Strategic Review of Telecommunications

Phase 2 consultation document

Annex O: Telecommunications regulation in other countries: case studies

Issued: 18 November 2004

Closing date for responses: 3 February 2005

Introduction

O.1 As part of phase 2 of this review Ofcom has considered a range of international approaches to the regulation of broadband and resultant experience of broadband development. In particular it has looked in some detail at the evolution of both markets and regulation in a number of countries identified as being of particular interest in the broadband context. We have chosen to focus specifically on broadband (rather than, say, mobile or fixed voice services) because as we note in the main consultation document, Ofcom considers current generation broadband to be a key strategic market and a bridge between traditional voice telephony and the next generation of broadband services.

O.2 The first of these countries, South Korea, has stood out for some time as the world leader in broadband penetration, and is already deploying next generation broadband services. It is therefore an obvious candidate for further study. The second country – Japan - while ranking some way behind South Korea in terms of broadband penetration is generally regarded as a benchmark in terms of developing the potential of local loop unbundling as a competitive force for broadband development. Japan is also of interest because of its leadership in take-up of VoIP, which seems to be a key part of the service 'bundle' being offered to consumers.

O.3 The Phase 1 consultation document noted that the regulatory environment in the US – whilst based on similar economic principles to that of the UK and the rest of Europe – has a number of significant practical differences. This annex looks more closely at these differences and the evolution of US regulatory practice in relation to broadband services. Ofcom notes stakeholders' comments during Phase 1 about the apparent correlation of higher levels of broadband penetration and the existence of strong inter-platform competition in the Netherlands. And the US experience of a strong cable alternative to DSL can be considered useful to study in this context.

O.4 During Phase 1 stakeholders also pointed to the early success of broadband in Germany and the bold attempt by France Telecom to stake out a leadership position in broadband through its Wanadoo brand. Ofcom has thus looked at the German and French experiences in more detail.

O.5 Ofcom is interested in understanding the extent to which market outcomes in each of the countries studied can be attributed directly to the regulatory environment. This annex sets out a brief overview of comparative market performance before looking more closely at each country in detail and summarising any useful lessons for the UK. Note that most of the data are based on information for late 2003 or early 2004. While more recent information is available in some cases Ofcom does not believe that this materially affects any of its conclusions.

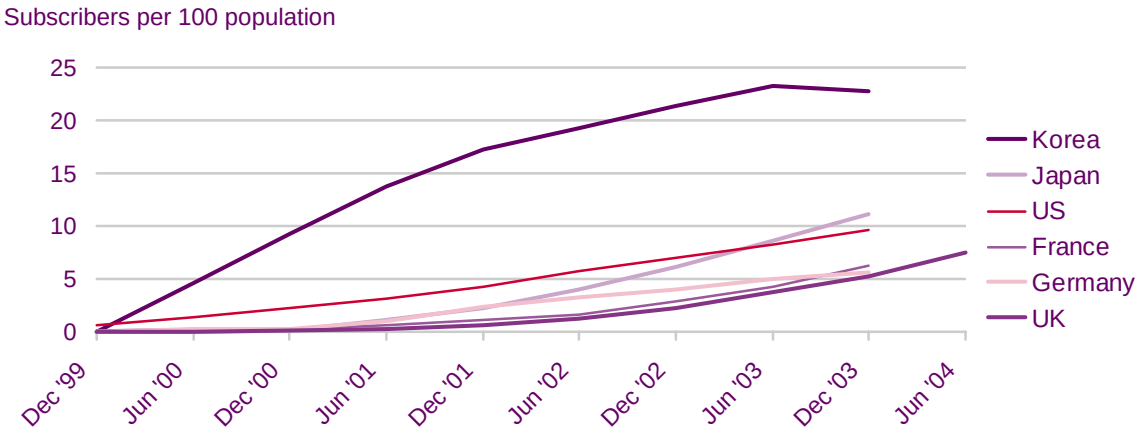
Overview of comparative market performance

Penetration

O.6 Figure 1 confirms Korea's status as the leader in terms of broadband penetration. At the end of 2003 there were over 11 million broadband

subscribers in Korea, equivalent to a penetration rate of around 23 subscribers per 100 population. Perhaps more impressively, around 4 in 5 homes in Korea have a broadband connection. This makes Korea unique in that almost all of its total internet users do so via a broadband connection. Signs are however that penetration levels have now peaked.

Figure 1: Broadband internet penetration



source: Ofcom Market Intelligence, OECD, NRAs

O.7 Of the countries under consideration, Japan and the US can be considered in being in the 'second tier' in terms of broadband penetration with take-up in the UK similar to that in France and Germany. More recent data for Europe show that the UK now ranks above Germany in terms of penetration but remains slightly below France where growth in the number of unbundled local loops and improved availability of lower speed entry level products has helped boost penetration.

Availability

O.8 Differences in penetration, particularly in the early stages of development, is the consequence, to some extent, of variations in the availability of broadband access technologies.

O.9 DSL coverage in Korea is almost totally in urban areas. Due to the high concentration of the Korean population in these areas national DSL coverage is thought to be around 95%. The Korean government has allocated money to ensure universal roll-out by 2005. Most of the country's cable networks are already capable of supporting cable modem services and the government has also allocated funds to upgrade the remaining analogue networks by 2007. Fibre-to-the-home (FTTH) services are also available but mass roll-out is not expected to begin until 2006. Korea Telecom (KT) claims that by 2010 its FTTH network will be able to deliver speeds of 50 Mbit/s to 100Mbit/s to around three quarters of Korean households.

O.10 ADSL services were launched in Japan in December 1999 via unbundled local loops by Tokyo Metallic (later merged with Softbank BB) but it was not until 2001 that take-up reached significant levels. NTT, the incumbent operator, is now able to serve over 95 per cent of the country with DSL and aims to establish broadband connections with virtually all households and

businesses in Japan by the end of 2006. DSL services are provided by several other operators although these are generally targeted in urban areas and do not add to overall coverage.

O.11 Most prefectures in Japan have at least two competing cable operators and some have many more; Tokyo, for example, has 26. The nature of cable provision, however, makes it unlikely that all households have access to cable internet services and the actual level of coverage is thought to be around two thirds of households. The Japanese government has offered tax incentives to roll out fibre in the local loop for the last decade. NTT is thought to have rolled out fibre to around 70 to 80 per cent of local exchanges and FTTH is likely to be available in all municipal cities in 2005.

O.12 The vast geography and population spread of the United States makes the provision of broadband services over fixed networks more problematic than in the other countries studied here. Cable TV networks pass almost all households in the US except in the most sparsely populated areas. Analysys estimates that cable modem services are available only to around 75 per cent. Distance and technical limitations also mean that DSL coverage is relatively low. Again, taking Analysys estimates would suggest that coverage is around 60 per cent. The Federal Communications Commission (FCC) stated that broadband services were available within 93 per cent of zip codes at the end of 2003 but this does not account for partial coverage and overall coverage is unlikely to be above 80 per cent. Interestingly, cable was the first to offer broadband, and still holds a 2:1 lead over DSL, but the telecoms companies are slowly gaining.

O.13 DSL services were available to just under 80 per cent of the population in France at the beginning of 2004 according to France Telecom. The operator plans to cover 90% of the population by the end of 2004, rising to 95% by the end of 2005. Cable modem services are also available to around a third of the country although this is unlikely to increase in the foreseeable future. FWA and satellite services are also available although the extent of roll-out remains small.

O.14 Broadband coverage in Germany can be chiefly attributed to the incumbent's - Deutsche Telekom (DT) - DSL services which provide coverage to over 90% of the population through 6000 upgraded exchanges. Despite the presence of extensive cable networks, cable modem availability in Germany is very limited, with only a few million households currently passed by networks capable of delivering the services. As in France and the UK there is also limited availability via Fixed Wireless Access (FWA) and satellite services.

Competition

O.15 Differences in the availability of alternative access technologies contribute to interesting results when comparing the current level of competition across the countries under investigation. Figure 2 reveals Germany as a clear outlier, the access market being dominated by DT's DSL product. Each of the other countries benefits to some extent from the availability of alternative infrastructure although in France this is predominately through unbundled local loops rather than alternative access networks.

Figure 2: International comparison of broadband platform competition

Share of broadband subscribers

Notes: Incumbent figures for Japan are for access only; NTT is not permitted to offer service provision

Source: Ofcom Market Intelligence, National Regulatory Authorities, ECTA

O.16 Cable modem services were introduced in Korea in July 1998 by Thrunet. KT was initially reluctant to enter the ADSL market through concerns about the cannibalisation of its ISDN business, into which it had invested significant amounts of capital. This paved the way for Hanaro Telecom to enter the market providing access to a range of multimedia services through its own infrastructure. Most of the smaller niche players in the Korean market are also based on alternative infrastructure, offering broadband connections via Ethernet LANs to multiple dwelling units, satellite services and broadband FWA connections.

O.17 In Japan at the end of 2003 around three quarters of broadband subscriptions were via DSL with cable and FTTH making up 18 and 7 per cent respectively. The combined NTT regional subsidiaries (NTT East and NTT West) provide just over a third of DSL access although they are not permitted to offer service provision. The Yahoo BB service which combines both internet access and service provision also accounts for around a third of all DSL connections. This is interesting from a UK perspective. In terms of service provision BT's overall share is around a quarter and now ranks higher than ntl as the single largest provider. Nevertheless its share of total broadband service provision remains below Yahoo BB's share in Japan.

O.18 In the US cable operators remain the biggest players in the broadband market. The three largest of these are Comcast Corporation (which acquired rival cable operator AT&T Broadband in 2002), followed by Cox Communications and Time Warner Cable. Although cable companies remain the largest in terms of subscribers, ADSL is showing slightly faster growth rates. In addition, the provision of wholesale cable and DSL services, despite the diminished availability of unbundled local loops and line sharing, have enabled a number of infrastructure-independent ISPs such as Yahoo, MSN, and AOL to start acquiring market share.

O.19 Until recently infrastructure competition in France has been mostly limited to France Télécom's ADSL service and cable modem services provided by other operators with the latter limited by low coverage. While retail competition has been available for some time from ISPs reselling FT's wholesale ADSL product, FT (Wanadoo) has maintained a market share of

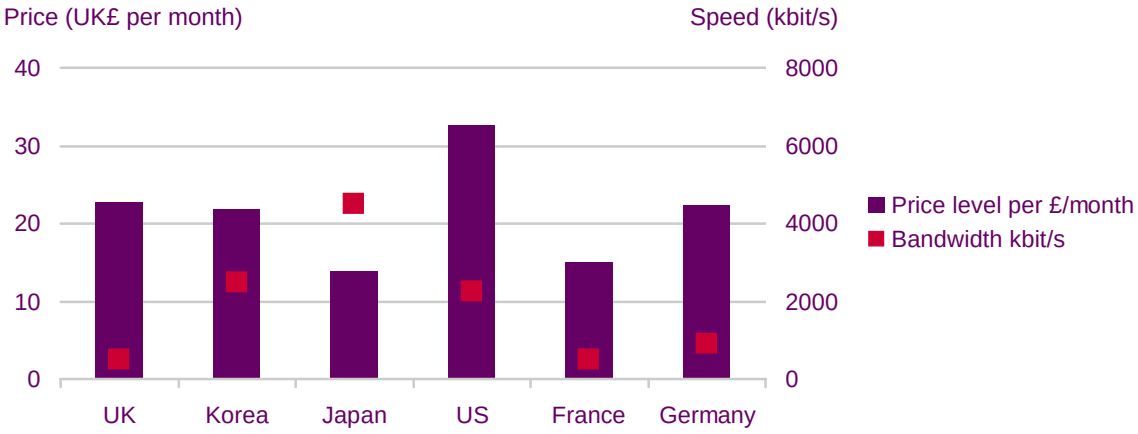
retail ADSL connections of around half. However Iliad, operating under its "Free" brand has recently taken advantage of new LLU pricing arrangements to actively market its triple-play product in the larger metropolitan areas and has successfully grown market share to provide a stronger competitive threat to Wanadoo.

O.20 In Germany, broadband is predominantly supplied via DSL with DT's own product accounting for the vast majority. DT also accounts for the vast majority of retail service provision. The remaining 10 per cent or so of the market share of the market is subdivided between those which use an unbundled local loop connection and those using cable, satellite or an alternative infrastructure such as power line technology to access broadband.

Price and service offerings

O.21 Figures 3a and 3b attempt to provide a summary of the relative price levels and access speeds available in each of the countries being studied. Data are based on prices available at April 2004 and consider prices and speeds available for "entry level" products. Japan emerges as the cheapest country for both residential and business users. The basic speeds available in Europe are significantly below those in Japan and Korea, and to a lesser extent, the US.

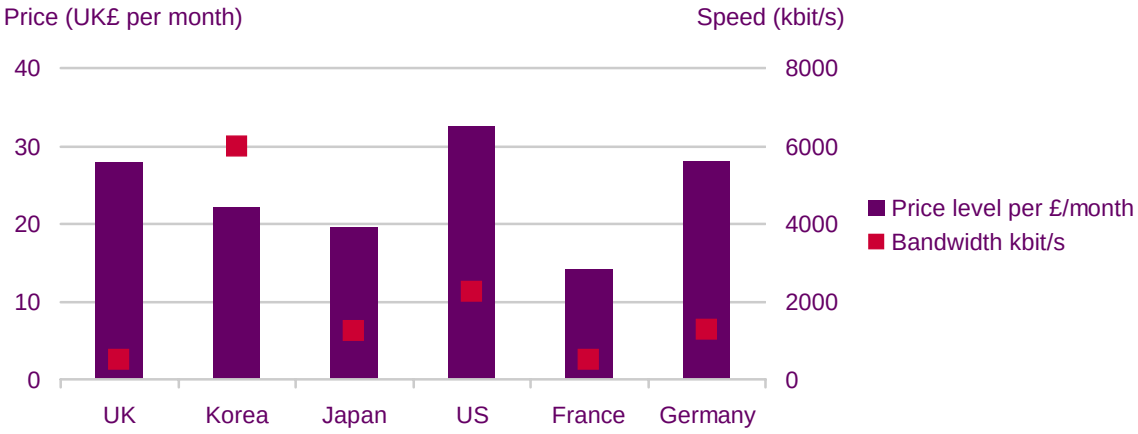
Figure 3a: International comparisons of residential broadband prices



Notes: All prices adjusted using purchasing power parities

Source: Ofcom

Figure 3b: International comparisons of business broadband prices



Notes: All prices adjusted using purchasing power parities

Source: Ofcom

O.22 This analysis confirms Japan's acknowledged position as a broadband price benchmark. This position can in part be attributed to aggressive regulatory policy in respect of LLU. In addition, speeds available to users are higher. While the actual speeds delivered to consumers are unlikely to be as large in all cases it is likely that they are still considerably in excess of those available in the UK and elsewhere in Europe. Speeds are also higher via FTTH.

O.23 Prices for broadband internet access in Korea are not much different to those available in the UK although access speeds in Korea are much higher. There have been recent reports that Korean users are becoming frustrated by the speeds actually delivered which were being reduced due to bottlenecks created by overcrowded networks. These problems together with concerns about stagnant revenue growth following market saturation are likely to be the main reasons behind KT's announcement in June 2004 that it was considering fees based on volume usage rather than the flat-fee model which is currently preferred. But such a move would require regulatory approval.

O.24 In the US, cable operators are now downplaying their triple-play and focusing on drawing attention to their superior connection speeds of up to 6Mbit/s compared to the 1.5Mbit/s of the DSL providers. DSL providers on the other hand are marketing their services as the cheaper ones. Bundling of telephony and internet services remains commonplace with the incumbent local exchange carriers (ILECs) some of whom (e.g. Verizon) offer wireless packages too, in their own version of triple-play. However February 2004 saw Qwest set off in a new direction by offering DSL as a standalone service, and offering discounts if customers signed up to either Qwest's wireless or satellite TV services.

O.25 Deutsche Telekom (DT) has reduced the range of connection speeds it sells and in doing so phased out lower bit rate offerings. It now provides only a 1, 2 or 3 Mbps connection. In contrast the number of ISPs offering 128kbps in France has increased recently, helping to stimulate demand.

O.26 The following sections of this annex look in more detail at the market and regulatory development in each country.

Korea

Market development

O.27 A high proportion – around 80 per cent - of the Korean population lives in urban areas. Although this proportion is not as great as the island economies of Hong Kong or Singapore this density is undoubtedly a key contributing factor to high broadband penetration. Apartment buildings account for almost half of Korea's housing stock and for around 40 per cent of its population. Furthermore the average distance of a customer from a telephone exchange is 2.2km with 95% of the population within 4km. These factors will have assisted Hanaro Telecom in realising scale economies not available to new entrants in less densely populated countries.

O.28 Operators have further benefited from Korea's strong base in ICT manufacturing with local suppliers keen to reap rewards from the expanding broadband market. This has helped maintain supply and keep equipment prices low. The speed of market growth also assisted in creating economies of scale for manufacturers. For example Korea Telecom Corporation's ADSL equipment cost per line dropped by almost 80 per cent between 1999 and 2001.

O.29 The level of genuine infrastructure competition at the local loop is a key difference between Korea and other major economies. The success of Hanaro Telecom is noteworthy; based as it is on fully alternative infrastructure rather than a KT wholesale product. Hanaro's early business plan was based on a decision not to compete directly with KT's dominance of the fixed voice market but to grow its subscriber base by emphasising the benefits of multimedia services.

O.30 In terms of stimulating consumer demand for broadband services, education has played a large part in Korea. Korea boasts a high level of educational attainment which has helped the population understand and use ICT. But more specifically a significant proportion of education is delivered over the internet which has helped create demand for always-on high bandwidth services. All schools are also provided with free internet access. This drive is likely to have contributed to the phenomenal growth in Korean-originated internet content. The ITU reported in 2003 that the number of .KR registered domains ranked the nation fifth in the world. The top 10 web sites accessed in Korea are all Korean. Demand for Korean-based content has also reduced the need for expensive international circuits.

O.31 On-line gaming is also an important explanatory variable to examine in relation to Korean broadband growth. By way of context it is important to note that Korean trade policy limited Japanese imports for some time. As a consequence PCs have always superseded consoles as the main gaming platform in Korea. Many Koreans got their first exposure to internet access via "PC baangs" or internet cafés. This is likely to have created a demand for a wider range of on-line games beyond the traditional fantasy adventure model most prevalent in the UK and US. Baangs, for example, feature webcams on all the terminals which offer services like video chat that

enhance the user experience. Because many Korean users came to the internet through these baangs they are more comfortable with paying for on-line content. Users are able to charge their on-line time or games subscriptions to either their mobile or fixed line phone bill.

O.32 Analysys estimates that overall premium subscribers currently make up 23 per cent of KT's subscriber base. As part of a strategy to improve the profitability of its broadband services, KT announced in December 2003 that it will be offering free one month trials of its premium VDSL broadband service to non-premium rate subscribers.

O.33 VoIP does not appear to be as important a driver of broadband growth for Korea as for Japan. While around 90 providers have registered with the Ministry of Information and Communications (MIC) to provide VoIP services to consumers and businesses, market demand initially fell short of expectations. Growth was reported to have been stymied by a number of technical and operational issues but VoIP does now appear to be taking off.

Regulation

O.34 Until the early 1990s the South Korean government took a hands-on approach when dealing with the country's telecom industry. But since then there has been a shift in emphasis toward market liberalisation The path to full liberalisation has been slow. KT was created in 1989 – although the government retained full ownership until 1993 – and was not fully divested until May 2002.

O.35 Alongside the licensing of new service operators, the limits to foreign ownership are now being dismantled. Nevertheless KT retains a virtual monopoly on local voice telephony and its shares of long distance and international traffic are above most other incumbent operators in the OECD.

O.36 That competition exists at all in the broadband market is almost entirely the result of the investment made by Hanaro Telecom in constructing its own local infrastructure and providing a significantly differentiated product from KT. Hanaro was dissuaded from entering the voice telephony market through a lack of number portability and rules which meant users would face higher connection and subscription charges if they switched to Hanaro and then returned to KT.

O.37 The Korean regulator MIC introduced LLU and line sharing at the end of 2001 with relatively low prices. In March 2003, Korea Telecom was fined for failing to respond adequately to unbundling requests from Hanaro. The price set by the MIC for unbundling is KRW12 200 (GBP6.45) per month, with a 25% discount for the first year, and 18%, 10%, and 5% for the successive three years. In cases where only the ADSL line is leased, the rental rate is KRW6100 (GBP3.23) per month.

O.38 MIC also announced in October 2003 that it was imposing new broadband pricing rules on KT. This announcement followed an investigation into KT's aggressive pricing strategy on its VSDL services including an alleged free 6 month subscription. The new regulations require KT to seek government approval whenever it sets broadband prices.

O.39 Recent concerns about actual broadband delivery speeds has led a number of industry commentators to demand further intervention from MIC. Network operators have countered that part of the problem lies with the failure of corporate customers to upgrade the level of bandwidth to their sites to cope with increased demand. At the time of writing,MIC has not yet intervened.

Government policy

O.40 The Korean government has facilitated broadband development through an early commitment to high speed infrastructure with a range of specific programs. It has a positive and supportive relationship with the private sector, low interest loans and a certification programme for apartment complexes with high speed access.

O.41 The Korea Information Infrastructure plan was launched in 1998 and provided the equivalent of £17 billion to be spent over 12 years to provide national broadband access throughout the country. Under this plan the government subsidised the deployment of national broadband infrastructure while access and metro facilities were funded by the carriers themselves. Carriers also received subsidies to conduct broadband trials in each region. To ensure that this initiative delivered Cyber Korea 21 (CK21) was launched in April 1999 to focus on national infrastructure development. CK21 aimed to ensure universal access to 1.5Mbit/s at “reasonable prices” plus internet access for all schools.

O.42 In July 2001 the MIC announced “a basic plan for upgrading ultra-high speed information networks” to establish the world’s most advanced network by 2005. MIC aims to connect 84 per cent of households with 20Mbit/s internet services – a target that Korea Telecom has said that it will meet. This project is funded to the tune of £10.5 billion through both private and public investment.

O.43 The e-Korea initiative launched in April 2002 aims to increase the percentage of Koreans on-line to over 90 per cent by 2006, improving e-government and increasing the penetration of more sophisticated ICT services and technologies in schools.

O.44 More recently, in November 2003 the MIC announced plans to construct a national broadband convergence network that will offer both wireless and wired users connection speeds of up to 50/100 Mbit/s. The aim is to complete the network by 2010 although some areas may have access by the end of 2005. The project has a budget of £33 billion almost all of which is from the private sector. The Korean government has also pushed the advancement of e-government initially through improving internal processes with more efficient ICT systems. More recently the focus has shifted to providing on-line interfaces for Koreans wanting to use government services. By the end of 2002, approximately 400 services had been enabled for electronic processing.

Lessons for the UK

O.45 There is no doubt that the pro-active approach of the Korean government in promoting investment in broadband infrastructure has been a key reason for the staggering success of Korea in terms of broadband penetration levels.

What is less clear is whether such levels of intervention would be practical in the UK. The demographics of Korea make the roll-out of DSL and cable modem services much cheaper. As noted, there may also be a much higher willingness to pay for on-line gaming services which increases the profitability of broadband services. Consequently the level of subsidy required could be much less than would be required in the UK.

O.46 The high population density in Korea is also likely to be the main reason for the much higher speeds available to Korean consumers. In particular, the short distance of the majority of the population from the nearest telephone exchange means that high speeds can be delivered via DSL rather than requiring significant investment in fibre. Nonetheless there are signs that users are becoming less happy about the quality of service delivered, which may require intervention in future.

O.47 As noted previously perhaps the key difference in the Korean broadband market is the presence of genuine infrastructure competition at the local loop. Of course the demographics of Korea made this a more viable business proposition for Hanaro Telecom than it would be for potential entrants elsewhere. Nevertheless there is no doubt that enhanced competitive pressure from Hanaro and cable operators had a positive effect on KT in terms of both investment and innovation.

O.48 There are also signs that market conditions could change. While KT was initially reluctant to enter the ADSL market through concerns about the cannibalisation of its ISDN business into which it had invested significant amounts of capital, it did acquire market share relatively quickly. Thrunet went into receivership in March 2003 and while a court ruling earlier this year allowed the company to stave off creditors and avoid liquidation, KT is reported to be considering acquiring the company. Hanaro is also under severe financial pressure. The financial status of KT's main competitors is a direct consequence of fierce competition reducing prices, which has eroded profits. More relevant is the extent to which KT's behaviour, in particular in relation to its VDSL pricing strategy, was a direct contributing factor. There are important lessons for the UK here in terms of ensuring short term price competition does not lead to market exit.

O.49 Korean broadband penetration has benefited from the strong consumer demand for enhanced on-line gaming. To some extent this would seem to be a direct consequence of PC pre-eminence as the main gaming platform together with a strong software industry. But it also reflects some cultural differences. It is unlikely that the exact same set of demand factors would exist in the UK. However, Ofcom intends to investigate further whether similar demand drivers could emerge in the UK, and whether any barriers to take-up exist.

Japan

O.50 Note that during 2004 the Japanese Ministry of Public Management, Home Affairs, Posts and Telecommunications (MIC) changed its English name to the Ministry of Internal Affairs and Communications (MIC). For ease of reference this abbreviation is used throughout this annex.

VoIP

O.51 Despite the high speeds available to Japanese consumers it does not appear that there is any particular form of content or entertainment service which is driving use. Indeed there is strong evidence to suggest that the main application catalyst for broadband growth is VoIP rather than content per se. Currently there are an estimated 200 ISPs reselling VoIP services and the Ministry of Public Management, Home Affairs, Posts and Telecommunications (MIC) has allocated about 16 million VoIP-specific telephone numbers to 27 ISPs. At the end of 2003 there were an estimated 3.93 residential VoIP users mostly via Yahoo.

O.52 To some extent the growth of VoIP in Japan can be attributed to PSTN tariffs which have been historically relatively high. However it is also important to acknowledge the steps which Yahoo and other players have taken to remove the problems associated with IP telephony. For example, users do not have to leave their PCs on 24 hours a day. Instead they only need ensure that the VoIP adapter remains connected to the PSTN through their modem. They can also make calls to mobile phones – something which was not possible previously.

O.53 As a way to tackle Yahoo's first mover advantage five large ISPs formed an alliance to standardise technical specifications of their respective IP telephony service so that all their subscribers can phone each other free of charge. The joint service was launched in March 2003.

Other broadband drivers

O.54 While there is no strong evidence of any "killer" broadband content application in Japan there are, nevertheless, a number of peer-to-peer applications which appear to be important stimuli contributing to a relatively high level of broadband penetration. Digital photography is one such stimulus. In addition to the ability to send pictures via e-mail and to upload photos onto personal websites there is also higher take-up and use of mobile camera phones in Japan which is further likely to stimulate use.

O.55 Video streaming over the internet has been available for some time although broadband has generated a momentum towards real-time viewing. Most of the major ISPs have launched a broadband portal where they distribute video- and sound-enhanced contents. But there remain issues surrounding the efficient managing of copyrights used in any of these programmes. Similarly, while the games industry has recognised the importance of broadband - Sony launched a broadband service for its Playstation 2 in 2002 - demand is not yet thought sufficient to make the service commercially sustainable.

O.56 MIC has recognised that stable data transmission is required for broadband content distribution. As DSL and cable transmission speeds continue to vary considerably, FTTH has been identified as the infrastructure with the greatest potential to offer a suitably high level of quality service in the future. Recent figures show a very consistent level of take-up with competitive pricing likely to be a factor. But it remains too soon to identify any particular broadband content peculiar to Japan with VoIP perhaps the exception.

Regulation

O.57 Competition was established in Japan in 1985 when three reform laws came into effect: the Telecommunications Business Law, the NTT Law and Background Law for the Telecommunications Law. NTT privatisation began in 1986 following government acceptance that the company should not be broken up. Complete privatisation did not take place and the government still holds a substantial share in NTT.

O.58 These reforms placed regulatory authority in the hands of the Ministry of Post and Telecommunications (MPT) now subsumed the MIC. The retention of government ownership of NTT and the greater political independence of Ofcom are two clear differences between the Japanese and UK regulatory regimes.

O.59 In the early stages after privatisation MIC adopted what can be considered a more interventionist approach to regulation of NTT when compared to the UK, with direct setting of prices and returns for key products. While the Japanese approach resulted in some market entry, prices remained high and perhaps surprisingly little innovation or new services emerged.

O.60 A further point to note about the early regulatory regime in Japan was that neither rate rebalancing nor access charges were introduced, primarily as a result of difference between NTT and MIC about the question of local access deficits. MIC favoured structural separation to increase cost transparency and NTT eventually complied, to some extent, by changing its managerial structure into long distance and local divisions.

O.61 This delay caused some distortion in the economics of the Japanese telecoms industry in terms of reducing the level of cross-subsidy of access and calls. It has been argued that this delay has also had a social cost to Japan from an income distribution perspective. Nor was an agreement on access-charge payment reached until 1994. This required new common carriers (NCCs) to pay a fee additional to the local rate already paid to NTT which reduced the NCCs' profitability and consequently their level of investment – negatively affecting the level of infrastructure competition in Japan.

O.62 While competition in the local market was possible from 1985, entry was limited to utility companies. Competition was further hampered through a lack of symmetric interconnection. MIC did introduce an interconnection charge in 1995 although this was based on historical costs rather than long-run incremental costs. As a result interconnection charges in Japan were much higher than in the UK or United States. In 2000 and 2001 NTT reduced the interconnection rate drastically. It is not clear the extent this reflected the need to retain market share which was being eroded through mobile substitution and, at that largely potentially, through VoIP.

Local loop unbundling

O.63 The lack of progress of competition in voice telephony led MIC to consider the full break-up of NTT although, not surprisingly, this was resisted. A compromise was reached that allowed NTT's divisions to become separate

subsidiaries of a new NTT Holding Company. The two regional subsidiaries continue to dominate the local voice call and access market.

O.64 Despite the restructuring NTT remained unenthusiastic about introducing DSL to its customers and opened only a small number of exchanges for collocation with heavy limitations on equipment space and the number of lines available for unbundling. However, MIC was swift to intervene and in July 2000 ordered NTT to open up all exchanges for collocation and to lift limitations on rack space. The effects were quickly felt as SMEs took advantage of cheaper prices for services with speed generally around 700kbit/s.

O.65 In 2001, the government announced its e-Japan Priority Policy Programme which set at its heart the objective of making the most advanced information economy by 2005. A key part of this plan was a stated intention to amend the basic rules for interconnection to further ease access to NTT's local access network. Currently third party DSL services using NTT's network take one of three forms:

- **FLETs ADSL** – NTT provides the DSL device; the ISP interconnects on the backbone network side of NTT's central office – the service may include traffic routing to the central office from a remote point of interconnection (POI);
- **Type 1 ADSL** service – NTT provides the DSL equipment; the ISP interconnects at the NTT central office; and
- **Type 2 ADSL** service – the ISP provides the DSL equipment, interconnecting at the MDF in the central office.

O.66 Prices for LLU in Japan are now the lowest in the world. Ofcom understands from discussions with MIC that it believes that NTT had already amortised the cost of the "last mile" of copper assets which is being paid for by the consumer in basic line rental and call charges. LLU costs in Japan are therefore only the new net costs of the bypass of the PSTN switch - the equivalent of US$1.50 and US$13.00 for a shared line and a fully unbundled loop respectively.

O.67 LLU has proved very successful so far in Japan and is a common way for new entrants to connect their subscribers, with the majority of competitive local exchange carrier (CLEC) DSL lines provided via LLU.

VoIP regulation

O.68 While VoIP is regarded as a telecommunications service in Japan it has been subject to relatively little regulation. MIC believe that this helps ensure interoperability and enhances reliability. There is no regulation for example of charges and tariffs. VoIP providers which are facility-based must provide interconnection to their networks and where calls are terminated on PSTN networks, the providers are subject to the relevant interconnection charges. There are also technical conditions which are applied to the allocation of each of two types of VoIP numbers:

- **050** numbers enable terminals to receive calls from existing telephones and location-free services. They require a minimum level of voice quality although this is likely to be lower than PSTN in most cases and have no

obligation to provide emergency calls although this is currently under discussion; and

- **0AB-J** numbers require providers to demonstrate that the service is available via direct access, provides voice quality equivalent to an existing telephone plus location correspondence and the availability of emergency calls. These numbers enable number portability from existing telephones.

O.69 There are a number of outstanding policy issues surrounding VoIP in Japan, most of which mirror those in the UK. First the diffusion of services to areas not currently served by broadband networks remains a problem. Second interconnection among IP networks is currently dependent on commercial negotiation. Third is the need to balance increasing unit costs of the existing PSTN due to loss of voice traffic with the need to maintain the network. Further issues include the lack of number resource, security and the scope of universal service.

Government policy

O.70 As noted previously the Japanese government introduced the e-Japan Strategy in 2001. In addition to specific rules regarding interconnection and LLU, the strategy sets out five key policy areas that Japan should focus on. They are:

- infrastructure;
- human resource;
- e-commerce;
- e-government; and
- network security.

O.71 With regards to infrastructure one target is to complete a nationwide fibre-optic subscriber local loop by 2005. Reports suggest that this target is lagging behind due to NTT's reluctance to build local loops where it is not acting as an ISP. Legislation is being introduced which will extend this favourable treatment to DSL, cable and FWA.

O.72 The Japanese government has been operating a system of tax incentives and subsidies to encourage the private sector to provide fibre networks since 1995 although the direct effect of these policies remains unclear. Companies deploying fibre-optic infrastructure can currently apply for several incentives.

- **Special financing system for the development of subscriber optical fibre network**: A subsidy for loan interest from the Telecommunications Advancement Organisation of Japan can be used to supplement interest payments on NTT-C loans (long-term 15-year loans) for Type 1 carriers and cable TV operators. The subsidy covers up to 2% of the loan interest, while the minimum interest rate after subsidy is set at 2% for the first five years and 2.5% after that;

- **Corporate tax incentives**: Telecoms carriers intending to deploy subscriber optical fibre-networks can apply;
- **Property tax incentives**: Telecoms carriers intending to deploy subscriber optical fibre-networks can apply for a reduction in fixed property tax; and
- **Public private partnership**: In August 2001, the MIC announced plans to spend JPY40–JPY50 billion (GBP230m GBP290m) over four years from FY2002 to build optical fibre networks in under populated areas as part of its public works projects. The spending programme picked 150 to 200 villages and towns willing to upgrade their local communications systems and subsidised half of the expenditure.

Lessons for the UK

O.73 While Japan remains ahead of the UK in terms of broadband penetration growth rates for both ADSL and cable modem adoption have recently shown a slow down. In addition, overall internet penetration (dial-up and broadband combined) in Japan is not significantly higher than in the UK. But broadband take-up in Japan is likely to have been assisted by the relatively high price of narrowband dial-up access, partly the result of regulatory policy. This is in contrast to the UK where the availability of un-metered narrowband services, helped by the introduction of FRIACO, is likely to have slowed the migration to broadband.

O.74 In terms of competition there are similarities with the UK situation in that cable TV services were the first to gain a foothold in the broadband market. In Japan however, NTT was restricted in terms of its retail provision. NTT had little retail experience to inform what wholesale products would be required of it.

O.75 The main difference between the Japanese and UK broadband market is the speeds available to consumers. Almost certainly the greater competition at the local loop level has encouraged service providers to deliver differentiated products as well as lower prices. The availability of FTTH in Japan further enhances the speeds available to end-users.

O.76 The early roll-out of fibre is interesting given the price and quality of DSL service in Japan. Japan is very densely populated making roll-out much more realistic than in many other countries – although this cannot be the sole factor. Tax and fiscal incentives may have played a small part but regulatory policy appears to be a more significant factor.

O.77 NTT holds a relatively small share of current generation broadband access, largely as a consequence of MIC policy on local loop unbundling and rules on service provision. One interpretation is that the company sees fibre roll-out as a way of regaining share lost to LLU and other broadband providers. Investment could well be a calculated business risk to ensure first mover advantage in the next level of broadband development. This would support the view that the balance between MICs relatively light touch PSTN regulation and interventionist approach to first generation broadband services is bearing fruit in terms of delivering next generation networks.

O.78 Ofcom's analysis does not provide conclusive evidence that there are any major demand side factors which are driving broadband take-up in Japan although low price and consumer appetite for new technology will have contributed to take-up. But while consumers are attracted to the higher speeds on offer this appears to reflect relatively small price differentials between these and entry level services. Services requiring high speeds do exist but these are far from mass market. Peer-to-peer usage appears to be an important driver rather than 'pushed' content or entertainment services.

O.79 Clearly VoIP services are a key driver, however. Growth in this area can be, in part, attributed to the relatively high price of PSTN services in Japan. Continued downward pressure on UK voice prices together with lower broadband penetration means that the UK is some way from comparable levels of take-up. Take-up in Japan was undoubtedly helped by the aggressive marketing of Yahoo, a powerful new entrant.

O.80 In relation to specific VoIP regulation, the quality of the service being offered has enabled MIC largely to forbear in the development of this market, other than in areas which impact on existing PSTN regulation such as numbering and in the provision of emergency services.

USA

Market development

O.81 Broadband access in the USA has enjoyed fairly rapid growth, and by March 2004 over a quarter of all Internet subscribers were using broadband connections. However, growth rates do appear to have slowed and broadband service providers are concentrating as much on revenue generation as they are on market share acquisition or new infrastructure deployment.

O.82 Considerable competition in access is possible in the US between the incumbent local carriers and the cable companies. Initially this competition was for broadband data services, but increasingly this has also meant competition for voice services as cable companies have started to deploy VoIP capabilities. Because cable networks are more widespread in the US than in the UK the extent of this inter-platform access competition for broadband has been greater than in the UK. There is further scope for access competition from fixed wireless and maybe one day from power-line technologies.

O.83 The US regulatory model has created the conditions for strong competition between access providers for the broadband market. Nonetheless, the US policy debate has been increasingly influenced, as in the UK, by the striking rate of deployment of broadband and in particular next generation broadband access networks in the Far East and Pacific Rim. An industry lobby group called the FTTH (Fibre to the Home) Council, consisting of many of the major telecoms operators and equipment manufacturers, has influenced the policy debate to promote greater orientation towards the goal of deep fibre-based next generation access network deployment. As in the UK, the arguments advanced for a public policy regime conducive to next generation broadband deployment go beyond the narrow market implications to issues of international competitiveness.

O.84 The success of these arguments is evidenced by President Bush making widespread availability of broadband by 2007 an important component of his re-election manifesto. President Bush's FCC chairman focused, in particular, this term on making greater amounts of spectrum currently reserved to the military available for civilian broadband applications with a view to paving the way to 3G licence auctions. He also offered targeted tax breaks for broadband apparatus. But there has been slow progress on these issues.

Regulation

Local loop unbundling and forbearance

O.85 Since the introduction of the 1996 Telecommunications Act, the underlying orientation of policy in the US has been towards infrastructure-based competition. That Act reversed the previous approach of maintaining the Regional Bell Operating Companies (RBOCs) as local access monopolies. The Commission, especially under Powell, has repeatedly made clear that it favours facilities-based competition over resale or services-based competition wherever possible, on the basis that this should deliver greater benefits in terms of competition, choice and innovation. However, the debate has been intense as to the nature and extent of infrastructure-based competition that is possible and desirable.

O.86 Despite this, much regulatory focus since 1996 has been devoted to unbundling elements of the RBOCs' networks to create conditions for intra-platform competition. The current Commission under Chairman Michael Powell is considered to favour greater promotion of competing access competition over regulated access to the incumbent local loop. However, the complex and legalistic US regulatory structure makes a 'bright line' distinction of this kind between historic and current policy difficult. In practice, much legacy regulation of access bottlenecks remains in place, and attempts to re-orient policy towards a more explicit pro-forbearance strategy have been subject to a number of challenges, not least from within the FCC itself.

O.87 Forbearance – the deliberate decision not to apply regulatory measures to a given problem - has an explicit place in the US regime, which is worth explaining. The Telecommunications Act 1996 enshrined forbearance by stating the FCC should choose not to apply regulations from a telecommunications carrier/service if:

- Enforcement of such regulation is not necessary to ensure that the firm's charges/practices are just, reasonable and not unjustly discriminatory;
- The regulation is not necessary for the protection of consumers; and
- Forbearance from applying the regulation is consistent with the public interest.

O.88 In deciding to forbear, the FCC must consider whether forbearance from regulating will promote competitive market conditions, and hence be in the public interest. Firm's can petition the FCC for the right to forbearance in markets.

O.89 Ofcom's view is that these provisos have made it difficult to forbear from where a firm is in a dominant position. A discussion of whether or not there are features of natural monopoly/enduring bottlenecks in the UK market and how this may affect future regulatory policy is thus relevant to the US debate as well.

The Triennial Review

O.90 In 2001, the FCC announced its intention to conduct a Review of the unbundling rules applied to incumbent telecoms operators. The FCC's intention was to create a clear and coherent regulatory framework with particular regard to broadband services and the related rules on unbundling. In 2003 the FCC announced, following this Triennial Review of unbundling rules, that it would forbear from regulating next generation fibre deployments for a period of five years on the understanding that there will continue to be scope for inter-platform competition in a future, fibred environment.

O.91 While the majority of the Commissioners were in agreement on this broad approach, consensus broke down on two specific areas. The first was whether the FCC should also withdraw existing line sharing requirements on incumbents. The majority proposal was that these requirements, which allow new entrants with their own infrastructure to use a part of the capacity of incumbents' copper loop for services, should be progressively withdrawn. Chairman Powell argued, however, that this measure actually encouraged infrastructure-based competition. Its withdrawal, therefore, would blunt competition and lead to higher prices.

O.92 Chairman Powell and Commissioner Abernathy also disagreed with the majority decision (in which the third Republican joined the two Democrats) not to rule on whether 'access to the switch' should be included as part of the list of unbundled network elements required to be made available to third parties. The argument was that inclusion of this element allows pure, resale-based competition by non-infrastructure providers, which the minority argued was not conducive to maximising overall consumer welfare. They argued that this non-decision would leave the issue to state legislatures, opening up the scope for drawn-out regulatory arguments.

O.93 The Commission majority view was that conditions of competition could vary between different states and different geographies. In some states or geographies, unbundled access to incumbent switches may be the only way to deliver competition. Consequently, it was inappropriate to issue a single rule to cover all circumstances.

Forbearance in relation to cable assets

O.94 Despite cable's position of leadership in broadband, it has not been subjected to the kind of unbundling regulations which have historically been applied to the RBOCs. The FCC concluded in March 2002 that a cable modem service is an interstate information service, and thus subject to FCC jurisdiction. The FCC also determined that a cable modem service was a largely unregulated "information service" as defined by the Communications Act. As a consequence cable companies were not subject to the same non-

discrimination, access and interconnection regulation requirements placed on the RBOCs.

O.95 However, In October 2003, the U.S. Ninth Circuit Court overturned the FCC ruling and designated cable modem services to be a combination of information and telecommunications service. The intention was that cable should be subject to open access regulation. This triggered further legal procedures and the issue is now potentially going to be considered by the Supreme Court.

O.96 Leaving aside the legal and jurisdictional aspects of this case, the economic issues underpinning this debate are whether the RBOCs and cable companies are dominant (either individually or jointly) or whether the market is effectively competitive albeit via a duopoly of access platforms. With reference to the Triennial Review the FCC was initially moving to an overall position that current duopoly provision coupled with the threat of entry from other technology platforms is sufficient to sustain effective access. But a clear direction is unlikely to emerge until after the US Presidential election.

Lessons for the UK

O.97 The issues being considered by the FCC are very similar to those which form a part of this review, in particular the nature and extent of natural monopoly in telecoms networks and the appropriate boundaries for access regulation. The FCC must also determine the full scope for competing infrastructures, how to remove regulatory barriers to investment and how to provide incentives for next generation broadband access network deployment – all of which are relevant issues for Ofcom too. Perhaps the most vexing question for both the UK and US is how best to balance forbearance from regulation in new technologies with the need to maintain appropriate regulation of existing platforms.

O.98 In the US there is strong consensus in favour of promoting competing infrastructure competition. Many urban areas benefit from strong inter-platform competition with scope for additional networks to be deployed. Much of the rest of the US has less competition, and in some rural areas the only pipe to the home is the powerline. Hence the interest in broadband by these means. Nonetheless there is no clear view as to the required level of access regulation – as evidenced by the Commissioner's disagreement on the list of unbundled network elements subject to State regulation. This question really turned on what view was taken on the scope for competition over self-provided facilities in non-metropolitan areas.

O.99 Commissioner Martin's view is of some relevance in a UK context. He stated that "uniform national rules may be inappropriate" and that "one needs to take into account specific market conditions and look at specific geographic areas." This acknowledges the impracticality of rolling out alternative infrastructure in areas in which it is less economically viable. Nonetheless, it should be noted that the majority Commission position is not that access regulation should be indefinitely maintained but that there should be a gradual diminution over time, subject to a detailed economic analysis of the importance of such regulation in specific geographic areas.

O.100 One other point that is worth noting is the difficulty in implementing a strategy of forbearance, even in an environment where it is an explicit part of the regulatory armoury and one of the FCC's few levers that can be exercised under the 1996 Act. Since the Triennial Review, much effort has been expended on prescribing the detailed rules giving effect to the Review's conclusions. These detailed rules have to distinguish between new investments and those subject to pre-existing regulatory rules. Nevertheless the FCC approach does appear to have borne some fruit with recent announcements of major new investments in broaderband, for example that of SBC Communications Inc. in June 2004.

O.101 As noted earlier the strong position of cable in the US is in many ways similar to the situation in the Netherlands where it is also the main broadband delivery platform. The experience of the Netherlands is a important reminder of the power of competition in access infrastructure in stimulating rapid roll-out, innovation and price competition. However, the availability of cable in the Netherlands is much higher than in the UK. Therefore the less interventionist policy approach adopted by the Dutch regulator (OPTA) to date cannot be expected to have the same results in the UK.

France and Germany

Market development

O.102 In some ways the French broadband market offers the most significant comparison to the UK, given key similarities in population size, geography and income. Indeed broadband competition is similar to the UK in that direct infrastructure competition to incumbent DSL is restricted to cable access in urban areas. The slightly less clustered nature of the French population means that this form of competition is less developed than in the UK. Population distribution has also has contributed to lower levels of coverage in France. Local loop unbundling was unsuccessful in France for a long period, but there has been very significant progress here more recently, driven in particular by the success of Iliad's launch of a triple-play product. However, Wanadoo (the ISP owned by France Télécom) continues to retain a relatively high share of overall service provision.

O.103 The French telecoms regulator, ART, has also pointed to comparatively low levels of PC penetration in France as a reason for a lower level of broadband take-up. It has also been speculated that the widespread use of the Minitel information service could have had a negative effect upon overall internet take up. In spite of these factors, French broadband take-up remains ahead of the UK's.

O.104 France Télécom (FT) has been proactive in promoting the benefits of broadband. It is unclear the extent to which this is the consequence of direct regulatory pressure. As part of its "Broadband for Everyone" commitment, FT made five pledges that it claimed would result in an increase broadband access across France. It promised:

- to equip all exchanges with more than 1000 lines with ADSL by 2005;
- to speedily deploy ADSL access once a local area exchange has 100 potential broadband customers;

- to provide satellite broadband for isolated communities;
- to test alternative broadband technologies in order to meet customer demand regardless of location; and
- to work closely with local and regional authorities to promote broadband.

O.105 This implementation of this plan has increased the pace of DSL roll out dramatically. In addition FT has introduced three broadband satellite products as well as trialling WiFi and broadband satellite technology in partnership with local authorities. FT is also trialling VOD services via broadband (MaLigne TV) in a number of cities/departments including Paris, Lyon and Marseille to assess whether it could be driver for take-up. This programme has been accompanied by an overall efficiency drive with realised cost reductions decreasing the price of ADSL equipment and indirectly promoting roll-out.

O.106 Perhaps the most noticeable characteristic of the German broadband market is the extent to which it is dominated by Deutsche Telekom (DT). The incumbent retains around 90 per cent of all broadband connections. While around one in six of these connections are via another ISP, DT's relevant wholesale product does not enable competitors to differentiate their service significantly from DT. Furthermore, consumers must purchase a T-DSL line for connection over the last mile separately from DT, a situation which offers little incentive to go to an alternative provider. Germany has had some success with local loop unbundling. However, prices and conditions imposed by DT have meant that so far unbundled last mile connections have been used predominantly for voice services.

O.107 Cable, which given its relatively high coverage levels throughout Germany might be seen as a natural platform for infrastructure-based competition for broadband, has also failed to make inroads into this market. Only 10 per cent of German households can access broadband via cable and cable accounts for just 2 per cent of total broadband subscribers. Competition may also have been further restricted by DT's previous ownership of several cable operators and consequent disinterest in upgrading these networks for broadband services.

O.108 Initially, this relatively uncompetitive environment did not hinder broadband penetration which grew rapidly. High ISDN penetration helped, with DT having great success in migrating its existing ISDN subscribers to ADSL services, and with ISDN helping consumers become more aware of the benefits of broadband. However during 2003 growth rates slowed significantly. DT has has insisted that customers subscribe to both ISDN and ADSL. Competitors have thus focussed on offering symmetric DSL services via fully unbundled lines as the rental costs are less than those associated with the bundled ISDN/ADSL product. ECTA, the European Competitive Telecommunications Association, has cited DT's continued market dominance as a key factor in the slow down of broadband growth in Germany.

O.109 Ofcom has considered the extent to which VoIP can be considered a driver for broadband take-up in the France and Germany. The current phase of evolution of these markets is similar to that in the UK . To date, VoIP has generally been promoted by new entrants targeting both small to medium

sized businesses and residential customers. Some VoIP providers such as QSC in Germany offer downloadable broadband software to enable VoIP telephony while others require users to purchase specific hardware. This nascent market is however increasingly being addressed by the incumbents with all both DT and FT now offering VoIP, at least for business customers. Ofcom will continue to monitor the development of VoIP and emerging regulatory policy in these markets with interest.

Regulation

O.110 ART has recently stepped up its effort to position LLU as a competitive tool in broadband development. In its 2002 annual report, ART stated that its major objective for 2003 would be to continue to improve operating conditions for unbundling and service quality in densely populated areas and to encourage access migration to unbundled local loop. Also in April 2002, the regulator ordered significant price reductions for both fully unbundled and shared access. ART also made provision for dedicated space to allow co-location by new entrants in France Télécom's exchanges – an action to which it attributed much of the growth in the volume of unbundled lines.

O.111 In early 2003 ART produced a review of the internet market in which it re-emphasised its commitment to the promotion of effective access competition via local loop unbundling. This policy is now delivering encouraging growth rates in the early part of 2004 keeping overall penetration levels in France above those in the UK.

O.112 Despite these efforts on ART's part there is still concern over the effect of FT's monopoly over fixed line services. Customers of rival service providers still receive a second bill for line rental from the incumbent. As in the UK, some entrants have argued that this acts as a disincentive to turn to alternative providers, and FT has been accused of delaying the hand over of lines to alternative providers.

O.113 The French government has also supported broadband development by making subsidies available to support broadband roll out (organised through general councils and other community organisations) particularly in less densely populated areas. In July 2001 the government announced measures to increase investment in providing high speed Internet access to remote rural areas in France. The plans included funding for the provision of fibre-optic network deployment to non-commercially viable areas. Further funding is also being made available via low-cost loans from the state operated Caisse des Depots et Consignations, co-financed by commercial banks. Local authorities will have fewer restrictions on investing in communications infrastructure and will be able to invest in or subsidise networks.

O.114 In May 1997, Germany became the first European country to make LLU mandatory. Unbundled cooper pairs were available from Deutsche Telekom for all operators with certain licences and a standard agreement has been developed with new entrants. In addition to this, Deutsche Telekom offers bundled access, allowing the alternative carrier joint use of the transmission equipment upstream of the MDF.

O.115 The first indications of the policy of the German regulator (RegTP) towards broadband development came in the late 1990s when it did not mandate the supply of a wholesale product such as FRIACO, to facilitate service-based competition in dial-up internet access. Instead, it decided to forbear and relied on DT making the necessary investment in broadband services. RegTP also chose not to require DT to provide a bitstream wholesale product to existing or potential competitors. The strategy worked well in terms of delivering relatively high growth rates for broadband penetration, but these have slowed significantly in recent months.

O.116 RegTP, prompted by the European Commission, has taken action to address a 'margin squeeze' by DT resulting from its line-sharing tariffs for unbundled loops. Following the end of a Commission investigation into DT's dominance of the German broadband market, the incumbent agreed to withdraw its €4.77 a month fee until end 2004 at which point it will renegotiate a new fee in concert with RegTP. RegTP ruled at the end of last year that the extent of T-DSL (DT's interconnect product) must be reduced, i.e. it could no longer extend beyond the local loop into the ATM network. In May the regulator required DT to offer a resale version of T-DSL thereby enabling alternative ISPs to establish a sole relationship with the consumer for the first time.

Lessons for the UK

O.117 These two markets offer distinct models for broadband. The first, exhibited in Germany, is to allow the market to be developed largely by the incumbent. The second, as seen in France, is to focus upon local loop unbundling as a means of creating competition.

O.118 Current experience in Germany appears to give some indication of the longer term effects of having relatively weak competition to the incumbent. Despite initial success in terms of consumer take-up and relatively low prices, growth has now slowed and price differentials with the UK in particular have been eroded.

O.119 The French experience with local loop unbundling gives some cause for optimism. The success of Iliad suggests that (all other things being equal) the entry of a strong player with a fully differentiated product in the UK could have realistic expectations to quickly grow its subscriber base. Ofcom's recent action on LLU pricing is not too far behind similar action by ART, and on this basis some similar market growth may emerge in the next few months.

O.120 Unlike Japan and Korea, and to some extent also the US, there has been little large scale commercial roll-out of next generation broadband access networks in these European markets, nor any substantial regulatory or government pressure to do so. This state of affairs is in common with the UK. But we expect that, as in the UK, this will become a significant political focus in other European countries in the near future.