

Market developments which could drive digital take-up

96. There are several market developments which could help to drive digital take-up:
- a) Greater flexibility of pay offerings;
 - b) Personal Video Recorders (PVRs);
 - c) Making DTT more attractive to viewers;
 - d) HDTV (High Definition TV);
 - e) Potential for broadband to deliver DTV;
 - f) Satellite broadband.

Greater flexibility of pay offerings

97. Digital take-up may be boosted if pay-TV broadcasters and platform operators were to offer more flexible payment terms such as pay-per-night or pay-per-programme, extending the appeal of pay channels in a similar manner to the introduction of pay-as-you-go mobile telephony.

Personal Video Recorders (PVRs)

98. PVRs are still in the early adopter phase but the success of the recent BSkyB major marketing campaign, where subscribers to Sky+ more than doubled to 250,000 between the launch of the campaign (October 2003) and the end of 2003, is driving penetration towards the mass market. In addition, several models of PVR for DTT are now available, with more to come as a 7-day EPG is introduced to the platform. The consumer benefits of a PVR for busy households, especially when integrated with a digital receiver with twin tuners, are becoming more widely appreciated and word-of-mouth should continue to drive take-up.
99. PVRs overcome issues which annoy TV viewers, such as missing favourite programmes, and being interrupted while watching TV. Early adopters express high levels of satisfaction. PVRs enable television broadcasting to fit better with modern lifestyles of flexible working patterns, enabling viewers to make better use (and, for pay-TV subscribers, get better value for money) out of the programming they have access to – increasing the attraction of digital TV over analogue.
100. As well as having the potential to become a widely-recognised differentiator for digital TV over analogue, PVRs should also help to re-balance the relative consumer attractiveness of DTT with other platforms. PVRs could also increase the efficiency of broadcasting by enabling broadcasters to make more efficient use of “graveyard” slots in the early hours of the morning to download content onto consumers’ hard disks, with implications for the value of released frequencies post-switchover.

Making DTT more attractive to viewers

101. Broadcasters will continue to invest in their digital channels across all digital platforms. But until the analogue services start to be withdrawn, when released frequencies could be used to provide additional TV channels¹⁶, there is limited scope for DTT's total bandwidth to be significantly increased to enable a much wider range of channels to be offered to those analogue viewers for whom it is the only platform in which they have any interest.
102. There is probably some scope to squeeze minor improvements to the efficiency of MPEG-2¹⁷, the compression standard currently used for DTT (and digital satellite), which could enable more efficient use to be made of the existing DTT bandwidth. Small efficiency gains would probably be better utilised improving the picture quality of existing services rather than for adding new services to the line-up. Worthwhile efficiency gains would require DTT to move to either the successor compression standard, MPEG-4, or alternatively Microsoft's Windows Media 9, which would offer up to three times the compression efficiency of MPEG-4. However, neither of these would be "backwards compatible" to the 3+ million existing DTT receivers, so achieving these efficiency gains would not be an easy option to pursue.
103. Theoretically there are also several options available for introducing additional bandwidth pre-switchover on a local or regional basis although they may require trade-offs to be made. For example, proposals which have previously been made were for the introduction of "mini-muxes" with reduced bandwidth (because of the necessary use of a more rugged transmission mode), which could be used to introduce mobile services (reception on 'mobile phones, within vehicles or on portable media screens¹⁸); and Data-to-Home ("D2H"), which would transmit a rugged transmission mode of DTT from sectorised transmitting antennae on narrow beams or 'petals' from each mast. Implementing either of these options would have implications for analogue and DTT coverage and consequently neither has been actively considered so far. The Digital Action Plan will be looking at the uses for interleaved spectrum later this year.

¹⁶ A DTT network requires 6 frequencies for each multiplex to provide nationwide coverage, which implies a maximum of 2 additional high coverage multiplexes post-switchover.

¹⁷ A common means of compactly representing digital video and audio signals for consumer distribution on CD-ROM and digital television, as standardised by the Moving Pictures Experts Groups (MPEG).

¹⁸ However, the transmission technology in the UK for DTT broadcasts is not currently optimised for this and the costs of rolling out the transmission network to achieve good mobile coverage could be very high, and hence coverage would be likely to be concentrated on areas of high population rather than across the country as a whole. In addition, it is unclear pre-switchover whether additional TV channels might drive DTT take-up more. As such, it might seem more appropriate to consider mobile reception as a potential use for some of the released frequencies as analogue services were withdrawn, not driving switchover but enabling digital TV, post-switchover, to be available to consumers where and how they wanted it, playing to the strengths of the platform.

HDTV (High Definition TV)

104. HDTV is a potential key differentiator between digital TV and analogue and has been enforced by regulators in markets with historically poor television picture quality coupled with large screen sizes (e.g. US, Japan) and a pre-existing wide choice of TV channels. However, consumer uptake remains low.
105. As UK households adopt TV sets with ever larger screen sizes (a trend likely to accelerate as prices are dropping quite quickly), which expose the picture quality limitations of digital TV, demand for HDTV might be expected to emerge, for which consumers would need to invest in new receivers. Growing familiarity with the picture quality offered by DVD-Video could be expected to contribute to this. However, although HDTV is likely to become a viable consumer proposition in the UK within the next 5 years, it is unlikely to drive switchover within that timeframe.
106. If UK demand for HDTV emerged, it would be most likely to do so from existing digital TV adopters and so, initially, would not drive switchover. In addition, because an HDTV channel would be extremely bandwidth-hungry (requiring an entire DTT multiplex which could otherwise carry 4-6 Standard Definition - SD - channels), limited DTT bandwidth suggests that, in the absence of improvements in the compression technology currently implemented for European digital TV, HDTV could only be efficiently introduced for the satellite and cable platforms.
107. There is also currently limited availability of suitable content which would benefit from HD treatment (although high-end drama and sporting events - such as the Olympics – would), and could be made in HD without substantial added costs for the broadcasters, and for which consumers might be willing to pay (HDTV is not backwards compatible to any of the current digital receivers and so to consumers would represent another new platform).
108. To enable HD channels to be launched prior to switchover would require new DTT capacity or the closure of existing DTT services and only cause consumer confusion. However, broadcasters could go a long way towards improving picture quality, without making the leap to HD, by paying closer attention to the way SD services are captured and played out.
109. The BBC is considering distribution of HD. This won't, in itself, be a driver for digital take-up for the owners of millions of small-screen SD analogue televisions currently in the market, but it would be a service potentially of interest to the growing number of owners of large screen devices.

Potential for broadband to deliver DTV

110. Broadband take-up is growing rapidly and it has the potential to deliver digital TV to households for which traditional digital TV platforms may be unattractive, unavailable or impractical. Kingston Interactive Television has offered linear digital TV channels to TV sets for a while and Video Networks (Home Choice) has recently started to do so. In addition, several xDSL operators offer, or are considering offering, linear digital TV channels to PCs.
111. However, the provision of linear TV is not central to broadband's consumer proposition and it does not play to broadband's technical strengths. Consequently, it is too early to determine what rôle broadband might play in achieving digital switchover.
112. But when considering broadband's potential contribution to achieving switchover it has to be borne in mind that PVR technology, and consumer expectations carried over from online, are re-shaping digital TV into much more of an on-demand medium such that (rights permitting) broadband could have a considerable rôle in helping to take analogue viewers into a future of digital consumption of audiovisual media.

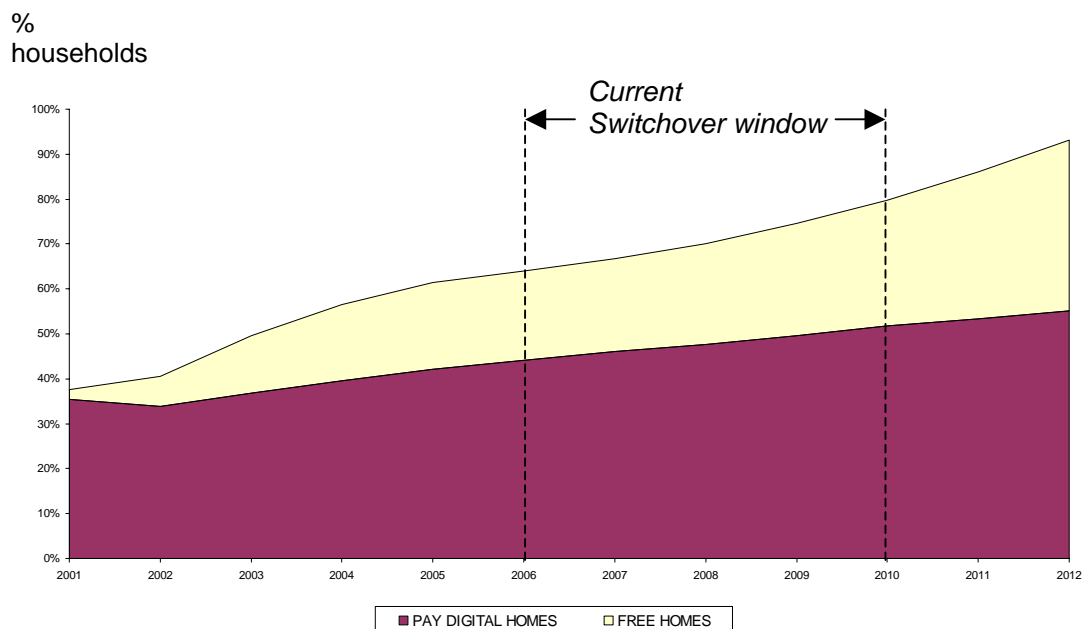
Satellite broadband

113. An internet via satellite service (using the ASTRA satellites) is now available with claimed download speeds of up to 768 kbit/s which would also provide access to free-to-air satellite TV channels. The adoption of satellite broadband could be attractive to consumers in rural areas where broadband via xDSL technology over telephone lines was not available (although, for as long as they are encrypted, users wouldn't have access to ITV1, Channel 4 or Five via satellite).

Digital TV take-up forecast

114. The BBC forecasts that total digital TV take-up (for primary TV sets only) will reach 95 per cent (often taken as an indicator of affordability) of TV households in 2013.

Fig. 9 : BBC forecast of UK digital TV take-up (primary TV set only)



Year end

115. The core assumptions of the above BBC forecast are that:
- forward projections for the number of UK households are from the Office of the Deputy Prime Minister.
 - 98 per cent of households have a TV set (consistent with BARB data).
 - SkyDigital comfortably reaches its target of 8 million UK & Eire subscribers by 2005 and annual churn falls steadily from 9.6 per cent currently to about 7 per cent by 2010.
 - Strong growth in Freeview penetration continues and it remains the primary free platform in the market and the proportion of Freeview receivers purchased destined to convert secondary TV sets will increase over time from the current estimate of 10 per cent.
 - By 2010, Top-Up TV is subscribed to by 15 per cent of those people with Freeview receivers.
 - A free-to-view satellite offering launches in 2005 ensuring TV channels are available to viewers without a viewing card.
 - All analogue cable subscribers are converted to digital by 2007.
 - Digital cable continues to see moderate growth in subscriber numbers, but due to the cable companies' focus on pushing broadband this will not be significant.
 - The switchover process starts as planned in 2007, acting from Christmas 2006 as a further impetus for analogue viewers to upgrade to digital, but the timetable for the switchover process is informed by regions achieving

Progress towards achieving digital switchover: a BBC report to the Government

comfort levels of digital take-up, and as such the final regions are not switched over by the end of 2010 as currently planned.

Technical challenges and solutions to implementing switchover

116. To enable the necessary planning to be undertaken prior to the start of the switchover process, the form of that process would need to have been substantially agreed upon, probably before Ministers would feel comfortable authorising the start of the switchover process.
117. The BBC has long argued that the most practical method of implementing switchover is by means of a region-by-region “rolling” switchover programme whereby the switchover process is carried out region by region, rather than in a nationwide “big bang”. This would have several crucial advantages, including:
- staggering the costs of switchover
 - offering the opportunity to learn from earlier mistakes
 - breaking down the process into manageable chunks allowing targeted communications and deployment of resources to -
 - visit each one of the transmitting stations to be converted to make the necessary changes
 - make home visits to restore reception for those unable to make the changes themselves
 - handle the significant volume of calls likely from the public¹⁹.
118. The BBC is pleased to see that the advantages of such a rolling programme have now been generally accepted. However, there remain several key elements of any switchover process, some of which are inter-linked, where decisions have yet to be taken. Principally, these require determining:
- the optimum DTT distribution of the public service channels across the multiplexes
 - what constitutes a region
 - the criteria for the order in which regions will be switched over
 - the procedure for switching off the analogue transmitters
 - a communications strategy to ensure that all viewers in the relevant regions will be aware of the impending changes – and what they must do
 - what changes it would be practical to make to the current DTT network topology to ensure that it is optimally prepared for post-switchover network characteristics
 - how large a challenge achieving portable reception might be, and how best to tackle it
 - how necessary digital availability of the public service channels outside Freeview coverage would be
 - what assistance might be needed for analogue viewers in regions being switched over?

¹⁹ ITV Digital estimated that 50 per cent of its subscribers called whenever a technical change was required, regardless of the advance publicity.

Optimum DTT distribution of the public service channels

119. At most transmitters, the Government's spectrum clearance strategy means that only three analogue conversions²⁰, would be technically possible. Yet the public service channels are currently distributed across four of the six multiplexes – multiplexes 1,2 A and B (see table 1 below). Although, once analogue services have been withdrawn, even multiplexes which did not undergo an analogue conversion would be able to substantially increase their broadcast power, any public service channels broadcast on unconverted multiplexes would not have near-universal coverage.
120. This presents a policy dilemma. Given that, of the four multiplexes in question, multiplex A has the lowest proportion of its bandwidth allocated to the public services, the BBC believes that multiplexes 1,2 and B should be planned for conversion. This then requires a decision to be taken about whether it would be practical to transfer some or all of the three public service channels carried on multiplex A (Five, S4C and S4C-2) onto multiplexes 1,2 or B, balancing:
- costs to the broadcasters (both financially and potential reduced bitrates for existing services carried on the multiplexes into which channels are being moved)
 - potential consumer confusion (for most current Freeview receivers, a manually activated re-scan would be required before a consumer could re-acquire services on the moved multiplex).
121. Five currently has no universal service obligation. Early confirmation on whether Five is eligible for universal coverage would be welcome.

²⁰ The process of withdrawing an analogue TV channel at a transmitter, and replacing it on the same frequency with a DTT multiplex, so that the digital service inherits the analogue channel's internationally agreed frequency assignment, antenna pattern and (relatively high) transmission power. The Government has accepted that implementing analogue conversions is the only practical way of achieving near-universal coverage by DTT.

Table 1: DTT multiplex and service map

Multiplex	Operator	Transmission mode	TV Channel	Radio Station	Data service
1	BBC	16-QAM	BBC ONE BBC TWO The CBBC Channel/BBC THREE BBC News 24	BBC Radio Scotland BBC Radio Nan Gaidheal BBC Radio Wales BBC Radio Cymru BBC Radio Ulster BBC Radio Foyle	BBCi
2	Digital 3&4	64-QAM	GMTV/ITV1 GMTV2/ITV2 ITV News Channel Channel 4 price-drop.tv <i>Bloomberg/UKTV Food/E4</i>		FourText Teletext Teletext TV Guide
A	SDN	64-QAM	S4C or QVC S4C-2 Tele-G Five Teletext Holidays <i>Shop 1/Boomerang/UKTV Gold</i> <i>TCM/Cartoon Network</i> <i>Shop 2/UKTV Style</i> <i>Discovery H&L/Discovery/Television X</i> <i>TBA general entertainment</i> bid-up.tv	BBC Radio 1 BBC Radio 2 BBC Radio 3 BBC Radio 4 FM Heat Mojo	

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B	BBC	16-QAM	CBeebies/BBC FOUR BBC Parliament BBCi enhanced TV videostreams Community Channel 24/7 loops	Radio 1Xtra BBC Radio Five Live Five Live Sports Extra 6Music BBC7 BBC Asian Network	
C	Crown Castle	16-QAM	Sky Travel UKTV History Sky News Sky Sports News		
D	Crown Castle	16-QAM	The Hits UKTV Bright Ideas/Thomas Cook TV/ftn TMF	The Hits Radio BBC World Service Smash Hits! Kiss 100 Magic Q oneword Jazz FM Kerrang!	f2p 4TV

Notes:

- i. Not all services are available UK-wide
- ii. Pay-TV services (operated by Top Up TV) shown in italics