with low importance to the project, but with high influence: may be a source of significant risk to the success of the project and will need careful monitoring and management.

Whilst most of the groups listed above are **key** stakeholders for the success of the project, particular attention must be paid to meeting the needs of the primary stakeholders - those who will be expected to use the DTV services but who are not in a position significantly to influence the important variables of access, ease of use, usefulness, entertainment value or desirability, all of which will promote adoption. However, this group of stakeholders is far from homogeneous, consisting of both domestic and community users (for example, educational establishments, prisons, hospitals and carehomes), users with an enormous variety of financial, educational, social and household circumstances, and users with a range of special needs. These differences are likely to give rise to a diverse set of requirements and concerns in relation to the switchover.

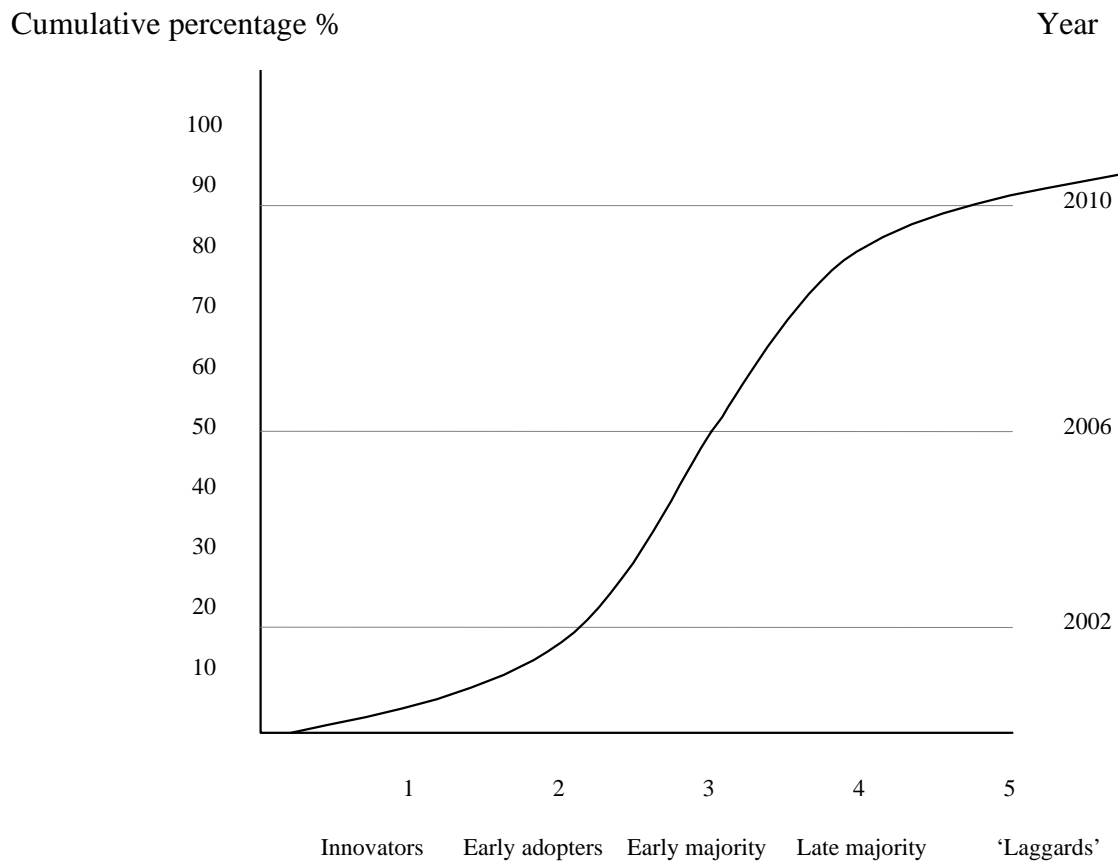
### **1.3 Review of Stakeholder Issues**

In reviewing stakeholder issues, this paper concentrates on issues relating to the primary stakeholders, since a majority of the secondary stakeholders are both influential and already well represented in the Government's consultation process. The needs and concerns of the intended users **must** be addressed if the requirement for almost universal take-up of digital television is to be met.

#### **1.3.1 Known barriers to take-up of DTV**

The literature on the diffusion of innovations (see Paper 3) suggests that DTV would be taken up voluntarily over a period of time by a significant proportion of the population, as shown in Figure 1 below. To achieve a successful analogue-digital switchover by the Government's target date, it will be important to identify potential barriers to this process and seek to overcome them. This will assist in accelerating the rate of voluntary uptake and enable attention to be focused on addressing the obstacles perceived by those who would not voluntarily make the switch.

**Figure 1 Rate of Uptake of New Technology Over Time**



There is a significant amount of research evidence already available which identifies the perceived barriers to the uptake of DTV. These are as follows:

- The cost of the service - this is cited as the main disadvantage to taking-up digital television services, even though consumers often over-estimate the cost of digital services (MORI, 2001). Furthermore, an advisory report to the Government states that the cost of open standard iDTVs is prohibitively high for most customers, as well as a lack of availability of low priced set-top boxes designed to deliver the free-to-air services and an unwillingness or inability on the part of viewers to pay for television services (Joint ITC, Oftel and OFT advice, May 2000). New research shows that 25 per cent of respondents would not be prepared to pay anything to switch to DTV. Forty per cent of those over 65 would not be willing to pay anything for DTV and a further 40 per cent were not really sure about the costs involved (Taylor, Nelson, Sofres, 2001).
- Lack of awareness of switchover – a survey of almost 2000 people found that 51 per cent of non-adopters and 44 percent of those who have adopted digital television are unaware of the Government’s plan to switch off the analogue signal (Consumers Association, 2001).
- Lack of clear messages about free-to-air services without subscription – in the consumer survey reported above, only three out of ten respondents were aware that the existing public service channels will remain free-to-air after switchover to digital broadcasting (Consumers Association, 2001).
- Lack of awareness of what DTV has to offer. Over half (56 per cent) of those not adopting DTV have reported that they feel that they do not have enough knowledge about

what digital television is currently offering; 25 per cent of *adopters* of DTV also feel this way (Consumers Association, 2001).

- Disinterest in extra choice of channels and services - 48 per cent of non-adopters only want to watch free-to-air channels after switch off with 21 per cent stating that they do not need or will not use the extra channels (Consumers Association, 2001).
- Little information on costs and benefits of services given. Apart from the option of receiving different types of channels, extra channels in general and better picture quality, consumers had difficulty identifying other benefits of DTV over analogue TV. Furthermore 20 per cent of non-adopters did not know what the benefits were of choosing DTV (Consumers Association, 2001).
- Having fewer social contacts - this reduces the opportunity to find out about DTV. In a survey conducted on behalf of the Department of Culture, Media and Sport (DCMS), 30 per cent of 'possible' digital viewers cited talking to family and friends for further information about DTV (MORI, 2001).

The DCMS research also found that those being least likely or less likely to switch over to DTV share the following profile (MORI, 2001):

- female;
- in older age groups (55 and over);
- in the lower social classes (c2de);
- have no children under the age of 15 in the household;
- have no access to a computer or the internet.

### **1.3.2 Experience of DTV take-up so far**

In qualitative research conducted on behalf of OFTEL, most respondents found the DTV systems to be extremely intuitive and user friendly. However, this was usually only in terms of finding television programmes (as opposed to interactive television or internet usage): most consumers used their service by trial and error (Counterpoint Research, 2001). This method of familiarisation may prove challenging to groups of people unfamiliar with new technology in general, particularly for some elderly/disabled people or other vulnerable groups.

The Counterpoint research was based on 12 telephone, eight household and six peer group in-depth qualitative interviews with those adopting digital television in different areas across England. Other highlighted findings include:

- Fragmentation of the audience has taken place – some respondents found it difficult to identify programmes that they had in common;
- There is an increased focus on 'channel hopping' or 'zapping' and increased knowledge of the channels and their content rather than the programme;
- There was communal use of DTV - television sets were typically located in one main living area, so that parents were confident about what children were watching;
- Some respondents saw television as a matter of profit, with themselves as consumers. Respondents identified themselves as consumers because they had a wide range of channels from which to choose from and they chose to pay for or to reject them in favour of a cheaper or more personalised option, thus they went 'shopping' for television. Television was therefore seen as being fundamentally linked to profit for service providers, with no mention of public service broadcasting.

- The use of DTV impacted on use of other related equipment. For example, VCR use declined due to the perceived ease of accessing programmes at another time through DTV, and the wide choice of channels meant that respondents felt less inclined to accumulate material for later viewing. The purchase of DVDs was also more likely to be abandoned due to the inclusion of pay per view film channels and better picture quality.
- Children were typically more confident users than older people and were more likely to use interactive features - older people tended to continue to watch whole programmes, whilst children and younger people tended to ‘zap’ across channels.
- Viewers who had switched to digital subscription from terrestrial services only tended to be less satisfied than others already paying for services. Pay per view was seen as contentious as most who were unused to the idea of paying for television were dissatisfied at having to pay again for other channels.
- There was some geographical variation –it appeared that those living in the north were more cautious about which element or combination of packages they adopted.
- There was a low awareness of, and technical difficulty with, interactive services offered (for example, e-mail, home shopping and online banking). Those who had used interactive services reported difficulties in connecting to the service, the speed of the service, and interruption to normal television viewing. DTV was frequently cited as inappropriate medium for home shopping and banking. Television was seen as a light, entertainment orientated medium, which should not place interactive demands on viewers. On the other hand, shopping and banking were seen as personal, individual activities and should therefore not be conducted in the public environment of the family lounge. (Currently just five per cent of Great Britain’s Internet users are accessing the web or using interactive services via DTV (BRMBi Bytesize website, 2001).)

### **1.3.3 Experience of take-up of other new technologies**

The evidence from the statistics and from case studies<sup>1</sup> such as the adoption of Automated Credit Transfer (ACT) and Minitel, suggests that the take-up of new technological services may be much harder to achieve amongst lower socio-economic groups and older age groups. In particular, there appears to be a sharp decline in the acceptance of new technology amongst the oldest age groups. Young people and those with higher educational qualifications tend to be more accustomed to using technology or technological services at work or in their homes, which may result in their greater propensity to accept new public service technologies. In the UK, Internet access and home PC use represent a similar picture.

There may be several reasons why this social bias in the use and acceptance of new technology should exist. Different reasons are likely to apply to different social groups, requiring different policy responses. Possible explanations, derived from general social theories and the above case studies, might include:

- Social capital, education and technological ‘exposure’ - the more educated and familiar with technology, the more likely is the take-up of technological services for domestic use;
- Income and financial exclusion - new technologies require investment on the part of consumers as much as on the part of business; higher earners with ‘personal risk capital’ are more likely to invest in new technology;
- Household management - individuals or households that have never or only belatedly had to adjust to new forms of technology (for example, with wages paid into bank accounts rather weekly cash-in-hand payments) and engage in the social interaction these

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<sup>1</sup> Appendix 1 provides statistics on the take-up of new technology while Appendix 2 summarises case studies of other examples of transfer to new technology.

technologies presuppose, will find adjustment more difficult - for them there is no need for technology, the 'need' is that of others promoting the technology;

- Attitudes to risk, and trust - risk-takers are more likely to 'try out' new technologies they are unfamiliar with; people who trust the providers of these new services are more likely to adopt their use;
- Lifecycle factors - people develop and experience different social and commercial needs during the course of their lives; new technologies that offer services that consumers (think they) need at their particular point in life (rather than for a specific occasion) may increase the likelihood of take-up.

### **1.3.4 Users with Special Needs**

Groups likely to be left behind in the digital revolution are likely to be older people, those on low incomes and disabled groups. Twenty three per cent of households in Great Britain include one or more sick or disabled adults under pension age (Family Resources Survey, 2000). These households are also more likely to have lower incomes due to a greater proportion being economically inactive (DSS Disability Survey, 1999, Rowlinson & Berthoud 1996). Thirty-four per cent of households with one or more sick or disabled adult have access to satellite/cable television, 32 per cent have access to a home computer and 98 per cent have access to a television (Family Resources Survey 2000). For families with one or more sick or disabled child, there are numerous extra costs impacting on family life (Dobson & Middleton, 1998), which may make a difference to the technology/equipment that they are able to purchase and use.

#### **a) Hearing Impaired users**

There are approximately 8.7 million deaf and hard of hearing people in the UK. About 673,000 of these people are severely or profoundly deaf and approximately 420,000 cannot hear well enough to use a voice telephone, even with an amplifying device (RNID website, 2001). As the number of people over 60 increases so will the proportion of deaf and hard of hearing.

**Subtitling** - Although Digital Terrestrial Television channels must carry programmes with audio description and sign language interpretation, there is no subtitling regulation on cable and satellite channels and there is no obligation on cable and satellite to carry subtitles on BBC or ITV simulcast programmes. The Royal National Institute for the Deaf (RNID) recommends that all Digital Terrestrial Television (DTT) channels, along with cable and satellite, are set the same statutory targets; rising by 10 per cent pa to 100 per cent by the 10<sup>th</sup> anniversary of the start of the DTT programme service (RNID Response to Communications Reform White Paper, RNID website). Those with hearing impairments have also experienced difficulties with the quality of subtitling as there are a large number of transmission hitches including missing words, spelling errors and breakdowns. Amongst those whose first language is British Sign Language there may well be low levels of literacy, and reliance on subtitling could affect their levels of enjoyment and the quality of information that they receive.

**Sign language provision** – Sign language interpretation may be broadcast in both 'open' (visible to all viewers) and 'closed' formats (available to be added as an option in the receiver). Research has examined the possibility of using a 'virtual' signer, but this has not proved to be a popular option for deaf people (RNID Website, 2001). The RNID are hopeful that work on digital technology will eventually allow deaf viewers to decode and use sign language in the closed format.

### **b) Users with learning difficulties**

Work conducted by the charity AbilityNet (a charity that brings the benefits of computer technology to adults and children with disabilities) demonstrates that computers can be used by people with learning impairments, with some adaptations or alterations. For example, they consider the role of pointing devices, and the benefit of the touchscreen, which could apply equally to accessing DTV services. Other recommendations include the use of bright, colourful screens, larger text and monitors and the use of speech, sounds and music (AbilityNet website). Research carried out by the Home Farm Trust<sup>2</sup> has highlighted the use of touch monitors along with a range of specialist devices together with appropriate software (Home Farm Trust website, 2001).

### **c) Users with sight impairments**

Almost all (94 per cent) of people with sight problems watch television regularly. The large majority (90 per cent) of these are over the age of 60. This age group are also more likely to use their television for company, as well as for information, education and entertainment (RNIB Website, 2001). This suggests that for many, television acts as a 'lifeline'.

As things stand, blind and partially sighted people may be unable to:

- get audio description;
- find the right channel;
- use the electronic programme guide;
- have access to talking teletext;
- use interactive TV services.

The Independent Television Commission (ITC) recommends that ten per cent of programmes on Digital Terrestrial Television (DTT) should be audio described within ten years from the start of the service being transmitted on DTT. The ITC also recommends that licensees should consider other ways of improving the enjoyment of the blind and partially sighted viewer by for example, providing programme listings in an accessible form by telephone and in large type (ITC July 2001). For coverage of 'live' events, additional information should be provided in the commentary.

The RNIB has launched a campaign for audio description and access to digital broadcasting. It is campaigning for:

- 50 per cent of programmes to be audio described;
- provision of access technology to ensure that all visual instructions and information can be accessed by people with differing visual impairments;
- programme guides to be made available in a range of formats;
- all aspects of technology to be designed for universal access, for example, remote controls, and Internet keyboards.

### **1.3.5 Users on low incomes**

Figures from the Department for Work and Pensions Statistical Summary in December 2001 show:

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<sup>2</sup> The Home Farm Trust is a national charity for people with learning disabilities. It set up a project to provide computer systems in each of its fifteen day services settings, with the aim of giving Service Users access to information and communications technology (ICT) using the latest computer hardware and software.

- 2.2 million people in the UK aged under 60 receive Income Support (average weekly payment of £85). Of these, 23 per cent are lone parents (average payment of £101 per week) and 26 per cent are disabled (average weekly payment of £75). Two thirds of Income Support recipients are women.
- 1.7 million people aged 60 and over are recipients of Minimum Income Guarantee (equivalent of Income Support for those 60+), again two-thirds of recipients are women. This means that 1.7 million pensioners have to claim Minimum Income Guarantee in addition to their State Retirement Pension (if they get one), as their income falls below a set threshold.

1999/2000 figures from the Child Poverty Action Group show that 4.3 million, or one in three, of the UK's children were living in poverty (i.e., living in households with less than half of the average household income) (Child Poverty Action Group website). This is one of the highest rates in Europe.

The basic Income Support rate for a single adult is around £53 a week, and research shows that there is little, if any, spare cash from this, which can lead to the accumulation of debt (see for example, Kempson & Whyley, 1999). Access to credit is also difficult for many low-income households who do not have access to mainstream credit or banking facilities (poor credit ratings, geographical location etc) (Kempson & Whyley, 1999, Office of Fair Trading, 1999). This raises issues concerning the affordability of the necessary equipment to access DTV.

One and a half million households lack the most basic of financial products including current accounts and home contents insurance and a further 4.4 million are on the margins of financial service provision (Kempson, and Whyley, 1999). Many insurance companies will not insure households in deprived areas, so there will be little means of protecting DTV equipment if it is purchased. According to the Association of British Insurers, 25 per cent of households have no contents insurance and 60 per cent of lone parent families have no life assurance (ABI Annual Report 1998/99). (Figures relating to the link between income levels and access to banking, including online banking facilities are given in Appendix 1).

Government documents about DTV refer to 'affordable' costs, but do not (yet) appear to define this. Even if only five per cent are unable to access DTV due to being unable to afford it, it may well be that these five per cent are also on the margins of exclusion from other aspects of society (for example, education, transport, work, social and civic participation). Thus, exclusion from DTV services may compound existing risks of marginalisation from 'mainstream' society.

Those on low incomes (as well as younger users) are less likely to have landline phones, and may rely on mobile phones for their telephone communication (often because poor credit ratings making it difficult for them to access 'traditional' telephone lines). Those without a landline will not be able to access the internet through their digital television, which has the potential to exclude them from one of the aspects of DTV that was intended to increase social inclusion.

### **1.3.6 Geographical and social isolation**

There are many ways in which consumers could be disadvantaged by geographical or social isolation. For those living in remote areas of the UK, there is a possibility that digital services may not be obtainable (or reliably obtainable). Where services are available, there

could be difficulties with obtaining new equipment, the installation and servicing of equipment, or information about the switchover and its implications. Consumers who do not live in remote areas but are a long distance from towns or near neighbours, or consumers who do not have easy access to transport, could face similar difficulties in access.

Word of mouth is likely to be the most successful mechanism for encouraging take-up of DTV. Therefore, those with limited social networks are more likely to be excluded from this process (this would include not only geographically isolated households but also those who are sick/ or disabled, living alone, older, or those for whom the 'first' language is not English)

#### **1.4 Recommendations**

In order to ensure that the needs of the primary stakeholders in the analogue to digital switchover programme are met (thereby promoting the uptake of DTV services and enabling the Government to meet its objectives), the following actions are recommended:

1. Continue to monitor consumer attitudes to and uptake of DTV and associated services, to develop a profile of the specific adoption curve and to identify barriers and facilitators to uptake. If there are (as is likely) many different reasons for slowness or resistance to take-up, then different promotional responses and 'aids to adopt' to address the different reasons and causal factors will be required.
2. Define access and usability issues for community/communal users, for example, prisons, hospitals, schools, residential care homes and other communal housing (this is likely to need a targeted survey/study since these groups do not have a single representative body).
3. Promote trust by providing clear and impartial information on costs and benefits of services and equipment (and implications for use of other equipment, for example, internet access, VCRs) which can help consumers currently considering DTV;
4. Monitor availability and cost of DTV equipment and services; identify policies needed to enable widespread access (for example, supplying equipment through sources other than retailers or providing financial assistance for low income groups, pensioners etc.). This, however, raises policy issues related to equity of access amongst different groups. It is of note, however, that 'access' needs to be considered in two ways: awareness of services/benefits that new technology can bring; and the cost and availability of the equipment.
5. Promote use of 'design for all' and usability standards among DTV equipment manufacturers; promote awareness of good design among consumers and encourage consumer testing and trials of equipment;
6. Identify special design needs for disabled groups and ensure that manufacturers and services meet these requirements;
7. Ensure wide representation of consumers (not just bodies representing special needs users) in the consultation process;

8. Identify groups at risk from social exclusion arising from the switchover, and barriers to inclusion.
9. Identify and develop special initiatives needed to protect consumer interests and avoid social exclusion - particularly for disadvantaged groups (including those on low incomes, older people, disabled people and those living in areas that geographically have low DTV coverage).
10. Develop an awareness programme for the switchover – including timing, implications, what will change; develop mechanisms for ensuring this information reaches the widest possible audience, to include those isolated by disability, geography, language etc;
11. Conduct ongoing research to identify and monitor the range of human and social impacts of DTV.

Further research may be needed to inform Government planning and to enable the above actions to be carried out most effectively. For example, how can the early adoption of DTV be facilitated through clear Government messages? What type of message? What are the effects of providing information about the forthcoming switchover – for example, is it likely that households will replace their television sets earlier because of the arrival of DTV, thus speeding up switchover?

Other mechanisms that could be considered to promote uptake include:

- Financial and other incentives could be provided to enable those on lower incomes to afford equipment.
- People with disabilities could be allowed to obtain VAT refunds on information and communication technology and assistive technology devices.
- Home visits by professional TV installers to help to introduce new users to the technology, especially older and socially disadvantaged people. (If this were to happen, consideration should be given as to whether this should be done through the public sector – where greater trust is likely - rather than private businesses.)
- Expansion of use of local colleges to provide practical ‘New Technology’ for older and socially disadvantaged people.

The acceptability and effectiveness of such incentives could be tested with different categories of consumers.

In addition to research supporting the actions that are necessary to achieve a smooth and effective switchover, there is a need for research to understand the wider and longer-term implications of the new technology. Other issues for which research and monitoring is required include:

- What will be the effect of non-participation (that is, non-converters) on social inclusion?
- What are the likely cost-effects of more services, available via DTV?
- Consumer debt on the internet – is this a risk for DTV users?
- How successful are TV shopping channels and what lessons, if any, does their experience hold for DTV?
- What will be the impact of more DTV on home PC use? What will be the consequences, and for whom?

- Will business/government be able to cope with new demand? Will it provide appropriate customer services that can help when help is needed?
- What will be the impact of more teleshopping on the economic environment, town centres etc?
- What are the opportunities for DTV to enhance inclusion by addressing real needs of citizens e.g. for information, education, health care provision etc?

# **ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT**

## **POSITION PAPER 2 – PROMOTION OF SUCCESSFUL PUBLIC UPTAKE/ ADOPTION**

### **2.1 Introduction**

*The analogue-digital switchover is an ambitious programme of social and technical change. To ensure successful public uptake i.e. both purchasing and using the technology (assuming all technical aspects have been addressed), three key elements require attention:*

- The public needs to be aware of the changes and benefits of these changes. They also need to be motivated to change.
- Individual users need the competence and confidence to operate the technology.
- Individual users need to feel confident that they will be supported at all stages through the switchover.

*These elements can be addressed through developing and implementing an integrated marketing and training strategy. This paper outlines some of the considerations, approaches and stakeholders in developing such strategies. Although developed specifically to address the issues surrounding the analogue-digital switchover, these strategies are relevant to and have applications in the wider context with regard to the adoption and promotion of other interactive public services such as NHS Direct, National Grid for Learning, the Benefits Agency etc.*

In developing the marketing strategy it is important to consider:

- drivers for change;
- potential barriers for adoption;
- segmentation of adopters;
- mechanisms for marketing the switchover.

Once these areas have been explored, it is possible to develop a training strategy, considering:

- training and needs analysis;
- content and design of training;
- delivery options, integration with existing infrastructure;
- evaluation of training.

This paper outlines these considerations and then identifies actions to be taken.

### **2.2 Marketing Strategy**

#### **2.2.1 Drivers for change**

The drivers for change need to be very clear for all stakeholders in the analogue-digital switchover. These can then be communicated as a compelling vision for the future, starting to create an individual and collective desire for change. This desire for change can be built on by:

- clear benefits using personal examples;
- building trust in the ability to deliver;
- providing relevant, tailored information on the implications and actions needed to change (the technology and the training).

These forces driving change will need to be greater than the potential barriers for adoption in order for the change to be successful.

### ***2.2.2 Potential barriers to adoption***

In order to develop an effective marketing strategy for achieving successful adoption of the new system, it is important to consider solutions to overcome potential adoption barriers. Seven key barriers to adoption persist. These include:

1. Low perceived relative advantage. Failure on the part of potential adopters to see or be convinced of the need for the new technology/system/device/product and the benefits of embracing it. What is the point of switching if the new system is not offering something better than what currently exists? If compelled to switch (as in the case of the imminent analogue-digital TV switchover), these adopters are likely to constitute the ‘laggards’ who will resist the new technology until some external force compels them to do so.
2. Low perceived compatibility with current habits/behaviour/lifestyle. The more incompatible the technology/system is perceived to be with existing practices, the slower the uptake rate. Indeed, the more stressful it would be for these consumers to incorporate/use the system even if it were generally and widely available.
3. Complexity of the system/technology. Difficulty in understanding how the system works and how to use it. This facet is most closely linked to the notion of ‘technophobia’. A perceived, psychological risk.
4. Limited capacity to try out and experience the system. Often, the lack of opportunity for doubters or skeptics to try out/experiment/get a feel for a new technology/innovation slows down adoption. However, once they have the chance to experiment or have limited trial use of the product in question, the experience (if positive, enjoyable or satisfying) can dramatically alter preconceived unfavourable notions and prejudices about the new product.
5. Limited opportunity to observe the benefits that the system offers. This is related to the preceding point. However, in many cases, it may not be feasible to get potential adopters to actually try out the new technology prior to adoption, due to the high costs of product trials. Nonetheless, the obstacles to adoption may be surmounted by implementing schemes whereby the new system’s benefits can be demonstrated or made obvious to potential adopters, without incurring actual trial. The greater the extent to which potential adopters can easily observe or view the advantages of the system, the more likely they will be persuaded to switch to the new technology. This can be effected through getting a ‘selective’ group of potential users to try out the product/system, in the first instance, who subsequently act as change agents or opinion formers/leaders, communicating the beneficial effects of the new technology to others in their sphere of influence.
6. Perceived economic risk. This is different to psychological risk, which can include fear of ‘not wanting to be left out’ or that ‘everyone has one, so must I’, which works to

accelerate adoption. Perceived economic risk may also act to accelerate adoption - the potential adopter may feel that not 'joining the crowd' means having to lose out on the financial benefits from adoption (e.g., more and better access to programmes; cheaper rates; more value for money; etc. assuming there are economic advantages over and above the non-economic benefits accruing to adopting the new technology). Conversely, if the perceived economic risks are low, uptake and diffusion rates will be impeded. Again, if compelled to switch, the consumer may become more or less skeptical depending on the extent and speed with which benefits are communicated and actually accrued to the user.

7. Economic switching costs. This includes downtime (what if I do not get my new TV up and running?), retraining (does it require a great deal of learning? Do I need to get someone to 'train' me to use the new system? What does it cost to switch? [Note that this is related to perceived compatibility])

The extent to which the above barriers will affect potential adopters varies according to the nature of the adopters. As such it is important to research potential adopters status in terms of their propensity to adopt the new ideas/innovations that the analogue-digital switchover represents to certain quarters of the country's population. It is important to understand that not all customers or people within a population will display a similar level of inertia (conversely, enthusiasm) for new systems/technology/etc. As such, there is a need to research and analyse different categories of adopters and their attitudes and responses to the switchover in order to inform marketing strategy.

### **2.2.3 Segmentation of adopters**

Typically, the population/market can be characterized by the nature of adopters based on their tendency to adopt at specific time periods in the evolution of the technology/system/innovation. We can broadly expect the following segments:

1. Innovators (usually some 1-2 per cent of the market/population), who are the 'techno-buffs' who embrace new ideas/innovations well before the others take to it. These individuals do not need a great deal of coaxing and are often younger, more upwardly mobile, better educated, more cosmopolitan, better exposed to all sorts of media, and more affluent. They learn about new technologies from subscribing to the specialist magazines and listening to special media that talks about new innovations. Many of these already are familiar with a whole array of 'digital' equipment and appliances. However, innovators are also primarily oddballs who do not have a natural, large following. Often, they are seen by others in the market or population as odd, weird, 'too trendy', etc.
2. The early adopters are the early followers, who see the potential in the new technology/system and embrace it soon after its uptake by the innovators. Often, it is wrongly assumed that innovators start diffusion (continued adoption by the population). In reality, it is the opinion leaders, who are typically found among the early adopters, who are most influential in persuading others to adopt (or, conversely) resist a new idea/technology/system. These opinion leaders influence adoption and diffusion patterns through word-of-mouth communications. Often, too, like the innovators, they are more educated, more upward-mobile, cosmopolite, more exposed to various communications media, affluent. A trickle-down process of adoption occurs where we can envisage uptake to advance from the more affluent 'socio-economic groups' to less. However, there are exceptions too. There are examples of new technologies (e.g., citizen band

radios, satellite TVs, wide screen TVs, among others) where a 'trickle-up' phenomenon occurred. Innovators in CB radios were 'hells angels' and the early adopters, truck drivers. Once packaged as 'executive mobile phones', mobile telephony started to take off. Again, peers and reference groups play an important role in communicating benefits and associations with image/lifestyle, which endorsed uptake.

3. Early majority - who form the bulk of adopters and represent the routine users, not the 'buffs' nor the more sophisticated early adopters. These are often the 'imitators' who are quick to catch on and follow the crowd. Peers and opinion leaders often influence adoption among this segment of users.
4. Late majority. Slow adopters who wait and see, usually, are compelled to join the crowd, since everyone around them seems to have/use the technology/system. Like blue denim jeans, track suits and, nowadays, the mobile phone – eventually these caught up with the 'oldies'. Even grandmothers and grandfathers own a mobile (and, incidentally, digital) phone nowadays.
5. Laggards. Last to catch the wave. Usually, they do not adopt because they see little need in spite of what others in the population do. There are still households in the UK that do not own a phone, microwave oven, or deep freezer. Switchovers in technology do not pose a threat/problem for them.

Market research must be specifically conducted to ascertain the potential distribution over time. Acceleration/deceleration of uptake can occur due to many factors (economic, political, demographic, etc.) Communications and marketing strategies are not the only drivers of adoption.

In the case of TV entertainment systems, switchovers from one technology to another are not a new concept – think about black-and-white to colour TVs; the adoption of satellite TV; etc. Although not directly comparable to the imminent analogue-digital switchover, the emergence of different adopter segments occurs over time in each case.

The extent of the barriers to uptake outlined above varies across the different segments. As such, marketing and communications strategies must be adapted depending on the nature of the expectations and behaviour of each of the broad segments. A generic communications campaign does not work (recall the failed 'AIDS' campaign launched by the Tory government which was not well targeted at the group most vulnerable to exposure to the HIV virus).

The development of effective mechanisms for marketing the switchover therefore starts with determining: Who are the target adopter groups? What should the message be (given the target group)? How should the message be conveyed (i.e. By whom? How? What media?)

#### **2.2.4 Mechanisms for marketing the switchover**

Effective marketing (i.e. in this specific case, communications) always begin by asking:

- What are the objectives of the marketing task? (In this case, the goals in terms of positive impacts in terms of the target groups' awareness of, attitudes towards, and adoption of DTV. Another way of putting this is to ask: What rate of uptake do we need to achieve within a specific time period? Assuming by the switchover date, there will already have

existed an installed base of UK households that own a DTV or a 'converter'. As such, different mechanisms are required to market the switchover if the promotion campaign is undertaken over time).

- Who are the primary target groups for the marketing campaign? [All sectors of the public seem to be implied, but, these sectors or segments have different expectations and display different orientations towards the switchover, and, indeed, towards new DTVs and other technologies].
- What are the key drivers/motivations/concerns for adoption? [Not all sectors of the public are resistant to switchover; for the 'concerned' what might be the key barriers that the marketing campaign should seek to surmount? What forms of promotions might facilitate adoption?]
- How best should the messages or promotional devices be delivered to achieve the set objectives and goals?

Vehicles for marketing (communicating) the 'essence' of the switchover are varied. The array of techniques include:

- Personal communications: Equipment suppliers' sales force; Retailers' sales force; opinion leaders [e.g., consumer bodies, standards bodies, market analysts, community agents, current adopters/consumers who have made the switch early to digital systems as they come in to the market ahead of the final switchover date and so forth]. The relevance of these communication sources depends on the adopter group or stakeholder being targeted. Market research can establish uptake rates and nature of adopters, over time, so it is possible to identify non-adopter groups that are most in need of targeting over time. This mechanism allows for one-to-one and narrower targeting of potential adopters/stakeholders. It is expensive, but can be highly effective.
- Non-personal communications: Mass advertising through mass media channels [e.g., TV, radio, print, posters, billboard, and so forth – here lies the realm of advertising agencies]. Advertising works well to raise public awareness and interest, but campaigns should start early and build up excitement and expectations well ahead of the switchover in order to trigger primary demand. Because the 'network externalities' is high in this switchover – many stakeholders upstream in the supply chain are involved in embracing aspects of technologies that facilitate the ultimate switchover- trade campaigns should be coordinated to get a coherent message across to stakeholders within this network.
- Promotions: For example: Converters for existing TVs to be shrink wrapped with TV licence renewal? Discounted packages for certain sectors of the population? Overcome resistance/fear by reducing perceived psychological risk/fear of technology by giving 'problem groups' the chance to test out or observe the benefits delivered by the system.

A crucial element of marketing campaigns is to identify barriers to adoption and communicate messages that can help to allay fears/prejudices or surmount identifiable barriers. Noteworthy is the need for a segmented approach as opposed to a generic strategy for communications. The marketing strategy has to be configured according to the specific expectations and barriers presented by different stakeholder and adopter groups. A generic

mass campaign can raise general awareness and anticipation among the population at large, but specific, more targeted campaigns are required for special ‘problem groups’.

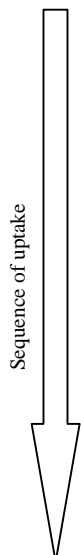
### 2.2.5 Research for informing marketing strategy

1. Segmentation research – Marketing agencies and social research organisations can do this. The emphasis is on identifying levels of stakeholder groups. Within these groups, different segments exist with different roles, expectations, and needs. Communications strategy therefore has to be aligned to the key segments at each level of the prescribed stakeholder groupings. A ‘one-size-fits-all’ strategy does not work in this case.
2. Consumer motivations, attitudes and needs study. The key drivers for and barriers to adopting DTV systems (draw parallels from similar types of switchovers, if possible) should be uncovered. Again, the research should expect that different segments of consumers would think, respond, and behave differently. Marketing/communications objectives for key segments must be developed and strategy determined accordingly. Not all segments show similar propensity to switch, but neither are all consumers resistant to new ways and systems. Importantly, learn from history. Market research should identify how societies/stakeholders/consumers have reacted and behaved in response to technological discontinuities reflecting switchovers similar to that of the current analogue-digital TV project. Examples are also found in the switchover from leaded to unleaded petrol in the UK. Analogies can highlight the pros and cons of marketing strategies that have been employed in prior switchover events, including what effective practices and policies might entail.

## 2.3 Training Strategy

### 2.3.1 Training needs analysis

*The first stage of the training is to identify the audience and analyse their specific training needs. The audience for training links to the segmentation of adopters. The innovators and early adopters are likely to be active in exploring and learning the digital technology on their own, not requiring any central or co-ordinated support. The early majority may require some options on support or training which they can self select (for example, written communication, demonstration and local training). In contrast, there will need to be a co-ordinated training and support strategy for the late majority and the laggards. This will be essential to remove many of their barriers to adoption and to give them the skills and confidence to use the technology.*



<b>ADOPTERS</b>	<b>TRAINING NEED</b>	<b>ANTICIPATED TRAINING MECHANISMS</b>
<i>Innovators</i>	Low	Self training mainly through exploratory learning
<b>Early Adopters/Followers</b>		
<b>Early Majority</b>	Medium	Range of training options through self selection (e.g. demonstration and written communication)
<b>Late Majority</b>	High	Coordinated strategy aimed at removing barriers to adoption
<b>Laggards</b>		

In addition to the segmentation of key adopters, it is important to recognize additional groups of people with special needs. This will include groups such as the elderly, people with disabilities, people for whom English is their second language, homeless people and other groups. The training needs analysis for these groups will need to be conducted in conjunction with representative bodies who can provide additional insight and help to identify the specific needs of these groups.

*The training needs analysis for all groups/adaptors will need to:*

- explore categories or groupings within each market segment so training can be clearly targeted;
- identify existing knowledge and experience of using technology for different groupings;
- explore previous experience of technology training and identify best practice with a specific focus on all the internet training initiatives held at local colleges and using community venues and retail outlets;
- define appropriate training goals for each group, based on government targets of what needs to be achieved by the switchover date and which groups are highest priority for switchover;
- identify differences in the technology available to ensure the relevance of the training.

### **2.3.2 Content and design of training**

The second key phase will be deciding the content and design of the training. This is likely to be a menu of options depending on specific needs. All the training will need to be in line with established best practice for technology training. That is:

- hands on – giving experience of using the technology;
- accessible in terms of time and location, taking into account any special needs;
- designed to support the full learning cycle: concept, practice, reflection;
- supported over a period of time through a range of mechanisms, such as telephone, face-to-face and written booklets;
- simplified into ‘chunks’ of learning, rather than all at once;
- building on existing knowledge;
- clear plan of the training and opportunity to self-assess progress;
- specific to the technology that is being implemented;

Also key is the learner’s motivation to learn. This will start with the marketing campaign and can be reinforced through the training.

For people with special needs, the representative bodies will need to be involved in training design. They will be aware of best practice that can be utilized for the analogue-digital switchover.

Given the scale of this exercise it is important to identify any global best practice. For example, there are at least two American organizations that are worth contacting: The Alliance for Technology Access and the National Centre to Improve Practice.

### **2.3.3 Delivery options**

The delivery options are likely to depend on the level of training and support required. In the UK we already have an established infrastructure for developing ICT skills. This can be

utilized for the analogue-digital roll out. For example, community centers and supermarkets can hold a number of training sessions for different products. Electrical retailers will also be keen to be involved. These delivery mechanisms can probably meet the needs of the early majority and some of the late majority.

For people with special needs, the delivery options will need to be tailored. The most effective mechanism is likely to be continued close liaison with a network of their representative bodies. For example, training for the elderly may be championed by 'Help the Aged' with support from other groups such as WRVS. Another national body that is ideally placed to support roll out is the Timebank movement. This has the advantage of providing a clear link between the commercial and voluntary sectors. Training for people with special needs will need a clear national strategy that is cascaded to local groups for implementation. Clear communication of this strategy to users and the representative bodies will be critical to its success.

All of the delivery mechanisms will require trainers. The skills and approach needed from the trainers will be dependent on the type of training they are delivering. This will not be clear until a full training needs analysis has been completed. However, it is anticipated that manufacturers, and existing ICT trainers will have the capability to deliver the majority of the training, requiring a short briefing to fully understand the context for the training. For people with special needs however, a more tailored approach is likely to be required, suggesting the need to train the trainers to conduct the analogue-digital rollout. This will need close liaison with representative bodies and a training needs analysis of the trainers needs. Sponsorship of this training may be available through the technology or media companies.

#### **2.3.4 Evaluation of training**

As with any scheme it is essential to pilot the training and evaluate as progress is made. This will ensure that refinements are made early. Setting clear training goals and conducting a full training needs analysis will enable a comprehensive evaluation to be conducted.

The analogue-digital rollout is also significant on a global scale. Full evaluation will highlight best practice that can be used in other countries attempting a large-scale technology rollout. It will also support further UK initiatives such as Public Information Kiosks.

#### **2.3.5 Research for informing training strategy**

Identify key categories within each market segment and conduct training needs analysis. This will require a steering group and people with responsibility for liaising with special needs groups.

- collaborate with representative bodies to develop targeted training strategies for special needs groups;
- scan the environment to identify best global practice for technology roll-outs;
- pilot the training approaches;
- identify, brief and train people to deliver the training;
- develop and communicate a menu of training options and project manage roll-out;
- deliver and evaluate training.

## 2.4 Conclusion and Recommendations

Considerable research needs to be carried out into DTV service users before marketing and training strategies can be effectively designed. Once information has been gathered on the different market segments, their motivations, attitudes and needs, a comprehensive marketing strategy can be produced to ensure that the analogue-digital switchover is effectively promoted. In parallel, training needs and delivery options need to be explored in order to develop a suitable training strategy and ensure that appropriate training is rolled out in a timely way. The following actions are recommended:

1. Consumer and market research activities:
  - Define market segments amongst consumers.
  - Identify the gaps in existing research into consumer attitudes, motivations and needs and carry out further research as necessary.
  - Conduct a baseline study of consumer behaviour and attitudes, to enable the evaluation of changes over time.
  - Continue to monitor consumer attitudes to and uptake of DTV, to develop a profile of the specific adoption curve.
  
2. Develop and implement coherent and integrated national plan for communication and education strategies, with tailored provision for disadvantaged sectors of the community:
  - Study previous experience on change management at a national level to identify communication strategies that are more likely to succeed.
  - Undertake information/training needs analysis, in conjunction with representative bodies that can provide additional insight and help to identify the specific needs of these groups.
  - Develop awareness programme for the switchover - timing, implications, what will change; develop mechanisms for ensuring this information reaches the widest possible audience especially those isolated by disability, geography, language etc.
  - Run training for the trainers.
  - Implement awareness, education and training - desirably, using existing and familiar environments – e.g. Social Services, Benefit Agencies, Community Centres, Libraries, Health Centres - both for providing information from government and for providing opportunities to experience the benefits of DTV. Existing outlets in colleges, community centres and supermarkets should be used as part of an information/educational network.

### **NB:**

1. Ensure promotion campaigns etc are innovative, clear and concise and that they highlight benefits of take-up beyond more choice of channels.
2. Promote trust by providing clear and impartial information on costs and benefits of services and equipment.
3. Emphasise that free-to-air services will remain, paid for from licence fee.
4. *Plan the timing of education and awareness campaigns carefully and conduct trials to identify the optimum period before switchover to begin the processes.*

# ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT

## POSITION PAPER 3 – DESIGNING FOR INCLUSION

### 3.1 Introduction

In 2001, the Council of Europe Committee of Ministers defined inclusive design or ‘universal design’ as making

*‘... the design and composition of different environments and products accessible and understandable as well as usable by everyone ... without the need for adaptation or specialized design solutions ... including the changes that people experience over their lifespan.’*

(Design Council, 2001)

Thus the key to inclusive design is ensuring that any particular product/service/environment is designed to be usable by the whole population, or at least as wide a range of the population as possible. The terms inclusive design, universal design and ‘Design for All’ are more-or-less synonymous and will be used interchangeably in this report.

The centrality of TV in people’s lives and the capability of DTV to provide access not just to more TV channels but also to the Internet and a multiplicity of other services reinforces the importance of inclusive design in the transition process. In the switchover to digital broadcasting, the key critical success factors to achieve inclusion will be:

- accessibility;
- usability;
- acceptability;
- affordability;
- relevant service content.

Of the factors listed above, the first three are determined to a considerable extent by the design approach and methods used and will be discussed in this paper. Extensive research has been conducted over several decades into the design processes and methods required to design products, systems and services that are **accessible, usable and acceptable**. This latter category refers to both social acceptability and for leisure services such as DTV, also desirability and enjoyment. This research has given rise to a very substantial body of knowledge in human-centred design. Human-centred design (HCD) principles and methods are thus central to inclusive design. In essence, HCD is the means by which developers and providers achieve the goals of inclusive design.

### 3.2 The Challenge and Opportunity of Inclusive Design for DTV

At the present time, the majority of designers and manufacturers tend to design and produce products that are aimed at younger, more physically able people and those more confident in using technological devices. At best, design is for the “average” consumer. Yet the UK population, and thus the potential consumer base, is far from a homogeneous one. Older users are in fact the most heterogeneous sector of the population so while many may be enthusiastic ‘silver surfers’, others will be much less likely to want to engage with new

media. The identification of the primary stakeholders in DTV in Paper 1 makes very clear the highly heterogeneous nature of consumer needs, which will vary on a wide diversity of parameters including the following:

- life stage from very young to very old and everything in between, reflecting different interests, goals and priorities;
- levels of ability, education and experience;
- varying degrees of interest in education, information and recreation;
- differing attitudes and levels of motivation to technology in general and TV and to the Internet in particular.

Current design practice is generally to leave design and delivery of products for older consumers or for those with special needs to specialist designers, producers and retailers. Demographic changes suggest that it is becoming increasingly urgent for mainstream designers and manufacturers to address design issues for older and disabled consumers, from a commercial as well as a social perspective. The population is becoming predominantly older. Although more people are staying fitter, active and generally living longer, sight and hearing does deteriorate, and physical disability is more common. Technology can improve the quality of life for many older and disabled people, but only if it is designed to meet their needs. Older and disabled people represent a significant proportion of the population:

- Europe is facing a significant increase in the proportion of elderly people in the population. 15.5 per cent of the EU population is currently over 65 and the UK Government Actuary's Department estimates that by 2031 almost 30 per cent of the population will be aged 60+, and more than ten per cent will be aged 75+. Older people also having a relatively higher level of disposable resources than previously (the 'grey pound').
- Estimates of the incidence of disability vary considerably, but between 10-15 per cent of the population are estimated to have significant disabilities (Gill, 1997). Since most disability figures record significant disability rather than temporary and mild impairments, they are likely to be underestimated.
- Public awareness of severe disability has increased, but few people are aware of milder but more common disabilities. For example, most people are aware of Braille text and the provision of guide dogs for the blind, but are less aware that 80 per cent of people with visual impairment (about two million people in the UK) would benefit from 14 point font presentation in documents or on screen (Gill, 1997). The evidence suggests that considerable improvements to the accessibility of products and services can often be achieved through relatively minor adaptations and accommodations. Similarly the use of subtitles for some programming has considerably enhanced TV enjoyment for hearing impaired users.

To ignore significant sectors of the population is to restrict market opportunities as well as to increase the risk of exclusion. Ensuring that individual DTV products are accessible, usable and desirable for a wide range of the population, immediately broadens the market to which they can be sold. It also increases the likelihood of their take-up in European and worldwide markets. Cost factors are clearly important for poorer sections of society, and incentives may need to be considered to encourage some people to move to DTV.

In the specific context of the switchover to DTV, there are excellent business opportunities to produce accessible, usable and desirable products that will appeal to a broad market and give a competitive edge. For example, those designing DTV products can ensure that controls are easy to understand and use (compare this with the difficulty many people still have in using VCR machines and controllers); present data and information in a user-friendly way (more visual than textual, interactive rather than static, adaptive rather than prescriptive); ensure compatibility of different products (e.g. telephone lines, keyboards, VCRs and 'Hi-Fi's) and make it possible for a range of products to be controlled by a single controller; thus avoiding the need for unsightly additional "gismos" and wires. Acceptability of DTV for the home environment will be influenced by factors such as aesthetic appeal. For the majority of consumers to find DTV acceptable the technology will need, minimally, to blend in with their living space and, desirably, to enhance it. For example, it is highly likely that the invention and design of small, unobtrusive or perhaps ornamental devices to replace current clumsy and unattractive set-top boxes would be very attractive to a large number of consumers. There is likely to be a substantial UK - and European - market for a wide variety of devices needed not just to view television programmes but for novel products which will, for example, make Internet access a possibility for many who are currently without such advantages. However it will be important to ensure that such Internet access is usable. Previous attempts at Internet access via TV has resulted in problems such as: small text which is difficult to read at a normal viewing distance, the cursor merging into the background display, too little distinction between adverts and content, difficulties in navigation with the cursor controlled by the remote handset etc. To meet the diversity of user needs there will be many, as yet, undreamed of, products waiting to be conceived. Thus the switchover represents an unprecedented opportunity for innovative product and system designers to develop exciting new concepts and turn them into valued products which enhance the quality of lives of many.

### 3.3 Achieving Inclusive Design

#### 3.3.1 Inclusive design processes

The application of human-centred design principles is an integral part of a successful inclusive design process. Both **generic** and **specific** research data on characteristics of potential or actual users of a product are required to inform design decisions and processes. Relevant **generic data** already exists and can be categorised as follows:

- human performance data (physical and psychological);
- user profiles;
- social and cultural data (e.g. from market research surveys);
- demographic data;
- classifications of physical and cognitive abilities;
- quality functional matrices based on user data, which can be extrapolated to a larger UK population;
- benchmarking of existing resources (e.g. CD ROMs from Handynet and the Disabled Living Foundation), which can provide a template for layout, navigation and presentation.

With regard to **specific** data required to inform the design of a particular product, there are human-centred design techniques and methods to collect and process data from specific, identified population groups in relation to the design and use of particular products, systems or services. For example a typical inclusive design process would apply one or more of the

methods listed below to inform a user requirement specification, and later, to gain feedback on a design prototype:

- focus groups;
- observational and task analysis;
- interviews;
- questionnaires;
- product handling;
- creativity groups;
- co-designing;<sup>3</sup>
- usage scenarios;
- user Profiling/Modelling.

### **3.3.2 Overcoming barriers to inclusive design**

While it will be evident that a very considerable volume of generic information exists, there are significant barriers to its usage, such as its disparate location and a dearth of ‘user-friendliness’ in accessing it and applying it. One pressing need is to create a centralized database that brings together existing information and makes it widely available in exciting and innovative ways. The following are some of the areas where readily accessible information is required:

- commercial and social benefits of inclusive design;
- regulations and standards relating to inclusive design;
- design testing and evaluation services;
- sources of advice, guidance, education and training;
- design guidelines to meet the needs of users with specific impairments;
- information on existing conventions in consumer product user interfaces.

#### *Case study*

As an example of an initiative to establish some common rules for user interfaces for consumer products, the European project FACE ‘Familiarity Achieved through Common user interface Elements’ (Burmester, 1997). The aim was to produce general design rules for consumer products such as VCRs, heating controllers and security systems. This involved collaboration with major companies manufacturing consumer electronics. Initially a survey was performed of 100 consumers in the UK, Germany, France and Italy to obtain a broad European perspective. Interviews were then performed to help study the way they use devices at present and to understand the problems they face with their own products at home. This provided a broad perspective on what facilities people liked and disliked and which were easier to use or more difficult to use.

From this work, a series of design rules for simpler usage were defined, which were implemented within a set of alternative software prototypes of new interface designs. These were then tested with members of the public performing tasks such as programming a video recorder or setting up a heating control programme. The results enabled comparisons of

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<sup>3</sup> This is an innovative technique which the Design Council describes as follows: ... “pairing young designers with groups of vulnerable or excluded users, often on a one-to-one basis, is a stimulus to innovation and new product development. Designers can engage with the frustrations of people they work with, empathise with their aspirations as well as physically with the people who use them and rise to the challenge of making things better.”

prototype designs to be made and the best features of each design to be identified. These features fed into the refinement of the user interface design rules. During the project, several rounds of evaluation, design rule refinement and prototype development were conducted as part of an iterative cycle. The FACE project was able, by the use of the process described, to develop a refined set of design rules which were then disseminated within the partner companies. The exposure of the human-centred approach to the industrial partners also enabled them to adopt similar procedures within future projects.

To encourage the commercial sector to address the needs of the wider community will require a coordinated communication strategy to provide this information.

### **3.3.2.1 Commercial and social benefits of inclusive design**

The main motivation for industry to adopt an inclusive design approach for providing DTV equipment and services requires awareness of the potential it offers for reducing costs and increasing profits. The commercial opportunities arising from becoming a market leader in inclusive DTV design have already been mentioned, as has the benefit of the wider marketplace for inclusively designed products. These opportunities need to be recognised by society at large, including investors, manufacturers, retailers, corporate customers and consumers as well as by the design community itself. In addition, examples of cost savings derived from HCD and usability engineering should be highlighted. For example, a study of software engineering cost estimates showed that 63 per cent of large software projects significantly overran their estimates (Lederer and Prasad, 1992, from InClude website). Software development managers, when asked to explain their inaccurate cost estimates, listed 24 reasons, of which the four reasons rated as having the greatest effect were related to usability engineering. If proper usability engineering methodology were used, most such problems would be prevented, thereby substantially reducing cost overruns.

### **3.3.2.2 Regulations and standards relating to inclusive design**

Good practice may be promoted through the refinement of existing British Standards and adherence to ISO standards such as the ISO 13407 standard for Human-centred design (ISO 13407, 1999), its related document ISO TR 18529, and the multipart ISO 9241 (ISO 9241, 1997), providing guidance on ergonomic design and usability. Current progress on European Standards for automatic teller machines (ATMs) (Fitzgerald, 1999) provides a model for future standards development.

Standardisation of product parts, such as video and HI-FI connections, (via standards) and encouraging manufacturers to avoid duplication of function, through industry guidelines, will enable a more convenient installation procedure and more choice through modularity.

The advantages of standardisation are appreciated by special needs groups. For example, the Deaf Broadcasting Council supports standardization and legislation within service provision to ensure that service providers are given a clear remit, which resolves confusion about areas of responsibility for meeting the special needs of particular groups of consumers. The Disability Discrimination Act also provides the basis for inclusive design, since it specifies that all people should have access to public services and systems.

### **3.3.2.3 Design testing and evaluation services**

In order to evaluate fully the functionality and desirability of a product or service such as DTV, there will be a requirement for national design and testing centres to encourage the

design, development and manufacture of products which comply with at least the minimum standards of accessibility for all appropriate sections of the population.

In addition, industry needs to adopt tools, which can measure and assess the degree of inclusion achieved by their products and services and use the design life-cycle to improve on past performance. To achieve this will require established research centres to participate in and to support the knowledge transfer process.

#### *Case study*

A series of studies have been undertaken to evaluate a new electronic programme guide (EPG) for a digital television service (Maguire et al., 1999). The aim was to assess how usable a new digital TV system would be for typical TV viewers. Context of use analysis highlighted the following characteristics of usage: viewing at a distance, limited space to display information, interaction via a handset, service integrated with TV programmes, system often used on a casual basis, without use of a manual and in relaxed mode. A software prototype of the EPG had been developed including features such as 'Now and Next' facility, which displayed in a window, the name of the programme being watched on the current channel and what was coming next. The user could filter the large number of channels by type (e.g. sport, movies, children's, documentaries) and select to see TV programmes by subject. Programme details were presented either in list format (as in a newspaper) or grid format. Recording, reminders to watch selected programmes and parental control facilities were also provided. The prototype EPG was tested using assisted evaluation at the offices of the development organisation. This involved setting up three simulated lounge areas so that user sessions could be run simultaneously by different evaluators. Users were recruited according to specific characteristics through a recruiting agency and were required to perform a series of specified tasks in a co-operative fashion with the evaluator who observed their interactions and comments. Sixteen user sessions were carried out within a two-day period (over a weekend) when the system prototype was not being worked on by the development team. The study demonstrated how user trials could be carried out within a simulated environment, off site, over a short period of time. User performance and attitude scores were recorded together with recommendations for change covering screen layout, menu structure, method of navigation, etc. Using this user-centred approach, the user interface was simplified and made accessible to a wider sample of users.

#### **3.3.2.4 Sources of advice, guidance, education and training**

There is a pressing need to ensure that all stakeholders but particularly designers and manufacturers know how to access advice, guidance, education and training to enable them to understand and apply HCD principles to achieve inclusive design. The point has already been made that the practice of inclusive design involves the application of HCD principles and methods that are well-established, documented and validated. There is extensive research available to draw upon which has been carried out by research groups and centers around the world. For example:

- Considerable research has been done on universal design in telematics, which is relevant to the design of equipment and interfaces with DTV (COST219bis, 2001).
- Tweed and Quigley published a detailed report in 2000, the first of a series on a project funded under the EPSRC's Extending Quality Life (EQUAL) programme, which describes television-viewing practices by the elderly that would impact on DTV design projects.

- EC SATURN project reports on developing ATMs and cash dispensers for use by visually impaired and disabled people (Gill, J. accessible through RCA).
- Usability-NET at Loughborough University, is an internet-based toolkit for designers which provides links to UK, European and International resources, product reviews and user profiles for elderly and disabled people. Other networks include the DesignAge Network (DAN), the European Institute of Design and Disability website and InClude.
- The InClude website provides information on cost-savings, design methodologies, plus case studies and a directory of experts and the Handbook on Inclusive Design of Telematics Applications, which deals in some depth with issues of inclusive design, cost and design for manufacturing.

**Advice and guidance** - As evidenced above, there is extensive research and generic information relevant to inclusive design already available. This repertoire of information could be made accessible through a centralized database, structured for ease of access to the contents. It could include, perhaps, independently validated case studies, frequently asked questions and answers, supported and extended by multimedia demonstrations, collections of artefacts showing good practice in inclusive design and on display to be tried out. Inclusive design guidelines are already available on CDROM and this should be widely promulgated to provide guidance on a more consultative basis will require appropriate mechanisms for delivery to be identified with the stakeholders. Workshops, design clinics, impartial advice on a one-to-one basis with guaranteed confidentiality are just some of the possibilities.

### ***Education and training***

The web accessibility initiative from the W3C consortium provides pages good guidance for the design of web pages and web sites to meet the needs of people with visual impairments (at [www.w3c.org/wai](http://www.w3c.org/wai)). These guidelines also relate to people using commercial screen readers. It will be evident that advice and guidance will only be sought by those who have at least some notion of inclusive design and its potential benefits. Many designers are unaware of successful inclusive design products and projects or of their economic and social value. Thus, there is a need to build awareness through education and training in the design and manufacturing communities of how inclusive design has worked in practice and the advantages it offers. A collection of inclusively designed products would be a valuable medium for promoting awareness and education. It could be publicised widely and visited by interested parties such as designers and manufacturers of DTV products. Such a collection would be even more powerful if it were backed with case studies explaining the inclusive design process and successful outcomes. These case studies could also be published and disseminated more widely.

In February 2001, the Council of Europe Committee of Ministers passed a resolution that introduces the principles of 'universal design' into the curricula of all relevant occupations in member countries. While centres of excellence in design research and education do exist in UK, the principle of inclusive design is still a novelty. The EU requirement for the implementation of inclusive design/universal design/design for all provides a push for national adoption across design curricula.

In addition to initial training in inclusive design principles, further education and training is available through the usual educational delivery mechanisms of undergraduate and

postgraduate degree courses, taught higher degree courses, short courses. For qualified professionals there are also Continuing Professional Development (CPD) courses. For use in business or from home Distance learning based (internet accessed) courses offer valuable learning opportunities. There is also a place for integrated training packages, for purchase by companies, which enable progression from one level of skills' development to another level. Some training packages already exist but many more could be developed.

### **3.4 Conclusion and Recommendations**

Promotion of inclusive design of DTV equipment and services depends not just on providing specific information, but on fostering a context and a culture conducive to the concept of inclusion. This begins with creating awareness of inclusive design within society in general and in design, manufacturing and retail communities in particular. Some recommended actions to engender awareness, understanding and uptake of inclusive design principles for DTV products and services are the following:

1. Establish one-stop information centres with comprehensive databases of relevant information relevant to inclusive design of DTV products and services. Desirably these will have such features as:
  - exciting and innovative multi-media presentation of material;
  - video footage, photographic storyboards and mood boards (e.g. that describe the end user, their lifestyle and home environment);
  - research papers, statistical references and case studies;
  - internet search facilities;
  - awards for good design practice or output.
2. Develop the business case for inclusive design, promulgating awareness of advantages such as:
  - National, European and worldwide market opportunities that derive from leading competitors in inclusive DTV design.
  - Extended market for inclusively designed DTV products and services (as a result of wider diversity of potential users, including the elderly and those with special needs, being able to use the same products as the “average” consumer).
  - Cost savings in the production process arising from HCD and usability engineering.
3. Encourage designers and manufacturers to use inclusive design methods specifically for the DTV market through, for example:
4.
  - Promotion of national design competitions (for both students and practitioners) – e.g. for the most “elderly friendly” electronic programming guides, remote controls etc.
  - Provision of government incentives (funding, endorsements) for manufacturers to encourage them to re-evaluate their current products and approaches and move to more inclusive design approaches.
5. Establish national or regional design assessment centres for testing, analysing and evaluating products. The centre should be staffed by a multidisciplinary team of experts, who respectively, speak the jargon of relevant groups, understand design and

manufacturing processes as well as economic constraints and can communicate effectively to designers and others who may not actually know what they are looking for.

6. Mechanisms to be established to encourage greater involvement of the general public in design research activities i) to promote awareness and understanding of the value of design; ii) to inform design specifications, test prototypes and evaluate products.
7. Establish independent advisory bodies – perhaps regionally based – to advise consumer organisations, special needs groups, industry and government with impartial and objective evidence and information in an accessible format.
8. Publicise good practice in inclusive design to those involved in the design and production of DTV products through such mechanisms as:
  - National/regional collections of artefacts that represent sound inclusive design awareness.
  - Museum exhibition of exemplars of leading British/European/international inclusive design.
  - Publication, dissemination and promotion of case studies where inclusive design has been used successfully.

# **ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT**

## **POSITION PAPER 4 - HUMAN ISSUES FOR E-BUSINESS AND THE ECONOMY**

### **4.1 Introduction**

The Government is committed to developing the e-society in Britain (“Our Competitive Future: Building the Knowledge Driven Economy”, DTI, 1998). It has set a target of becoming “the best environment in the world to do e-commerce”. In pursuit of these objectives, Government has introduced a number of policies and programmes (e.g. UK Online, National Grid for Learning) which aim to promote widespread access to the Internet and to increase the availability of information, goods and services – including public services – online.

Access to the Internet in the UK continues to grow steadily, but it is believed by technology watchers that the next step in popularising the Internet will come from the development of web and e-mail access via devices other than the personal computer - such as the digital television set. Digital TV companies are already beginning to offer this functionality as part of their future digital TV interactive services. If such services prove usable and desirable, then the widespread uptake of DTV which is being sought and encouraged in preparation for the analogue-digital switchover analogue - will increase the proportion of the UK population who have the equipment necessary to access the Internet, and thereby to participate in the e-economy.

However the availability of equipment is not in itself sufficient to ensure that those who wish to do so can access the Internet and participate fully in the e-society. The social transformation which the Government hopes to achieve through the uptake of new technology will be far more successful if it occurs as a result of ‘user pull’, not simply as a result of ‘technology push’. This will only happen if potential users can see the benefits arising from Internet access and are then able to use the Internet effectively to achieve them. This paper identifies the key human issues involved in ensuring access and creating demand within the e-economy.

### **4.2 Ensuring Access**

Many of the human issues surrounding access to the Internet are the same as those surrounding access to digital television. These are explored in some detail in papers 1, 2 and 3. Besides the availability of the necessary equipment, the key issues can be summarised as:

- cost and payment;
- usability of equipment and interfaces;
- knowledge and skills.

#### **4.2.1 Cost and payment**

The costs involved in accessing the Internet are undoubtedly a barrier for a number of households at the present time. Statistics collected for the National Statistics Omnibus Survey in 2001 showed that of 47 per cent of adults had never accessed the Internet. Seven per cent of the sample gave the fact that they could not afford it as one of the reasons for this. This survey also found that most Internet access takes place from respondents’ own homes,

using a personal computer; only six per cent of respondents had accessed the Internet via DTV. The Family Expenditure and Food Survey (July – September 2001) shows that percentage of households with Internet access from home computers is currently around 36 per cent. For those households which do not already have a personal computer, or for those households e.g. with children where there may be competing demands for use of the computer, there may be some perceived cost-benefits when purchasing new DTV equipment which will also provide Internet access. (This in turn may help to increase the rate of voluntary uptake of digital television services before the proposed analogue-digital switchover date, and thereby reduce the requirement for additional promotional activities by Government.)

In addition to the costs of the equipment there are of course costs associated with subscribing to an Internet service provider and telephone costs for time spent on-line. Many households may not be able to afford these costs even if they have access to the equipment they need; others may resist or restrict access because of anxiety about the potential for escalating costs as Internet access becomes more desirable or even necessary for some kinds of tasks. The proliferation of ISPs and telecommunications providers now means that it is very difficult for consumers to get clear and accurate information about costs and benefits and this may act as a further deterrent. In the USA local telephone calls have long been un-metered. With the advent of the Internet this has meant local Internet Service Providers (ISPs) can offer unlimited access via a local telephone number at a very cheap monthly tariff compared with that in many European countries. This is recognised as a primary enabling factor, which sparked the explosive expansion of Web-based commercial activity, and hence Government and commercial initiatives in the UK to promote low-cost or free connection to the Internet have an important role to play in uptake.

A related issue is the payment for goods and services purchased through the Internet. Although the use of the Internet for these purchases may not increase the household's overall expenditure, payment is usually required via credit or debit cards. A percentage of the population does not currently have access to these means of payment and there are many sections of the population whose personal, financial and/or creditworthiness circumstances are such that they will not be able to obtain or use these means of payment. Others, particularly elderly people, may simply be unwilling to use unfamiliar and untrusted means of payment. Building trust and ensuring the security of e-business sites is already recognised by Government as a vital step in the transformation to the digital economy.

#### **4.2.2 Usability of equipment and interfaces**

##### **Equipment and Hardware**

There has been much research into the design of computer hardware; the features which make keyboards, monitors and other interaction devices (e.g. the mouse) easy and safe to use by different kinds of users are now well established, and have been incorporated into design standards and health and safety guidelines for usage (Shackel, 1981 and 1984; Eason, 1984; Whiteside et al., 1988; Nielsen, 1993; Shackel, 1997; ISO 13407, 1999). There has been some research into the design of TV and video controls (including the use of remote controls) but there has been little research to date which can inform the design of easy, safe to use dual-purpose digital television/Internet access equipment. The characteristics of television viewing as an activity and Internet surfing or email writing are very different (the two situations are sometimes described as “laid back vs leaning forward”). Factors which need to be considered in the two different activities for the design of usable hardware include

seating/posture, viewing distance from the screen, environment (particularly lighting and background noise) interaction devices, cable management etc. There may also be issues arising from the social context of TV usage; television sets are often located in a communal setting with others likely to be present, which may impact on Internet usage.

As discussed in paper 1 and paper 3, there are many groups within the population (notably disabled and/or the elderly) who will have specific needs with regard to equipment design. Such groups perhaps stand to gain the most benefit from easy access to information, goods and services from within the home, but while there is a considerable body of existing knowledge about these needs there is again little evidence to date about effective designs which meet them.

### **Interface and Website Usability**

Some people see the World-Wide-Web browser providing the main interface with the user in the future, not only to the Internet but to other electronic household devices such as the video recorder (Price, 1999). To access the Web through DTV, the user will interact via the TV handset or a laptop keypad. This will require users to become familiar with indirect selection of items on screen with a selection bar, rather than direct pointing e.g. with a mouse when using a personal computer. Users who are already have DTV and are used to channel-surfing from the electronic programme guide via a remote control may find this easier than users who have not previously experienced DTV. However operations such as scrolling down the screen are difficult via an indirect pointing device; and the restructuring of a Website so that scrolling is not required may result in a greater depth of structure and increased complexity.

With regard to the availability of information, it is estimated that it would take massive effort to translate all currently available Web pages to be TV compatible. Automated converters are being developed but they may not create attractive TV sized pages. It is also hard to generate content that can be automatically tailored to different device (PC, TV, WAP phone for example) and make the best use of each device. Thus generating several versions of the same information may be too expensive for service providers which may mean that some devices will only have access to sub-optimum versions.

There is a growing body of research knowledge about Web design and Website usability (e.g. from the W3 Consortium) and emerging standards. As the range of devices for access to the Web expand, consideration needs to be given to the implications of different contexts of use, including the particular characteristics of the DTV context.

#### **4.2.4 Knowledge and skill**

In addition to the requirement for electronic connection and usable equipment and services, there is the issue of how to enable the vast majority of the population to enjoy effective access to the facilities and services available - consumers clearly need to have the skills required to use those services. Although there are a number of Government and other initiatives aimed at providing the general public with Internet access skills, 18 per cent of those surveyed in the Family Expenditure and Food Survey (July – September 2001) gave lack of skills as a reason for not using the Internet. Closing the skills gap therefore continues to be an important challenge to address. Interactive digital television is itself an important development in learning technology, with potential for providing wide access to education/training programs that exploit multimedia capabilities, but people will need to learn how to use and exploit this particular technology in order to achieve this. There will of course be some people who cannot be helped in this way; for them there is an important role

for 'human interfaces' i.e. trained, sympathetic people in the public sector to assist those with literacy problems and other special needs to use the Internet and to conduct Web searches etc.

These issues are discussed in detail in paper 2 in relation to the adoption and uptake of DTV, and many of the proposals can be extended to include the adoption and uptake of interactive services.

### **4.3 Creating Demand**

Rogers (1983) proposes that adoption of new technologies at the individual level can be seen as a five-stage process (see also paper 2). This begins with establishing awareness of the innovation in potential adopters; proceeds through persuasion or arousal of interest, mental evaluation of the innovation, trial; and then adoption. The Family Expenditure and Food Survey (July – September 2001) indicates that a large percentage of respondents do not use the Internet at present because they are not interested in it (40 per cent), and/or because they do not see any need (19 per cent). This clearly indicates that in order to achieve 'user pull', consumers must be able to see real advantages and benefits to themselves through Internet usage, and in particular through the medium of DTV. The key issues here are:

- Promoting awareness of what is, or will be, available;
- Identifying real user requirements for services and information which the Internet can deliver;
- Providing real benefits – which can offer the potential of improving quality of life for consumers and citizens.

#### **4.3.1 Promoting awareness**

Consumers need firstly to know what is available, and from where. Organisations offering equipment, products or services will of course launch their own marketing and promotion activities, but consumers also need to develop trust and confidence in using information and services via the Internet. This will depend partly on the quality of service they obtain from any interactions and transactions they make – and thus is to some extent in the hands of the service providers – but can be assisted by having access to sources of objective information which will enable them to make evaluations, comparisons and choices between a growing number of competing services and service providers. In addition to promoting its own services, Government has an important role to play in building trust and confidence, e.g. by regulating and monitoring e-business, and providing clear and objective information for consumers and citizens.

#### **4.3.2 Identifying real user requirements**

Interactive services will be very attractive to consumers if they meet real needs. Table 1 below shows how consumers currently use the Internet. Websites and services which are well designed to support these tasks, and which meet customer needs for privacy, security and pleasure of use, will be the winners in the competitive race for business.

Table 1 Purposes of Internet Use by Adults

<b>Adults who have accessed the Internet by purpose of Internet use (personal use only)</b>		
<b>Activities</b>	<b>October 2000 Per cent</b>	<b>October 2001 Per cent</b>
Finding information about goods/services	66	74
Using e-mail	73	73
General browsing or surfing	64	56
Finding information relating to education	34	33
Buying or ordering tickets/goods/services	33	36
Personal banking/financial/investment activities	22	26
Looking for work	20	21
Downloading software, including games	21	19
Using chat rooms or sites	18	15
Playing or downloading music	17	16
Using or accessing government/official services	18	16
Other things	5	2

Source – National Statistics Omnibus Survey.

*Note: percentages do not add to 100 per cent as respondents may give more than one answer.*

Studies of Websites (e.g. the Forrest Report, December 1999) show that a high proportion of company web sites suffered major problems, such as missing content, poor functionality, reliability and consistency. Designing a website around the task needs of its intended users, and testing them with users before launch, could avoid creating websites which disappoint potential customers and ultimately affect sales.

Given the diverse requirements of the consumer population, research is needed to determine the kinds of tasks which they will want to perform and the optimum design of Internet-based services which will truly and fully meet their needs. Mechanisms for capturing these requirements must take into account the way in which new requirements emerge over time. Traditional approaches to requirements capture for computer-based systems have focussed on analysing user characteristics and tasks and developing applications to support these. However it is now widely recognised that new requirements emerge as users learn and develop, and explore the limitations and possibilities of their existing resources, and there are now a number of well-researched techniques which support exploration and envisioning during (rather than after) the product development lifecycle, for example through the use of scenarios, prototypes and simulations. This human-centred and iterative approach to design, which is now embodied in the draft International Standard ISO 13407, 1997, should be encouraged and promoted by Government as a way of improving the quality of interactive systems and services.

There is also recognition that people need opportunities to try and experience new technologies, and to judge for themselves the possible advantages and disadvantages, before

they commit themselves to ‘investing’ in them – whether financially, by deciding to purchase them, or in terms of effort to acquire, learn and use them. There are many Government-sponsored initiatives which are doing just this e.g. the DTV Health Pilots, the Go Digital Pilots, the ‘networked village’, etc. The results of these need to be made widely available so that the public can see where the learning and experience of real consumers has contributed to the future of DTV.

#### **4.3.4 Providing real benefits – improving quality of life**

Collectively the new developments in information and communications technology, including DTV and the Internet, offer the tantalising promise of enhancements to consumers’ lives. These emerging technologies are transforming business, communication and lifestyle; they have the potential to enrich human life in innumerable ways, many of which we cannot yet imagine; they can simplify the mechanics of daily life, prolong independent living with smart homes and with ‘obedient’ domestic appliances, assist our learning, extend our skills and capabilities, and enhance our leisure. Many of the ways in which technology can support and enhance our lives are as yet unknown and even undreamed of. The need to recognise and capture such ‘undreamed of requirements’, as well as conscious and unconscious requirements, is emphasised by practitioners such as Robertson (2001), who have developed successful tools and methods to ‘trawl for’ future requirements. Anticipating future needs for a product or service, or predicting the future impact of a technology, will have considerable value to commercial enterprises, public sector organisations and policy makers as well as to consumers. Indeed enhancing competitiveness must be a significant objective, since wealth creation is critical to the implementation of ambitious policies of social inclusion. Harnessing the emergent technologies to deliver an improved quality of human life worldwide however requires a long-term agenda, in which societal, business and individual goals are not only identified but also harmonised.

#### **4.4 Conclusions and Recommendations**

There are major rewards for the economy and for society in enabling the vast proportion of the population to enjoy the benefits of the information society through the medium of digital interactive technologies in the home. Diverse products and services – including many novel ones, yet to be conceived – will be made accessible to large populations whose needs are not met by existing delivery mechanisms. There are excellent commercial opportunities for an informed UK business community to achieve a real competitive advantage in leading the way in Europe with devices and services designed to meet the needs of vast numbers of citizens (consumers) - many of whom do not currently use or have access to the Internet.

At present there is highly active engagement of broadcasters and related providers of content in the television industry in the Go Digital Project and in the Digital Technology Group. The planned switchover is, of course, recognised by them to be a major commercial opportunity to increase the choice available to viewers and promote Pay TV on a variety of tariff/subscription arrangements. However, the switchover offers not just more choice of television but opportunities for businesses to design and develop and market new products, systems and services. For example, there will be demand for novel devices and user interfaces which through careful attention to human-centred design principles (See Paper 3) will enable almost all people to use digital interactive technologies easily. Another challenge for businesses will be to anticipate (on the basis of effective customer requirements analysis), develop and provide services which would be valued by consumers for delivery via the

Internet, and to explore how these can be made easily and cheaply available to households without a PC or other existing means of access.

There would appear to be a need for an energetic campaign by Government to engage with the business community to stimulate recognition of the vast range of human needs to be met, especially those of an ageing population, and awareness of the opportunities for wealth creation that exist alongside the opportunities enhancement of the quality of life of citizens.

Government also has a key role to play in enabling citizens to exploit these new products and services. The most important areas to consider in promoting access are:

- promulgating user-centred design standards to ensure that new products and services are easy, safe and effective to use;
- government and commercial initiatives in the UK to promote low-cost or free connection to the Internet;
- **continuing the development of strategies and mechanisms aimed at closing the skills gap;**
- **identification and provision of specific mechanisms to support people with special needs, e.g. those with literacy problems, to use the Internet and to conduct Web searches etc;**
- *building consumer trust and confidence, e.g. by regulating and monitoring e-business, and providing clear and objective information for consumers and citizens.*
- providing information about existing and future Government and related services which will be available on-line;
- providing information about sources of advice, training and support for Internet users.

# ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT

## POSITION PAPER 5 – MANAGING THE TRANSITION PROCESS

### 5.1 Introduction

To realise the wide-ranging benefits envisaged by government for the economy and for society from the planned switchover to digital broadcasting will require a major change management programme to ensure the technological, regulatory, marketing, retailing and, especially, the human aspects are addressed effectively. Planning the transition began many months ago. The vision for 'Digital Britain' reflected in the December 2000 Government White paper 'A New future for Communications' prompted action on several fronts. The industry has itself formed the **Digital Television Group (DTG)**, which "acts as a technical clearing-house, publicising the work of members and providing a user-group to implementers around the world. It has established a wholly owned subsidiary, DTG testing Ltd., to provide interoperability testing services to the industry. The DTG also fulfils marketing and regulatory roles on behalf of its members and the industry."

Business has already entered into an important collaborative venture with government. In April 2001 a Press Release from the DTI entitled '*Government Unveils Plans For UK's First Digital Neighbourhoods*' described the launch of a pilot 'Go Digital' programme. In this initiative "more than 20 broadcasters, manufacturers and retailers of digital technology have pooled resources in partnership with government and led by the ITC to provide to a carefully selected sample of households free conversion to digital television. Each participating household will be supplied with free equipment allowing them:

- to watch all the existing free terrestrial channels on digital television where reception is usually better;
- watch in addition the current free digital TV channels including ITV2, Choice and BBC Knowledge;
- use their TV set to access interactive internet services including learning and shopping;
- send and receive email."

The stated objective of the pilot programme was "to help government and industry understand better the practical and social issues people face in deciding whether to switch from their existing analogue television homes to digital TV."

Other initiatives, essential to inform the transition planning, have been underway for many months. For example, the Government, working alongside service providers, has commissioned a study of the penetration and awareness of digital TV (MORI, 2001) and, through the Department of Culture, Media and Sport, invited a representative Viewers' Panel to recommend strategies and ideas to enable a smooth changeover (December 2001). Following consultation with industry, Government has also published an action plan (December 2001) to timetable events leading up to switchover.

These significant change planning activities have been initiated by secondary stakeholders (see Paper 1), that is, government departments and the commercial and industrial organizations who are the technological drivers of the switchover in pursuit of the potential

benefits for the economy and for society. Their important initiatives pave the way for a complementary programme of planned change, which addresses the requirements of primary stakeholders – the citizens of the UK – who will be the ultimate determinants of the success of the transition. An integrated change management strategy is therefore required to coordinate the many elements of the switchover.

There is extensive expertise and knowledge available worldwide to inform a strategic change management programme and bring the human aspects of the switchover into line with the overall objectives. This derives from (i) experience over several decades in implementing large-scale national change programmes that impact the whole of society and (ii) research studies of the human response to change and the factors which influence the nature of the response.

Experience from other large-scale national and international transitions shows the importance and value of developing a strategic approach to the human aspects of change. Within the UK, both the changeover to decimalised currency in 1971 and the transition from using Town Gas to North Sea Gas between 1967 and 1977 owed their success to long periods of careful planning, transparent collaboration between stakeholders and open communication and information campaigns to the public (see Appendix 2). The decision of the banking sector to introduce automatic teller machines (ATMs) highlighted the additional need for the application of inclusive design principles, to enable their use by all sectors of the population.

This paper positions the expertise required for successful management of the human aspects of change in the context of the planned switchover, identifies the key elements of the transition strategy and indicates the mechanisms required to deliver that expertise for the analogue to digital switchover process.

## **5.2 Human Responses to Change**

Research conducted over several decades has generated remarkably consistent findings regarding the human response to change (e.g. Bennis et al., 1985; Kanter et al., 1992; Dawson, 1996) and has identified the barriers and facilitators to adoption of new technology (e.g. Damodaran and Olphert, 2000).

### **5.2.1 Resistance to change**

The extent to which people are more or less resistant, indifferent or likely to lend support to change is affected by how they perceive the change affecting them. The reasons individuals cite for resisting change include the following:

- perceived loss of control;
- too much uncertainty;
- surprise;
- confusion;
- loss of face;
- concerns about competence in new context;
- increased effort required;
- change fatigue;
- perceived costs-benefits ratio;
- past resentments;

- real threats.

(Kanter et al., 1992; Dawson, 1996 – from Iles and Sutherland, 2001)

### 5.2.2 Perceived reward-cost ratio

As individuals we assess, inevitably, the need or desirability of change in our lives from our own perspectives. This means that a change that comes about as result of an individual making a decision for him or herself is a very different experience from having change imposed by others. As human beings we weigh up the ‘pros and cons’ of changes required of us. How we respond will be determined by the range of factors listed above. In particular, we are mostly likely to ‘buy in’ to the proposed change if: we are dissatisfied with our current situation; can envision real advantages to ourselves of the anticipated new order; have the knowledge and capability to migrate to that new order; and perceive that making the shift will not be too costly or painful. The relationship between these factors is represented by Gleicher’s formula as shown in Figure 1.

**Figure 1 Gleicher’s Formula (Gleicher, cited in Buchanan & Huczynski, 1997)**

*Change will occur if:  $D \times V \times K > C$*

*D = Dissatisfaction with the status quo (pain)*

*V = a shared Vision of the future*

*K = Knowledge about practical steps*

*C = the Costs (economic and psychological) of*

Applying Gleicher’s formula to the present circumstances, a major obstacle to consumer ‘buy in’ to the planned conversion to digital broadcasting is that there is minimal dissatisfaction with the status quo. On the contrary, surveys show very high levels of satisfaction with existing free-to-air channels. This, combined with the widespread belief that, like decimalisation in the past and the introduction of the Euro at the present, DTV will bring additional, perhaps hidden, costs for ordinary householders to meet, lack of knowledge about practical steps to take and disinterest/cynicism about the future vision makes clear the scale of the challenge to be met through the transition programme.

### 5.2.3 Factors influencing technology uptake

In addition to identifying causes of resistance to change, research evidence also indicates that the uptake of new technologies is generally slow, not primarily because it is actively resisted, but far more often because of factors such as those listed in Figure 2 below:

**Figure 2 Barriers to Uptake of New Technologies (Damodaran and Olphert, 2000)**

- the need to adapt to new ways of working/operating;
  - poor support for learning;
  - inadequate communication *both about the technology and reasons for change*;
  - failure to create a culture conducive to technology acceptance.

The barriers identified commonly arise where change is imposed on individuals. In this situation individuals frequently do not perceive the need or desirability for the proposed change. This means that they have little or no motivation to invest in learning the required new skills or to change their established ways of operating. In such circumstances the change is unlikely to generate the positive benefits sought by those driving the changes - unless or until at least some of those who will be affected are in favour of the change.

#### 5.3.4 Overcoming the barriers

There is extensive evidence in the academic and business literature to show that for a planned change to be successful it is crucial that those who will be affected by it are engaged in the planning of that change (Bennis, Benne and Chin, 1985). Identification of the stakeholders is clearly a pre-requisite for their engagement (see Paper 1). It is only through involving stakeholders effectively from an early stage that their needs can be identified and met in the design and planning process.

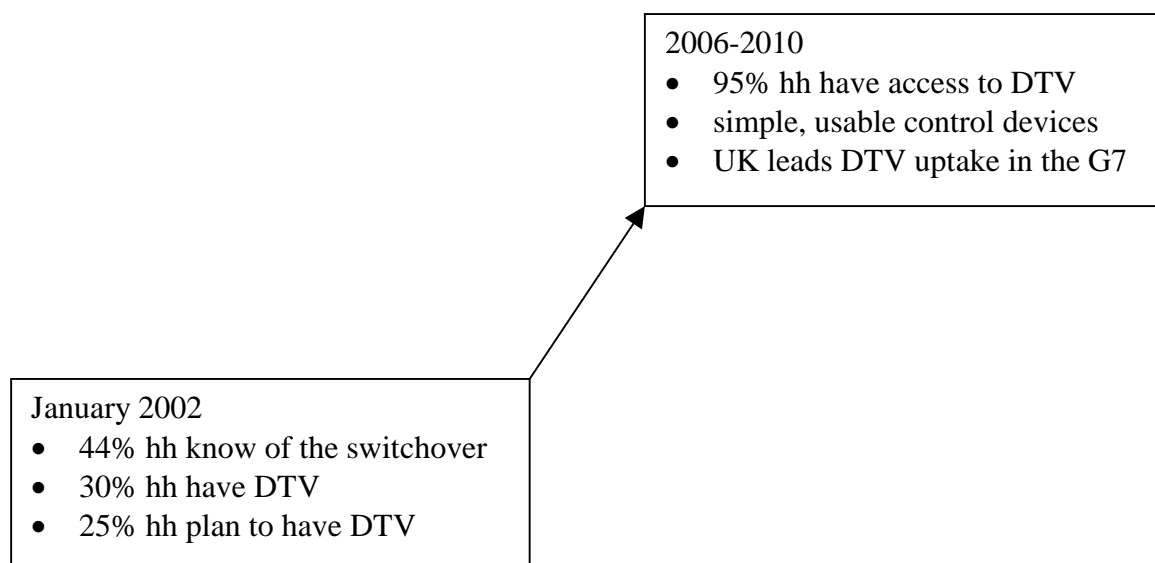
There are significant benefits to be gained from stakeholder participation. Through investing time and effort in the change process, stakeholders begin to identify with and to develop personal goals for the planned change. The engagement process also gives early warning of potential difficulties, which often enables solutions to be found before significant adverse impact occurs.

### 5.3 Planning the Analogue to Digital Transition Strategy

#### 5.3.1 Bridging the gap

An essential prerequisite for formulating an effective migration path from the current reality to an aspired future position is to establish clearly the parameters of the status quo and of the future vision respectively. The diagram in Figure 3 presents these two positions and shows the distance to be travelled to arrive at the point where the switchover is achieved. The following part of the paper identifies the key elements of the transition plan to achieve the adoption of nationwide adoption of digital broadcasting.

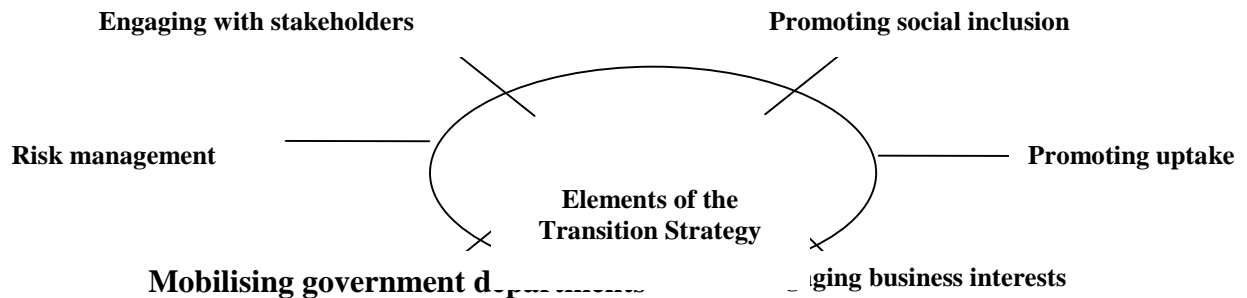
**Figure 3 Bridging the Gap: the challenge**



### 5.3.2 Key elements

Informed by good practice and established research, the key elements of a successful strategy for managing the human aspects of transition to digital broadcasting can be identified as:

**Figure 4 Elements of the Transition Strategy**



It is now essential to establish an equivalent programme of engagement with primary stakeholders. This is a necessary precursor to winning support for the switchover and will enable needs and wants to be elicited. Specifying these needs and wants as requirements will give valuable direction for business, informing the choice and design of products, systems and services to be developed and delivered through DTV. Promoting uptake as discussed in Paper 2 will also need to be an integral part of the engagement with the potential end-users of DTV.

#### 5.3.2.2 Promoting social inclusion

There are two components to achieving social inclusion. One relates to designing for inclusion and the other to formulation of strategy and policy. Paper 3 introduces the concept of Design for All. The transition strategy has a most significant role to play in promoting the widespread application of human-centred design principles in all spheres of life, especially in business, education, and healthcare. There are major rewards for the economy and for society in enabling the vast proportion of the population to enjoy the benefits of the information society through the medium of DTV.

One challenge for the strategy is to transform the perception of 'social inclusion' as burdensome and perhaps tedious to one of excitement in recognition that 'Design for All' is the key to innovation and commercial success on an unprecedented scale. Through the medium of DTV, diverse products and services - including many novel ones, yet to be conceived - will be made accessible to large populations whose needs are not met by existing delivery mechanisms.

### **5.3.2.3 Promoting uptake**

Knowledge sharing is key to bridging the knowledge/skills gap that exists between different populations and groups, between generations, and between different sections of the same population. Paper 2 scopes the nature of a successful programme to share the vision with manufacturers, suppliers and retailers on the one hand and with the community on the other. The need is to begin the education and awareness process at the earliest possible time through engaging with primary stakeholders and promoting dialogue between primary and secondary stakeholders for mutual benefit.

### **5.3.2.4 Mobilising Government departments**

The Government has many declared objectives to promote public access to information, providing on-line access to information on health care, benefits, employment and education (e.g. reports by Department of Education and Skills, Department of Health and Social Exclusion Unit, see Appendix 3). The explicit goal of enhanced social inclusion has also featured in a number of white papers (see Appendix 3). To achieve these ambitious and visionary goals requires government departments to work together to exploit the unprecedented opportunities that could be offered to the citizens of the UK, either through the medium of DTV or through the introduction of new integrated technologies.

It is clear that the success of the transition will not be achieved simply through the attractions of more TV channels and interactive TV for entertainment purposes. For a considerable proportion of UK citizens the switchover will only become a desirable objective when it offers some positive enhancement to their perceived quality of life. Such enhancements are likely to come from improved services delivered in to the home, meeting needs for easier job search, supporting education and learning, applying for social security benefits, supporting rehabilitation programmes, coordinating care in the community etc. The needs are legion and digital technologies offer cost-effective ways of meeting them – but this can only come about through government departments working together, sharing information and expertise to develop and implement services in a coordinated and integrated way – making the Digital Society a reality.

### **5.3.2.5 Engaging business interests**

At present there is active engagement of broadcasters and related providers of content in the television industry in the Go Digital Project and in the Digital Technology Group. The planned switchover is, of course, recognised by them to be a major commercial opportunity to increase the choice available to viewers and promote Pay TV on a variety of tariff/subscription arrangements. To begin to exploit the switchover to benefit the whole economy and society requires a far wider engagement with the business community.

The switchover offers business an enormous range of new opportunities to design and develop and market new products, systems and services. Opportunities will include the demand for novel devices and user interfaces which, through careful attention to human-centred design principles (See Paper 3), will enable almost all people to use DTV easily. Another opportunity will be to anticipate (on the basis of effective customer requirements analysis), develop and provide services that would be valued by consumers for delivery via the internet and made possible, through DTV, to households without a PC or other means of access.

There would appear to be a need for an energetic campaign to promote recognition in the business community that DTV offers far more than vast choice in broadcast entertainment.

There is an enormous range of human needs to be met, especially those of an aging population. This offers businesses the opportunity for wealth creation alongside the enhancement of the quality of life of British citizens.

#### **5.3.2.6 Risk management**

Managing change includes managing risks to ensure that any problems arising are addressed promptly to avoid the change initiative being undermined and compromised. The risks for the DTV transition include, amongst others: low uptake of DTV by the general public; inaccessibility of DTV products and services to important groups of primary stakeholders, leading to increased social exclusion; and users lacking the skills to operate DTV products and access internet services through DTV. Such risks need to be clearly identified and managed. Further risks will emerge as the transition process progresses and there must be a co-ordinated strategy for identifying and managing them as they arise. Engaging all stakeholders in the transition process is a key way of doing this.

### **5.4 Mechanisms and Techniques for Managing the Transition**

#### **5.4.1 Mechanisms for participation**

The enabling processes for stakeholder participation are:

- knowledge sharing: sharing the vision;
- awareness and education;
- dialogue between primary and secondary stakeholders;
- trawling the requirements: identifying the needs/potential drivers;
- identification and specification of user requirements;
- solution generation engaging specialist expertise;
- identification of options;
- pilots and trials;
- agreeing action;
- planning and implementation of strategies.

#### **5.4.2 Consultative mechanisms**

- focus groups;
- workshops;
- seminars and conferences;
- web-based discussion groups;
- communities of practice/interest.

#### **5.4.3 Envisioning techniques**

- Scenarios – positive and negative scenarios giving pictures of the outcomes of the changes for particular individuals or groups.
- Modelling – helping people learn through observing models, e.g. publicising best practice, promoting flagship initiatives and showing the benefits of inclusion.
- Predictions – existing psychological knowledge provides a vast repertoire of information about human needs and behaviour, making it possible to predict behaviour and influence processes accordingly. This can be applied to human-centred design as well as to change management processes.

## **5.5 Conclusion and Recommendations**

The advantages of effectively managing the human aspects of change cannot be overstressed. In the past, investment in tackling 'soft' or the human issues of change has often been resisted on grounds of cost, but there is now much evidence to suggest that addressing these issues carefully and appropriately as part of the transition process is actually cost effective and vital to success.

The requirement now is to devise an action plan for the transition process that energises and enables people to pursue their personal and professional goals through DTV. The essential features of an effective transition will be the participation and inclusion of primary as well as secondary stakeholders in the planning of the changes. The constituent parts of this scoping study outline the requirements and suggest the way forward.

The management of the human aspects of the DTV transition process is a major undertaking in and of itself and is distinct from the regulatory, technological and business aspects of the switchover - although, clearly, it must be co-ordinated with these aspects. Established good practice and extensive expertise in the field of human change management is available to facilitate the planning and implementation of the transition process and to ensure that the societal and business goals envisioned by government are realised.

# **ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT**

## **POSITION PAPER 6 - EXISTING KNOWLEDGE RESOURCES**

### **6.1 Introduction**

Multi-disciplinary expertise from across the UK and beyond will be needed to ensure the success of the analogue-digital transition programme. There is an enormous amount of relevant research and past experience, which should be drawn upon to inform transition activities.

This relevant expertise and experience comes from a number of sources:

- Research and state-of-the-art expertise in knowledge domains relevant to the human aspects of the DTV switchover, such as:
  - retailing and marketing;
  - social impact/social policy issues;
  - ICT/Telecommunications research (human aspects);
  - Human-Computer Interaction;
  - inclusive design;
  - change management.
- Information about the needs of disadvantaged groups – Organisations that represent and are concerned with particular disadvantaged groups have invaluable information about the needs of and previous experience of managing major change amongst the same or similar groups of the community, which will be invaluable in showing which strategies and measures of promoting awareness, education and adoption are likely to succeed.
- Past experience of nationwide and international change programmes - Case studies of past experience should be used to identify best practice for effective change mechanisms.
- Past experience of rolling out technologically-provided services – such as successful internet services and direct delivery of products and services.

It will be essential to take a multi-disciplinary approach to ensure that all the relevant information is effectively used in the DTV transition. No single organisation is equipped to handle all the human aspects of the change programme. Instead, there needs to be a co-ordinated programme to draw in all the relevant areas of expertise.

A range of reports and sources of information have been mentioned in the first five position papers of this study. The aim here is to bring them together and give a picture of the scale of resources available to inform, advise and support the DTV transition. It would be invidious to recommend any particular centre of excellence or individual expert at this stage and it would be impossible in this short scoping study to give details of all the relevant information. Thus, one of the initial next steps for the DTV switchover needs to be a full review of the available information, together with a knowledge management programme to ensure that that information is shared, disseminated and used effectively.

In addition, considerable information exists about plans for the switchover, such as the Government's action plan and other Governmental reports. Much of this is publicly available through the internet, but may need targeted dissemination.

## **6.2 Research and Expertise in Relevant Knowledge Domains**

As explained above, it is not appropriate to recommend any particular centre of excellence/expert, nor is it possible to cover the full extent of expertise in the relevant knowledge domains. The information below gives some examples of the wide range of organisations that might make useful contributions to the transition programme, but does not seek to be exhaustive or evaluative.

### **6.2.1 Retailing and marketing**

As outlined in paper 2, expertise in marketing mechanisms can be drawn upon to promote awareness and uptake of DTV. Relevant organisations, research programmes and reports include:

- The Future Media Research Programme, Centre for Marketing, London Business School.
- U.S. Product Development Management Association's UK/Ireland chapter, based at UMIST, Manchester.
- Counterpoint Research Report August 2001 for OFTEL.
- Continental Research report on DTV.

### **6.2.2 Social impact/social policy issues**

Research and expertise in social policy and the social impact of change will be important to ensure that the DTV switchover takes the relevant issues into account (see also paper 1).

Relevant organisations and research programmes include:

- CRSP, the Centre for Research in Social Policy, Loughborough University.
- futura.com2 - Research Centre for Future Communications, Leeds University.
- Diffusion of Innovations model - University of New Mexico, USA.
- Technology Acceptance Model - Vrije Universiteit, Amsterdam, Netherlands.

### **6.2.3 ICT/Telecommunications research (human aspects)**

The human aspects of ICT and telecommunications have been well researched and can provide insights into the DTV switchover. Relevant organisations and research programmes include:

- Digital World Research Centre, University of Surrey.
- The Human Communication Research Centre, Universities of Edinburgh and Glasgow.
- The Multimedia Communications Group, Glasgow University.
- BeCTA, British Educational Communications and Technology Agency, Coventry.

### **6.2.4 Human-Computer Interaction**

Human-Computer Interaction (HCI) is a multidisciplinary field concerned with the application of computer science, psychology, ergonomics and many other disciplines in industry and commerce. Its goal is to facilitate the design, implementation and evaluation of information and communications systems that satisfy the needs of those who own and use them. HCI expertise is important to build an understanding of how DTV services and the

interactive and internet services provided through DTV should best be designed and promoted. There are many research groups organisations and research programmes conducting relevant work, including the following:

- Department of Applied Computing, University of Dundee.
- Goldsmiths College.
- ITRI, Information Technology Research Institute, University of Brighton.

### **6.2.5 Inclusive design**

There is considerable expertise on inclusive design in the UK and worldwide, some of which has been mentioned in Paper 3 of this study. Relevant organisations and research programmes include:

- The Design Council, London.
- The Helen Hamlyn Research Centre, Royal College of Art, London.
- RICA, The Research Institute for Consumer Affairs, London.
- Usability and Rehabilitation Engineering Research, I-Design, University of Cambridge.
- Napier University School of Computing, Edinburgh.

There is also considerable international expertise of relevance to the DTV transition, available from organisations and research programmes (many of which are funded by the European Commission) including the following:

- VTT, Finland.
- The INCLUDE project, hosted by STAKES, the National Research and Development Centre for Welfare and Health, Finland.

Information networks/communities of interest in inclusive design include:

- The Alliance for Technology Access, San Rafael, USA.
- Design Research Society, based at the School of Design Research, Birmingham Institute of Art and Design.
- EQUAL research network, sponsored by the Engineering and Physical Sciences Research Council, Swindon.
- UsabilityNet, a Europe-wide network supported by the European Commission.

Internet resource indexes providing information on inclusive design include: SERI, Special Education Resources on the Internet; and Smart Home Technology Links website.

### **6.2.6 Change management**

As indicated in Paper 5, there is a great deal of expertise in the human aspects of change management that should be applied to the DTV transition. Relevant organisations include:

- Loughborough University.
- Institute of Work Psychology, University of Sheffield.
- Harvard Business School, Boston, Mass, USA.

### **6.3 Information About the Needs of Disadvantaged Groups**

There is an enormous number of organisations that represent and are concerned with the issues facing disadvantaged groups, for example: RNID, RNIB, SCOPE, Age Concern, Help the Aged, Child Poverty Action Group, the Government's Social Exclusion Unit, the British Dyslexia Association, the British Disability Rights Commission and the British Council of Disabled People, to name but a few. In addition, there are various research centres looking at issues relating to the needs of disadvantaged groups, such as: the Centre for Deaf Studies and the Norah Fry Research Centre at the University of Bristol, the Age and Cognitive Performance Research Unit at the University of Manchester and the Tavistock Institute.

Such organisations serve a dual purpose in that they are both representatives of stakeholder groups and sources of relevant expertise and experience. As such, they need to be part of the consultation and stakeholder participation aspects of the transition and also providers of relevant expertise and experience.

Relevant research studies and reports include:

- Home Farm Trust ICT Service Development project.
- Child Poverty Action Group (2001) *Poverty: the facts*.
- Information Society Commission *IT Access for All*.
- *Technologies for Independence in Later Life*, Parliamentary Office of Science and Technology, London.
- The campaign for audio description and access to digital broadcasting from RNIB.

### **6.4 Past experience of nationwide and international change programmes**

Appendix 2 contains examples of case studies of past nationwide and international change programmes. It is vital to learn lessons from this past experience. Tables 1 and 2 below show an analysis, which has been specifically undertaken for this Scoping Study. The analysis of three case studies: the decimalisation of Britain's currency, conversion from town gas to natural gas and the adoption of the Euro in Ireland, revealed common features and differences in approach and methodology, which provide insights relevant to the DTV transition. Similar analyses of other case studies could also be used to optimise the human aspects of the switchover.

**Table 1      Decimalization, Gas Conversion and Euro Changeover in Ireland – Common Features**

<b>Common Features</b>	<b>Gas Conversion</b>	<b>Decimalization</b>	<b>Euro Changeover, Ireland</b>
Pre-planning to explore changeover problems, patterns and costs and collect data	Canvey Island crash conversion – pilot study 1965 7850 gas customers	Committee of Inquiry on Decimal Currency 1961-1963	Loughrea Town Project accelerated change in 31 businesses, 2000
Special co-ordinating body established	Conversion committee established in 1966	Decimal Currency Board established 1966	Euro Changeover Board of Ireland established 1998
Planning time frame 5 years or less, but actual transition in very short time.	Ten years allocated but conversion virtually complete in 5 years	Transition effected in one month although 6 months allocated	<ul style="list-style-type: none"> <li>• Transition period of one month</li> <li>• In planning 3.5 years</li> </ul>
Strict objectivity of Committee/Board members	Mentioned	Mentioned	Not mentioned
Experienced members	Senior management supported by experienced engineers	Senior management, wholesaling, retailing, trade unionism, consumerism, teaching, journalism and banking	Business associations rather than large businesses “wide cross-section of Irish life”
Policy of openness	Specifically stated	Specifically stated	Not mentioned, but assumed
Cooperation with business	Appliance manufacturers	Bankers’ Association, large private and public organizations	<ul style="list-style-type: none"> <li>• Business associations</li> <li>• Business changeover referred to special sub-committee</li> </ul>

Businesses made responsible for their own costs and preparations for change	Yes	Yes	Business changeover managed by Forfás EMU Business Awareness Campaign
Handbook produced	The Conversion Handbook	Your Guide to Decimal Money	Your Handbook on the Changeover to the Euro
Intensive publicity campaigns using wide range of media		National and local media, trade press, talks, presentations, exhibitions, posters, leaflets	

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Common Features	Gas Conversion	Decimalization	Euro Changeover, Ireland
<p>Leaflets produced in four languages</p> <p>Awareness of need to address the concerns of the elderly and those with low means</p> <p>Communication with special needs groups through representative organizations</p> <p>Training and education of special interest groups</p> <p>Publicity campaign to general public over short time frame just prior to conversion</p> <p>Leaflets to every household</p>	<p>Leaflets produced in four languages</p> <p>Yes</p> <p>Yes</p> <p>Conversion engineers, sales assistants, home service advisers</p> <p>Personal visits</p> <p>(where the household used gas)</p>	<p>Yes</p> <p>Yes</p> <p>SMEs, small retailers</p> <p>Started 3 months before</p> <p>All households</p>	<ul style="list-style-type: none"> <li>• Publications in Braille and on audio tape</li> <li>• Leaflets in 11 languages other than English</li> <li>• Websites</li> </ul> <p>Yes</p> <ul style="list-style-type: none"> <li>• Special consultative panel with 18 members</li> <li>• Special materials for people with literacy difficulties in co-operation with the National Adult Literacy Agency and the City of Dublin VEC</li> </ul> <p>Retailers</p> <p>Intensive publicity in previous year</p> <p>All households</p>

**Table 2      Decimalization, Gas Conversion and Euro Changeover in Ireland Case Studies – Differences**

Different Features	Gas Conversion	Decimalization	Euro Changeover Ireland
Compensation	<ul style="list-style-type: none"> <li>• Replacement of appliances that could not be converted, but wherever possible, with reconditioned models</li> <li>• Allowances over and above trade-in value of appliances to save cost of conversion by engineers</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> <li>• Policy was that businesses which would have to pay most for conversion would also profit most from it</li> <li>• Tax relief already given on business expenses</li> </ul>	Not mentioned
Regulations for using standards	Manufacturers had to meet progressively tightening safety standards	Manufacturers had to design machines that could handle new coins, but other than that, “no constraints on the free exercise of initiative, resource and enterprise”	Not mentioned
Design	Not mentioned. Left to manufacturers	Applied psychologists gave recommendations on shape and size of new coins	Constrained by decisions taken in Europe
Education, schools	Hardly mentioned	Reference to work in schools	<ul style="list-style-type: none"> <li>• Schools have their own website</li> <li>• Classroom ideas for teachers</li> <li>• Integrating conversion to euro into the national curriculum</li> <li>• Information for pupils</li> </ul>

## 6.5 Information About the Switchover

As part of the knowledge management and information sharing aspect of the DTV transition programme, existing information about the switchover needs to be made available to the widest possible audience. Several reference documents pertaining to the switchover are already publicly available via the Internet, such as:

- An action plan available from the government digital TV website (<http://www.digitaltelevision.gov.uk/>)
- A report from a collective of interest groups – Digital Decisions: Viewer Choice and Digital Television. A report by the Viewers' Panel to the Secretary of State for Culture, Media and Sport December 2001.
- Marketing plans from service providers such as the BBC (Everyone's BBC: connecting with our audiences: *a marketing promotion plan for digital services*).
- Digital Television 2001 Final Report; Research Study Conducted for Department for Culture, Media and Sport, MORI June 2001.
- Information and Communications Technology for the elderly and people with Disabilities, The supply industry's approach - prepared for: The Department of Trade and Industry by Makrotest Limited, October 1998 ([http://www.dti.gov.uk/cii/docs/ic\\_for\\_elderly.pdf](http://www.dti.gov.uk/cii/docs/ic_for_elderly.pdf))
- Counterpoint Research *Digital Television - Consumers' Use and Perceptions* prepared for OFTEL August 2001.

## 6.6 Knowledge Management and Information Sharing

Thus it is clear that there is an enormous amount of information that needs to be drawn upon to maximise the effectiveness of the DTV transition. While there is a pressing need to carry out a full review of available material, it is also important that a knowledge management programme be defined to ensure that the best use is made of the available expertise. This knowledge management programme must include mechanisms to enable information sharing between those involved and those with relevant expertise. It must also include mechanisms whereby all information gathered is disseminated to those who need it in a form that will ensure that it is used effectively.

## 6.7 Conclusion and Recommendations

A plethora of knowledge and information exists that is relevant to the human aspects of the switchover to DTV. To use these resources effectively, such that wheels are not reinvented and the appropriate information reaches the stakeholders who need it, the following activities to promote dissemination and knowledge sharing are recommended:

1. A full review of existing information relevant to the different human aspects of managing the DTV switchover.
2. Definition and implementation of a knowledge management programme to ensure that knowledge is shared, disseminated and used effectively.
3. A range of mechanisms for knowledge sharing between the key players in the DTV transition and experts with relevant knowledge. These might include:

- workshops and symposia;
  - establishing consortia that cross disciplinary boundaries;
  - creating a “route map” for stakeholders to the relevant expertise.
4. A range of mechanisms for disseminating the appropriate information to the relevant stakeholders. As suggested in Paper 3, these might include:
- targeted information materials;
  - central database of information;
  - publicity about the sources of information that are available for consultation.

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**PAPER 7 – ACTION PLAN AND RECOMMENDATIONS FOR THE TRANSITION**

<b>Timeline of transition process across all strands of human aspects of analogue-digital transition Engaging with Stakeholders, Promoting Uptake, Promoting social inclusion, Engaging business interests, Mobilising Government Departments</b>	
2002  <b>Stage 1</b>	<p><b>Aims:</b></p> <ul style="list-style-type: none"> <li>• <b>Establish high levels of stakeholder participation.</b></li> <li>• <b>Specify requirements for human aspects of transition and risk management.</b></li> </ul> <p>Key Actions:</p> <ol style="list-style-type: none"> <li>1. Managed consultation process/focus groups using the outline scoping report to generate a full understanding of the human issues.</li> <li>2. Information gathering and needs analysis.</li> <li>3. Draw on expertise from relevant domains to establish appropriate actions.</li> <li>4. Initiate actions to engender awareness, understanding and uptake of inclusive design principles.</li> </ol> <p>(Examples of activities needed to achieve Stage 1 aims are shown below).</p>
Late 2002 – early 2003  <b>Stage 2</b>	<p><b>Aim:</b></p> <ul style="list-style-type: none"> <li>• <b>Agree actions for human aspects of transition.</b></li> </ul> <p>Actions:</p> <ol style="list-style-type: none"> <li>1. Draw up transition strategies for all strands of human aspects and risk management.</li> <li>2. Consult stakeholders to gain “buy in” and ensure appropriateness of strategies.</li> <li>3. Identify who will take which actions forward.</li> <li>4. Put in place mechanisms to manage risks.</li> </ol> <p>(Examples of activities needed to achieve Stage 2 aims are shown below).</p>
2003  <b>Stage 3</b>	<p><b>Aim:</b></p> <ul style="list-style-type: none"> <li>• <b>Initiate activities for human aspects of transition process.</b></li> </ul> <p>(Examples of activities needed to achieve Stage 3 aims are shown below).</p>

2004 – 2006/10  <b>Stage 4</b>	<b>Aim:</b> <ul style="list-style-type: none"><li>• <b>Reach point when human requirements for switchover are all met.</b></li></ul>
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### Stage 1 - Examples of Activities

<b>Engaging with Stakeholders</b>	<b>Promoting Uptake</b>	<b>Promoting social inclusion (1) Designing for Inclusion</b>	<b>Promoting social inclusion (2) Policy/strategy formulation</b>	<b>Engaging business interests</b>	<b>Mobilising Government departments</b>
<p>- Review involvement and activities of stakeholder groups in all sectors concerned with the DTV switchover and share information between them.</p> <p>-Establish a programme of engagement with primary stakeholders.</p> <p>- Undertake a needs analysis to identify the potential drivers for DTV uptake for each stakeholder</p>	<p>- Define market segments amongst consumers – see paper 2.</p> <p>- Identify the gaps in existing research into consumer attitudes, motivations and needs – see paper 2 – and carry out further research as necessary.</p> <p>- Continue to monitor consumer attitudes to and uptake of DTV, to develop a profile of the specific adoption curve.</p> <p>- Study previous experience on change management at a national level to</p>	<p>- Establish one-stop information centres with comprehensive databases of information relevant to inclusive design of DTV products and services.</p> <p>- Promulgate user-centred design standards.</p> <p>- Develop business case for inclusive design.</p> <p>-Promotion of national design competitions, e.g. for the most ‘elderly-friendly’ electronic programme guides, remote controls, etc.</p> <p>- Provision of Government incentives (funding, endorsements etc.) for manufacturers to encourage more inclusive design approaches.</p> <p>- Establish design assessment centres for</p>	<p>- Identify market segments most likely to be disadvantaged or unlikely to switch to DTV before switchover, to focus on providing information and education.</p> <p>- Extend existing focus on social impact issues to include low-income households, low literacy levels, speakers of other language as well as older people and disability.</p> <p>- Define issues for community/communal users.</p> <p>- Monitor availability &amp; cost of DTV equipment/services; identify policies needed to enable widespread</p>	<p>- Identify the business opportunities provided by the DTV switchover:</p> <ul style="list-style-type: none"> <li>• Arising from innovative inclusive design initiatives.</li> <li>• Arising from the potential to use the internet and local intranets as a means of reaching new markets and opening new routes to market.</li> </ul>	<p>- Identify the implications of DTV for different Government departments, e.g.:</p> <ul style="list-style-type: none"> <li>• DoH - NHS Direct via internet.</li> <li>• DfES – promotion of National Grid for Learning.</li> <li>• DfES – development of strategies and mechanisms aimed at closing the skills gap.</li> <li>• DWP – Benefits Agency information via internet.</li> <li>• DCMS – provision of information about sources of Government information online, advice, training and support for Internet users.</li> <li>• DTI – promotion of</li> </ul>

<p>group.</p>	<p>identify communication strategies that are more likely to succeed.  - Undertake information/ training needs analysis, in conjunction with representative bodies that can provide additional insight and help to identify the specific needs of these groups.</p>	<p>testing, analysing and evaluating products.  - Create/develop mechanisms to encourage greater involvement of the general public in design research activities.  -Establish independent advisory bodies in inclusive design.  - Publicize good practice in inclusive design.</p>	<p>access.  - Identify special design needs for disabled groups and ensure that manufacturers and services meet these requirements.  - Identify and develop special initiatives needed to protect consumer interests - particularly for disadvantaged groups.  - Commission ongoing research to identify and monitor the range of human and social impacts of DTV.</p>		<p>low-cost/free Internet access.</p> <ul style="list-style-type: none"> <li>• DTI – development of common policies for social inclusion across departments.</li> <li>• DTI - in procurement processes: <ul style="list-style-type: none"> <li>- require suppliers to comply, where relevant, with ISO 13407.</li> <li>- ensure acceptance criteria include human-centred design (HCD) requirements.</li> </ul> </li> </ul> <p>Etc.</p>
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## Stage 2 - Examples of Activities

<b>Engaging with Stakeholders</b>	<b>Promoting Uptake</b>	<b>Promoting social inclusion</b>	<b>Engaging business interests</b>	<b>Mobilising Government departments</b>
<p>- Knowledge management strategy to ensure that the information is shared and different stakeholder groups are mutually supportive.</p>	<p>- Coherent and integrated national plan for education and communication strategies, with tailored provision for disadvantaged sectors of the community.</p> <p>- Awareness programme for the switchover - timing, implications, what will change; develop mechanisms for ensuring this information reaches the widest possible audience especially those isolated by disability, geography, language etc;</p> <p>NB: 1.Ensure promotion campaigns etc are innovative, clear and concise and that they highlight benefits of take-up beyond more choice of channels.</p> <p>2. Promote trust by providing clear and impartial information on costs and benefits of</p>	<p>- Systematic programme to promote widespread awareness of the needs and concerns of the disability community (particularly the numerous sub-groups within that community) and to identify and address these effectively.</p> <p>- Plan of mechanisms for overcoming barriers to access, e.g. consider financial and other incentives to encourage those least able to afford new equipment to find it affordable.</p>	<p>- Strategy to promote.</p> <ul style="list-style-type: none"> <li>• use of 'design for all' and usability standards among DTV equipment manufacturers;</li> <li>• awareness of good design among consumers; and</li> <li>• consumer testing and trials of equipment.</li> </ul>	<p>- Departmental plans for transition activities need to be coordinated and implemented as part of an integrated national transition plan.</p>

	services and equipment 3. Emphasise that free-to-air services will remain, paid for from licence fee 4. Plan the timing of education and awareness campaigns carefully and conduct trials to identify the optimum period before switchover to begin the processes.			
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### Stage 3 - Examples of Activities

<b>Engaging with Stakeholders</b>	<b>Promoting Uptake</b>	<b>Promoting social inclusion</b>	<b>Engaging business interests</b>	<b>Mobilising Government departments</b>
<ul style="list-style-type: none"> <li>- If it does not already exist, establish a steering panel which monitors activities and channels information between different stakeholder groups, bearing in mind that service providers have already initiated marketing plans.</li> <li>- Establish a Government database/information source that provides the information needed by stakeholder groups.</li> </ul>	<ul style="list-style-type: none"> <li>- Run training for the trainers.</li> <li>- Use existing and familiar environments – e.g. Social Services, Benefit Agencies, Community Centres, Libraries, Health Centres - both for providing information from government and for providing opportunities to experience the benefits of digital television and Internet access.</li> <li>- Use existing outlets in colleges, community centres and supermarkets as part of an information/educational network.</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure that those in contact with disadvantaged groups (e.g., sick/disabled, living alone, older, ethnic minority groups etc) are charged with explaining the switchover and its implications.</li> </ul>	<ul style="list-style-type: none"> <li>- Invite equipment manufacturers to confer with design groups who have experience of design for all in order to produce equipment that meets consumer needs.</li> <li>- Continue to encourage coordination between designers, special interest groups, communicators, manufacturers and retailers so that user needs are understood and met.</li> <li>- Encourage retailers to inform and educate staff so that they are able to provide accurate information.</li> </ul>	<ul style="list-style-type: none"> <li>- NHS trusts to work with local health centres, pharmacies and other health services to provide services through a local intranet - e.g. prescription renewals for housebound patients.</li> <li>- Benefits Agency to provide information through DTV on benefits eligibility, job search etc.</li> </ul>

# **ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT**

## **APPENDIX 1 – STATISTICAL INFORMATION**

### **Take up of New Technological Services**

Research examining social class (cited in the PAT 15 Report 2000) provides an insight into those less likely to take-up new information communication technologies:

- ◆ Those in class DE are less likely to have ever used a PC or the Internet than for the population as a whole - 38 per cent and 14 per cent compared with 58 per cent and 29 per cent.
- ◆ Only a quarter of DEs say they have access to a PC at home compared with 44 per cent of all adults.
- ◆ Only two per cent of DEs say they have Internet access in the home compared with one in three ABs and 14 per cent of all adults.

Figures for low-income information communication technology ownership (ONS Family Spending, 2000) show that:

- ◆ Only 14 per cent of households in the lowest income decile have a home computer compared to 75 per cent of the highest income group.
- ◆ Only six per cent of households in the lowest income group have an Internet connection compared to 50 per cent in the top income group.

Figures for ownership of information and communications technology amongst older people (ONS Family Spending, 2000) show that:

- ◆ Only six per cent of two person retired households (mainly dependent on state pensions) had a home computer with only one per cent having an Internet connection.
- ◆ Only two per cent of households with one person above retirement age and mainly dependent on state pensions had a home computer and none had an Internet connection in comparison to households with two adults and two or more children 65 per cent had a home computer and 34 per cent of these households had access to the Internet.

### **Current TV ownership/usage**

Only one percent of households in the United Kingdom are without a television. However, 97 per cent of households consisting of one adult with no children have a television compared to 99 per cent of households with children (Social Trends, 2001).

### **Patterns/variations amongst different groups**

Older people watched more television than younger age groups with those aged 65 and over spending twice as much time watching television as those aged four to 15 (Social Trends, 2001).

### **Awareness of move to DTV**

Research conducted on behalf of the Consumers Association (CA) surveyed 1,918 people between 23<sup>rd</sup> February and 1<sup>st</sup> March 2001 across Great Britain. The survey found that:

- ◆ Of those who had not adopted digital television 49 per cent are aware that the Government are planning to switch off the analogue signal.
- ◆ Adopters were much more knowledgeable 66 per cent were aware of the switch off.

Research conducted on behalf of the Department of Culture, Media and Sport by MORI, which surveyed 1,918 adults across Great Britain, found that:

- ◆ Over half of all women surveyed (51 per cent) and those in social class DE (52 per cent) state that they have heard nothing or don't know about digital television, compared with 40 per cent in the population as a whole.
- ◆ Lone parents are more unaware of the switchover than two parent couples. Twenty seven per cent have heard of the plan to switch, compared to nearly half of parent couples (47 per cent).

### **Figures on income/expenditure of low income households**

The average weekly household expenditure on TV's, videos, computers and audio equipment of the lowest income decile was £1.70 compared to £15.40 for those in the top income decile (ONS Family Spending, 2000).

### **Access to credit facilities, banking (inc online banking) etc**

One and a half million households lack the most basic of financial products including current accounts and home contents insurance and a further 4.4 million are on the margins of financial service provision (Kempson, E. and Whyley, C., 1999).

Over half of individuals (52 per cent) without bank accounts were in the bottom quintile of the income distribution, more than 80 percent in the bottom two quintiles (DSS Households Below Average Income, 1999/00). One-quarter of households do not have home contents insurance (Association of British Insurers, 1998-9).

Research conducted by Jan Pahl found that those excluded from the electronic economy were 'work poor', in that they were typically living in households without a regular earner, 'credit poor' in that they had difficulty in getting loans and 'information poor' in that they did not understand the rules of the new world of personal finance (Pahl, J., 1999). Pahl's research also shows that differences in credit card use were associated with differences in employment status and that men dominate access to new technologies such as Internet banking.

# **ANALOGUE TO DIGITAL SWITCHOVER: HUMAN ASPECTS OF ADOPTION A SCOPING STUDY FOR THE DIGITAL TELEVISION PROJECT**

## **APPENDIX 2 – CASE STUDIES**

### **Case study 1. The payment of pensions and benefits by Automated Credit Transfer (ACT)**

The Government will begin paying benefits by Automated Credit Transfer (ACT) into bank or building society accounts from 2003. Currently about six in ten of all benefit recipients receive their payments either through an order book or a girocheque. Research undertaken by the Social Policy Research Unit for the Department of Work and Pensions investigates the characteristics, experiences and attitudes of benefit recipients who are not currently paid by ACT. This research has particular resonance for those wishing to embark on making Britain digital in that it demonstrates the difficulties of promoting and enforcing universal changes and highlights some of the issues for disadvantaged groups in society i.e. the elderly, the sick or disabled and those on low incomes.

#### **Levels of Awareness and Willingness to Transfer**

Only 41 per cent not currently paid by ACT said that they knew anything about the intended changes. A quarter of respondents were either ‘not very’ or ‘not at all willing’ to make the change to ACT, even if they could still get their pension or benefit at the Post Office with the same frequency as they currently collect it.

There was strong support for Post Office based banking. Two-thirds of those interviewed thought it was a good way to increase access to banking and almost nine out of ten thought it would ensure that Post Offices stayed open. A quarter of the people interviewed had an account that currently had an agency agreement with the Post Office; and all those without an account could open one to be used to withdraw money at Post Offices. Generally people lived nearer to Post Offices than banks, building societies or cash machines. Therefore getting to a Post Office was much easier.

The “easy to transfer” group held the most positive views about banks and banking and they had the least difficulty getting to one.

#### **Reluctant and unwilling transferers**

People below pension age were generally more willing to switch than were pensioners and there was a strong relationship with age. Seventy one per cent of people under the age of 20 were either fairly or very willing to change to ACT, compared with only 24 per cent of people aged over 80. Forty per cent of this age group said that they were either not very or not at all willing to transfer.

The researchers grouped people according to the ease to which they could be encouraged to transfer to ACT, based on their responses to survey questions. These groups were labelled:

- easy to transfer;
- potentially difficult to transfer;
- quite difficult to transfer; and
- difficult to transfer.

Easy to transfer was the largest of the five groups (four out of ten) and were the youngest with the average age of 43. Most had the use of a car and had no limiting disability.

The group “quite easy to transfer” consisted of two out of ten of the people interviewed and their average age was 64. Relatively few had access problems with getting to a bank or building society.

Concentrating on the last three groups the research shows that:

The average age of respondents described as “potentially difficult” to encourage to accept ACT was 61 years. A quarter of individuals in this group was lone parents. Recipients of Disability Living Allowance (DLA) or Incapacity Benefit (IB) were over-represented in this group. A disproportionate share of people in this group lived in rural area and comparatively few had access to a car, reporting a high level of mobility problems.

The group classified as “quite difficult” to transfer to ACT was on average older (76 years) than the group of respondents “potentially difficult” to make accept ACT. Four out of ten people in this group were aged over 80. They were very likely to be living alone, in someone else’s household i.e. with their children or in residential care and were drawn from the very poorest pensioners. They had the highest levels of disability and their difficulties with access to banks and building societies arose from their physical disability rather than from where they lived. Forty eight per cent of this group relied on someone else to collect their pension or benefit for them.

Individuals described as “difficult to transfer” to ACT were most sceptical about the proposed changes and rejected any changes. Ninety seven per cent of this group either said that they were not at all willing to transfer to direct payments, that they wanted to collect their money at the Post Office rather than access it through a bank account, or they expressed wholly negative views of ACT. For example in attitude statements (given by the researchers) they were the ones least likely to agree with the advantages of ACT. Only 17 per cent of them could see any advantages to ACT at all, which was much lower than any other group. Their average age was 69.

The research shows that it will be very difficult to accommodate the following people. These groups are:

- ◆ People who have an account but are unlikely to be persuaded to have their pension or benefit paid into it (around six per cent of all who are currently paid by order book or girocheque).
- ◆ People who do not have an account and are very unlikely to open one (around four per cent).

A small number of people (six per cent) had an account but were adamant that nothing would persuade them transfer to ACT - not even a financial incentive. The majority (66 per cent) were women and were from the quite difficult and difficult to transfer groups.

The research found three main reasons why these people it were resistant to having their benefits or pensions paid via ACT:

- ◆ access problems;
- ◆ a strong preference for money management in cash without a current account; and
- ◆ deep-seated objection to act.

Of those who did not have an account and were unlikely to open one to receive their benefit or pension, 64 per cent had never had an account. Nearly half (48 per cent) did not want to use any form of plastic card and 94 per cent did not have an account at the time they started to receive their pensions/benefits. One important reason for the low level of possession of bank accounts was low income or indeed the absence of earnings. Ninety one per cent of individuals who did not have a bank account had no income other than their social security benefits and they almost all operated weekly cash budgets. As 68 per cent of the difficult to transfer group were women, it would be reasonable to assume that there would be more women in the group without a bank account than men, however a breakdown is not given.

### **Conclusions/implications**

- ◆ Those on low incomes and pensioners want reassurance that changing to ACT will not disrupt their established pattern of money management.
- ◆ The elderly want a paper-based method of payment. If based on a plastic card they will need help with using it.

This ACT research suggests that switching payment methods may prove rather difficult for certain groups in society, in particular the elderly, those on low incomes and sick and disabled people. Before any kind of change is implemented it would appear important that people are fully aware of the changes taking place, that they become familiar with different payment methods/technologies and reassured that they can continue managing their money in their own ways.

### **Source:**

Kempson E, and Whyley, E., Payment of pensions and benefits: A survey of social security recipients paid by order book or girocheque (2001) for the Department of Work and Pensions Research Report 146.

## **Case Study 2. The Case of Minitel**

Minitel is a precursor of the Internet, which was developed in the 1980's in France. Connected to the telephone system, it has approximately 25,000 databases (ISP Planet Website). It is estimated to have around 16 million regular users in France, with nine million terminals in homes and offices. It is more popular than the Internet, which is accessed by 'only' eight million people in France. There are nine million Minitel terminals in French homes and offices (wired.com website). The services offered via the Minitel include:

- train/movie ticket purchase;
- stocks and shares checking;
- small ads publishing;
- searchable databases;
- chat rooms;
- fax and e-mail; and
- online banking.

Currently over 3.9 million people in France use Minitel for online banking compared to 1.9 million using the Internet (Forrester Research in wired.com website).

To promote Minitel, France Telecom gave away terminals to its telephone customers during the late 1980s and early 1990's (ISP Planet Website). The intention was to provide free terminals to all telephone subscribers, which was to be paid for by the substitution of the existing paper telephone directories with databases containing all French telephone subscriber details. However, this plan was abandoned as it was thought excessive to compulsorily replace the paper directory and thereafter only volunteers were given Minitels (Sutherland, 1995).

Minitel has encouraged new services by offering so-called "kiosk tariffs" (Sutherland, 1995). These tariffs allow potential new service providers to start-up without an established market. The kiosk tariff system operated by France Telecom collects a charge from the telephone subscriber for the services used based on a call to one of a number of special telephone numbers and France Telecom records the number of minutes connected to each service. The tariff system has allowed for a variety of divisions in cost between users and providers, ranging from free to nine francs per minute in the mid-1990s (Sutherland, 1995).

### **User Profile**

According to research conducted in France during the 1980s the use of Minitel was very unevenly distributed across social class and age groups. Between 1987 and 1988, senior citizens were found to have a penetration rate of only six per cent and manual workers a rate of eight per cent. The highest take-up rates were achieved amongst senior managers and professionals (30 per cent). Use was similarly divided by age, with the heaviest users in the age range 22 to 49 years (Arnal and Jouet, 1989 in Sutherland, 1995).

### **Conclusion/Implications**

Minitel was heavily backed and endorsed by Government. Even so and despite subsidy to encourage take-up, the new technology has not been embraced by all, with take-up highest amongst the young and amongst professionals. In order to promote the service, France Telecom has made it easier for Minitel services to be accessed from a variety of devices such as PC, PDA or mobile phone. It has also revamped Minitel's image and launched i-Minitel, a high-speed software enabling Minitel's services to be accessed via PC and Macs. France

Telecom has also introduced a service, which enables companies to publish their Web content on the Minitel (wired.com website), making Minitel more attractive to commerce. It is unclear, indeed questionable, whether this strategy will increase the take-up of Minitel amongst current low-users.

**Sources:**

Pastore, M. Web Making Headway in France; from  
[http://www.isplanet.com/research/2001/france\\_web.html](http://www.isplanet.com/research/2001/france_web.html)

McGrath, M. Minitel: The Old New Thing; from  
<http://www.wired.com/news/technology/0,1282,4293,00.html>

Sutherland, M. (1995) The resistible rise of French videotex; from  
<http://www.sutherla.dircon.co.uk/minitel/intro.htm>

### **Case Study 3. The Decimalization of Britain's currency**

Government announced the decision to decimalise Britain's currency five years before the changeover, in 1966. Australian experience had shown that three years was not enough for the necessary planning and preparation.

As planning and preparation continued, businesses and government perceived that the actual transition period would not have to be as long as at first envisaged. Once forecast at one and a half to two years, the actual period was more like one month.

Success was attributed to firm decisions being made early and adhered to, since businesses will not plan in detail and commit resources until they know exactly what is to happen and when.

Broad policy agreed that, as a general principle, compensation to businesses was not acceptable, since it was argued that, "organisations which will have to incur substantial costs are those which stand to benefit most from the change" and that tax relief was already available for business expenditure. So government and parliament agreed in 1969 that the Decimal Currency Board no longer needed to examine compensation. Moore (1994) says, "the absence of a compensation scheme for the costs of the UK changeover was an important contributory factor in the smoothness and speed of the changeover ... no constraints on the free exercise of initiative, resource and enterprise in tackling machine conversions or replacements in cost-effective ways ... as a result, the cost of the change to decimal currency is not known; no one needed to know it."

#### **Experts used:**

- Operational research to estimate the number of coins needed at transition.
- Applied psychologists to advise on ease with which people might accustom themselves to different coin shapes.
- Technical member of the board who was a professional engineer and experienced senior businessman.
- Small engineering support group.

#### **Members of the Board:**

- Ten members assessed as being able to take an objective but informed view from varied evidence.
- Collective experience in politics, senior business management, wholesaling, retailing, trade unionism, consumerism, teaching, journalism and banking.
- No civil servants.
- All part-time.

The Board worked on the basis of complete openness with the British Bankers Association's special working party.

#### **Main issues in changeover:**

- Legislative.
- Pressure for early decisions on important aspects.
- Machine problems.
- Public concern about likely and actual effect on prices, particularly amongst the elderly and those of limited means.

## Information and Advice

The Decimal Currency Board's main task was to give information and advice. Information and guidance moved from the centre as follows:

1. Government departments and senior management:
  - encouraging large private and public organizations to identify their needs and plan on how to meet them.
  - large organisations appointed Decimalization Officers.



2. Cash handling organizations: SMEs, 1969/70 Year of the Retailer



3. General public: 3 months before D-Day

## Publicity strategy and implementation

Success was achieved through unstinting cooperation between Decimal Currency Board, the government and the private sector.

1. From 1968 reference booklets published about
  - new coins; } These booklets were also
  - expression of amounts in new money; } sent to schools
  - points for business to consider;
  - banking;
  - payrolling;
  - conversion of accounting records;
  - legislation;
  - cash transactions during changeover period.
2. Newsletter
3. Syndicated articles to trade press and professional associations
4. Exhibition stands for trade shows
5. Conversion tables
6. Special booklet called "New money in your shop" for smaller retailers distributed through banks and retail associations
7. Leaflets from government and the Post Office
8. Film about cash transactions available on loan
9. Widespread TV and press advertisements
10. Posters
11. Mailing to each household of "Your guide to decimal money" with detachable conversion tables.
12. Film called "Granny gets the point" in demand from social welfare organizations.

There was competitive pressure between organizations to be helpful and to demonstrate an easy "customer friendly" approach.

**Source:**

Moore, N E A., 1994, The work of the UK Decimal Currency Board (1967-71) and possible lessons for the changeover to a common European currency. [http://www.ecu-activities.be/1994\\_3/moore.html](http://www.ecu-activities.be/1994_3/moore.html)

#### **Case study 4. Conversion of gas appliances following changeover from Town Gas to natural gas (North Sea gas)**

The Gas Council took responsibility for the conversion. There is no reference to government intervention.

North Sea gas had twice the calorific value of Town Gas. The Gas Council estimated that 35 million appliances were distributed among 13.5 million premises. 8000 different domestic appliance models needed to be converted, containing in all, 200 million burners.

In 1966, a **Conversion Committee** was created to establish general policy and coordinate a changeover programme over the next ten years.

Role of Conversion Manager:

- organise the national programme;
- determine the national need for conversion kits;
- provide a channel of communication between area boards and the gas council.

The Committee identified a need for adequate, detailed technological research to implement the technical changes efficiently.

#### **The Canvey Island pilot study**

Policy and practice was established following the Canvey Island crash conversion in 1965 undertaken by the North Thames Gas Board (NTGB). Canvey Island was isolated from other supplies – so could be better managed. The Gas Board had 7850 customers there.

Representatives of the Gas Board visited each appliance manufacturer to discuss the nature of conversion kits required.

There were complaints from customers whose conversion kits were not ready on time.

Ten models were found in the Canvey Island survey, which could not be converted. Board had to provide over 800 free, mostly reconditioned appliances to replace old ones, which could not be converted. These, the Gas Board claimed, customers were glad to accept. Customers had to sign the survey form as a true record of all the items in their possession. The Gas Council did provide allowances over and above the trade-in value of appliances in order to avoid cost of conversion to the Council. Many customers bought new appliances, but a few stuck out for expensive workshop modification.

#### **Canvey Island publicity campaign**

The campaign was conducted at two levels:

- relevant organisations on the island;
  - individual customers.
1. First, the NTGB informed Urban District Council that the conversion was to take place, before it made any public announcement.
  2. Old Age Pensioners of whom there was a high ratio, were informed through relevant organisations.
  3. Special display in local showroom and Home Service Providers gave demos.

4. NTGB took particular care to liaise with local police for cooperation concerning road works, parking etc.
5. The Press were informed.
6. All customers were informed.
7. Then individual personal visits from NTGB representatives.
8. Letter and card confirming date of conversion.

The study revealed that the actual process of conversion leads customers to expect higher standard of performance from appliances, although appliance performance naturally deteriorates over years. This exercise also yielded financial data from which conversion cost could be estimated.

### **National conversion**

Started in different areas as from 1967.

Conversion engineers often found it difficult to find an occupant at home in areas predominated by single occupancy rented accommodation. Apathy, rather than touchiness was the problem.

Special security arrangements had to be made for places like Hatton Garden and Downing Street.

Some regional boards had particular problems of language with immigrant communities (North Eastern, East Midland, North Western and North Thames). Leaflets were produced in Urdu, Bengali, Punjabi and Gujarati. The special status of women in these communities gave rise to problems of access.

### **Appliances**

All area requirements had to be channelled through a central purchasing unit in order for the great number of separate items to be ready on time. This made competitive tendering impossible.

Each manufacturer had to produce conversion kits for their own appliances. The Gas Council negotiated through Society of British Gas Industries comprising 50 appliance manufacturers. The manufacturers were suspicious at first, but then the programme established its own impetus and manufacturers saw the advantage of being to make and sell new products.

A census of appliances had to be carried out in order to establish need for kits etc.

There were problems of safety – regulations were being tightened during the transition period. Some appliances, which had met regulations when installed, no longer conformed at time of conversion. This upset owners.

### **Contractors**

In all but two board areas, the industry had to rely on outside contractors to effect conversion.

Thirteen training schools were set up round country. The training syllabus was agreed jointly by Gas Council and training boards of the Gas and Construction industries in consultation with the General and Municipal Workers' Union. Salesmen, public-relations staff, home service advisers and others also had to be trained.

Contractors were hired for 2-3 years at first. Subject to satisfactory fulfilment, contracts were renewed. Terminal bonus paid to men who completed the conversion programme, which worked as an incentive. Bonuses also paid to high quality performing teams.

Results of a postal survey to 5000 converted domestic customers in September 1967, showed that only 1 per cent complained about conversion teams.

### **Public Relations**

A small working party was set up after Canvey Island to consider PR.

The working party produced the Conversion Handbook, said by Norman Rogers of the Institute of Public Relations to be 'one of the most remarkable, if not *the* most remarkable text-book on an industry's PR work I have ever seen'. The working party considered strict objectivity to be the best policy.

Each consumer was contacted personally shortly before work began, and again after conversion.

Local level publicity:

- background stories in press;
- talks to representative organisations;
- displays and demos in showrooms.

National level publicity:

- media;
- technical press;
- women's journals;
- visits to North Sea Rigs;
- close contact with information department of Ministry of Power, particularly to provide minister with facts to answer questions in House.

### **Problems**

General indifference of public.

Possible negative over-reaction from press.

### **Afterwards**

Regional boards had been autonomous, but the conversion exercise brought closer internal collaboration with Gas Council through the conversion executive. The exercise would have been beyond the capacity of the fragmented pre-war industry.

### **Reaction to salesmen**

Press cuttings from 1971 show that some of the public complained about high-pressure sales from the Gas Council (personal communication). The report by Williams appears to dismiss this as over-reaction from the Press.

**Sources:**

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### **Case study 5. The changeover to using Euro currency in Ireland**

The Irish Minister of Finance issued the decision to create the Euro Changeover Board of Ireland on 5<sup>th</sup> May 1998, which allowed a changeover period of 3 years 7 months before the Euro became the legal transaction tender in Ireland on 1<sup>st</sup> January 2002.

As from that date, all transactions would take place in euros. Irish money can be used as legal tender up to 9<sup>th</sup> February, but change is given in euros. After 9<sup>th</sup> February, Irish notes and coins cease to be legal tender.

#### **Euro Changeover Board of Ireland**

The Board has 23 members representing a “wide cross-section of Irish life”. Its tasks are to:

- oversee the detailed implementation of the changeover to the euro;
- provide public and consumer information;

The Board has sub-groups as follows:

- retail sub-committee to oversee challenges of conversion for retailers;
- information sub-committee to plan and oversee a publicity campaign;
- Cash Changeover Working Group’
- Consultative Panel with representatives of 18 organisations representing people likely to have special needs in the context of the changeover to the euro;
- secretariat;

A separate business campaign is being managed by *Forfás EMU Business Awareness Campaign* with whom close links are maintained.

The Board commissioned a survey to determine public awareness levels after the widespread public information activity that followed the launch of the euro. The survey indicated that, for the general public, the issue would be to try to maintain awareness and develop it, especially in helping people build a scale of values for themselves in euro.

For groups at risk of low awareness, the issue would be to try to ensure that information reached them and was in appropriate form.

Dual display of prices provides the most pervasive source of euro values for the general public.

#### **Special needs**

Information materials are widely available at post offices, social welfare offices, centres for older people, Citizens Information Centres and Money Advice and Budgeting Centres. Special materials have been provided for people with literacy difficulties in co-operation with the National Adult Literacy Agency and the City of Dublin VEC.

The information handbook, *Your Handbook on the Changeover to the Euro*, is available in Braille and on audio tape as well as in hard copy. Leaflets have been translated into 11 languages: Albanian, Arabic, Chinese, Croat, Czech, French, Polish, Portuguese, Romanian, Russian and Vietnamese. Materials are also published in Irish.

The electronic euro converters sent out to all homes in the Republic from the end of November 2001, have larger displays than normal to cater for those with poor or failing eye

sight. The buttons on the pocket-sized converters are also quite large so those suffering from conditions like arthritis can manage them.

### **Schools and education**

The Board has developed its links with the education sector:

- launching a new interactive website for schools;
- circulating an information pack to primary and post-primary schools,
- co-operating with the Department of Education and Science in the preparation of subject guides on the euro for the start of the 2000/2001 school year.

### **Pilot Study**

An accelerated conversion exercise was undertaken with 31 businesses (retailers) in Loughrea in 2000. This highlighted the need for businesses to plan and prepare well in advanced of actual transition in 2002.

### **Business**

Forfás is implementing the EMU Business Awareness Campaign, a parallel changeover strategy for business. Forfás is the National Policy and Advisory Board for Enterprise, Trade, Science, Technology & Innovation in Ireland. It is the body in which the State's legal powers for industrial promotion and technology development have been vested.

The following is quoted from its website at <http://www.emuaware.forfas.ie/>

#### **OVERVIEW OF THE CAMPAIGN**

The overall objective of the EMU Business Awareness Campaign is to raise awareness in the enterprise sector, especially among SMEs, of the implications for their businesses of EMU and the changeover to the euro.

#### **Goals**

The EMU Business Awareness Campaign has a number of goals:

- To increase business awareness of the implications of EMU and the changeover to the euro.
- To communicate to firms the significant steps/developments being taken to initiate EMU.
- To promote appropriate preparation as early as possible by firms.
- To facilitate exchange of information and co-operation among different groups and organisations involved in advising or supporting firms in preparing for EMU.
- To achieve feedback from firms, on their information requirements in preparing for EMU.

#### **Operation of the Campaign**

This campaign is directed through business associations, professional bodies, and state agencies that deal directly with enterprises. These act as **information multipliers** and are the main channels of communication with the enterprise sector.

They are represented on a **Consultative Committee** for this campaign. By involving all the major participants in the changeover, the campaign will co-ordinate action, encourage co-operation and act as an information exchange.

A **Management Committee** has been established to give strategic direction to the campaign. This Committee consists of representatives from Government Departments, the Central Bank and business people.

The campaign focuses on disseminating information and collecting feedback . It encourages enterprises to begin analysing how EMU and the changeover to the euro will affect them and to start planning the steps they will need to take to deal with the changes that will arise.

Features of the campaign include a comprehensive Information Pack, this Web site, a newsletter entitled “Eurochange” and information meetings held around the country, as well as working groups to spell out the implications of EMU for firms in relation to training, information technology and the retail sector.

The campaign, launched in December 1996, is part of a wider national programme of public information on EMU and the changeover to the euro.

Questions regarding the impact of EMU on business should be directed, in the first instance, to the representative organisations on the Consultative Committee.

The Irish EMU website contains a great deal of information for business, advising on the impact of the changeover on Accounting and Finance, Human Resources, Training, Production, Marketing, IT, import and export and so on.

The campaign produced guidelines for importers and exporters, a code of practice for dual display and software which businesses can download to undertake a Business Impact Analysis.

At this stage, there is no review of how effective the campaign has been.

Note that the Bank of England has also published documentation about plans for the business, retail and public sectors in UK to take account of the change to using the Euro.

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