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# International Broadband Market Comparisons

# Update December 2004

## A Report for the Department of Trade and Industry

**27 January 2005**
CLM19

# Contents



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# 1. Executive Summary

The UK broadband market continues to show positive signs of development over the six month period April to September 2004, and overall is performing well against the other G7 countries as well as Australia, Ireland, South Korea and Sweden. Although there is little change in the rankings for the individual indices (apart from availability where the UK has done particularly well, and pricing where the UK has been overtaken by a strong performance from France), the overall mix giving competitiveness and extensiveness comparisons is very encouraging. For example, as a result of the UK's strong performance in the availability index, it now leads on extensiveness.

The competitiveness index reflects performance on choice, price and regulation. The UK maintains its third position overall, behind Japan and Canada. The regulatory picture has remained fairly constant over the preceding six months (with the only major activity being seen in the US over local loop unbundling (LLU) legislation), and the UK retains its first position.

Choice is improving in many countries. LLU in the UK is starting to gather pace, but it is still early days in terms of the impact this has on the choice index. BT's improvement in market share (reflecting limited infrastructure choice outside of cable network areas) over the previous 6 months has also had a negative effect on the index. Japan and France are the most progressive countries currently in offering LLU opportunities for alternative operators. The US has many players operating in the market, and superficially looks competitive as a result. However, the true state of the market is that in any given area, two players tend to dominate – the local cable franchise, and the local phone company, creating local duopolies throughout the US. Nevertheless, the market is looking healthy with broadband lines surpassing dial-up lines in the first eight months of 2004, and growth in DSL outpacing cable modem growth.

The UK drops a position in the price index, despite demonstrating improvements in its score. Prices have reduced significantly, with a number of players' services at 512kbps dropping to £17.99 per month. France has experienced a recent spate of huge price cuts – as little as Euro 14.90 for some 512kbps services – which has improved its position in the index. Japan retains its top position as probably the cheapest broadband market in the world, and it remains to be seen how long both Japan and France can sustain such competitive pricing.

The extensiveness index reflects the potential addressable market for broadband (or market context) and availability. The former measures the potential market for broadband take-up by looking at use of services considered 'part way' towards broadband (e.g. flat rate narrowband, ISDN, digital TV, 3G). The UK retains its third position here, with a strong digital TV and flat rate narrowband Internet market.

The UK has witnessed its strongest performance in the availability index where it moves into first position, overtaking Canada and Japan. BT has removed any limit on the length of copper between exchange and end user that is viable for broadband provision, and as

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a result of this change and continued deployment to local exchanges, achieved 93.3% coverage at September 2004. The effect of cabled areas outside DSL enabled areas brings the total coverage figure up to 93.9%. It should be noted that, although the UK has improved its availability score significantly (up from 87% six months previously), its rise in this report to first place also reflects the downgrading of Japan. In light of a recent survey by the Japanese Ministry of Internal Affairs and Communications, coverage has now been estimated at 92% (previously estimated at 96%), moving it into second position. BT's promise is of 99.4% coverage by summer 2005, and if achieved, will see the UK consolidating its top position in the availability index.

The combined, weighted score of market context and availability moves the UK into top position in the extensiveness index, a position it is anticipated to maintain over the next year.

Take-up is the main challenge for the UK. Although significant growth has been experienced over the six-month period (from 13% to 20% penetration), it remains in fifth position due to an equally strong performance from France (now at 23%). At the end of September 2004, broadband lines were calculated at 5,124,972 by Point Topic, indicating promise of a strong market going forward which we expect to improve further through increased availability, and continued pressure on price points.

Going forward, if the UK is to improve its positioning among the G7, the focus must be on competitiveness – primarily choice available to end users. The more choice of suppliers available will impact pricing as well as service quality, so improving take-up. It is important that alternative operators are provided with opportunities to compete, offering customers a variety of different types of services from which to choose that will perhaps fit better with their own particular lifestyles.

Forecasting competitiveness to the end of 2005, we estimate the UK will retain its current third position behind Japan and Canada, particularly as the latter continues to drive forward its objective of universal access for all citizens.

With take-up, in light of recent developments in France, where growth has seen a spurt over the last six months, we expect it to retain its lead over the UK with the latter maintaining its fifth position. However, we expect the UK to improve its score and its ranking beyond 2005, to lead the European G7 contingent by 2010.

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# 2. Broadband market indices

## Measuring success: key metrics

This Report, covering the period from April to October 2004, commissioned by the DTI from Ovum, continues the series of six monthly reports to benchmark the progress of the UK against certain key broadband enabled countries in support of the Government's overarching objective for the UK to have the most extensive and competitive broadband market in the G7 by 2005.

For the previous International Broadband Comparisons Reports, broadband market indices were developed with Ofcom and the Broadband Stakeholder Group to measure and compare the attractiveness and performance of the broadband market across a range of countries. In the interests of consistency, Ovum has used the same indices in analysing the findings for this 2004 report.

The underlying principles used to develop the indices that comprise the broadband market index are:

- Simplicity: the index must be transparent and easy to explain and understand
- Quantifiable: the data to be used in the index must exist in a consistent manner across all the countries studied
- Realistic: it should give as realistic an impression as possible as to the status of broadband in a given country.

When dealing with any complicated, dynamic environment, measuring performance is never easy. Such difficulty is compounded when dealing with a market, which is developing, such as broadband. What will constitute success? Once measures of success have been decided, how should they be interpreted?

In these situations it is sensible to start from an end goal and work backwards. In the UK's case, the goal is to have the most extensive and competitive broadband market in the G7[1] by 2005. Therefore, extensiveness and competitiveness are clearly the two criteria that will need to be measured. These words do not naturally lend themselves to measurement in a simple fashion.

A consensus has emerged around a dashboard of six indicators. A range of indicators enables a deeper understanding of the relative strengths and weaknesses of each international market that cannot be attained from a single aggregated measure. A further advantage is that causes (e.g. regulation, competition) can be separated from effects (e.g. take-up) and analysed independently. This section presents definitions for each dashboard indicator and the rankings for the 11 countries studied.

[1] G7 countries are: Canada; France; Germany; Italy; Japan; the UK and the USA.

# Definition of indices

Six key measures of success have been identified: price, choice, regulation, availability, market context and take-up. These are calculated as indices between 0 and 1, where a high score represents a good performance. Weightings are attached to these different indices to produce extensiveness and competitiveness indices, against which countries can be ranked. All indices are defined so as to give a value between 0 and 1, so that the weightings applied to each index are transparent. All indices are calculated based on the situation at the end of September 2004.

Please note that, although Ovum has striven to ensure consistency in its scoring methodology with the previous reports (this being the first that Ovum has produced), precise correlation with previous benchmarks in terms of absolute score is difficult due to differences in assumptions made throughout the methodology. However, the rankings provide a robust indication of performance since all countries have been benchmarked on a like-for-like basis, and future international comparison reports (produced each 6 months) will again provide consistency with this edition.

## 1. Choice index

The choice index comprises three parameters:

- Infrastructure competition: sum of the squares of the top three infrastructure player market shares
- Infrastructure choice: proportion of households with a choice of terrestrial infrastructure operator
- Retail competition: sum of the squares of the top five retail ISPs market shares.

Figure 2.1: Choice Index at Q3 2004

| | **Q3 2004** | **G7 rank Q3 2004** | **G7 rank Q1 2004** | **G7 rank Q3 2003** |
|---|---|---|---|---|
| Japan | 0.90 | 1 | 1 | 1 |
| Canada | 0.83 | 2 | 2 | 2 |
| US | 0.77 | 3 | 3 | 3 |
| Korea | 0.70 | | | |
| Sweden | 0.67 | | | |
| **UK** | **0.66** | **4** | **4** | **4** |
| Australia | 0.58 | | | |
| France | 0.53 | 5 | 5 | 5 |
| Germany | 0.50 | 6 | 7 | 7 |
| Ireland | 0.32 | | | |
| Italy | 0.31 | 7 | 6 | 6 |

*Source: Ovum*

Since April 2004, choice of supply has generally improved in most markets, providing no change to G7 rankings, although we see the UK drop slightly on scoring due to growth in incumbent BT's wholesale line numbers over the last 6 months. With the success of Yahoo! BB, a partnership between Softbank and Yahoo!, Japan has become the largest LLU country in the world, consolidating its position at the top of the table.

With regard to the US, we take into account within the index the fragmented nature of the telecoms market, whereby competition is better viewed on a region by region basis rather than nationally. The US broadband market is dominated by ten players, six cable operators and four local phone companies, which between them have 88% of the retail market. However, this list of competitors masks the true state of the market, which is that in any given area, two players will dominate – the local cable franchise, and the local phone company. Local municipalities have traditionally only licensed one cable company and one DSL provider in each town or city, which creates local duopolies throughout the US.

Nevertheless, the market is looking healthy in the US with broadband lines surpassing dial-up lines in the first eight months of 2004, and growth in DSL outpacing cable modem growth.

Germany has improved its score (if not its rank) substantially, as competitors such as Freenet and city players like HanseNet do battle with a still powerful incumbent. Arcor claims it now covers 40% of Germany households, improving the choice of provider to customers. In Italy, however, Telecom Italia retains its stranglehold on the supply of broadband services, despite promising developments from competitors such as Fastweb.

## 2. Price index

The price index is calculated as the price of the top 5 retail ISPs, weighted by market share. Prices used are for mainstream residential products and include connection fees amortised over a three-year period and are adjusted for purchasing power parity (PPP).[2] In order to give a value between 0 and 1 for this index a PPP price of USD200 or less (per year) is allocated a score of 1, with a PPP price of USD800 or more allocated 0. A linear scale is used between these points.

[2] Prices are converted from local currency to USD using the exchange rate from the same time as the PPP factors to ensure consistency.

Figure 2.2: Price Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| Japan | 0.99 | 1 | 1 | 1 |
| France | 0.80 | 2 | 4 | 5 |
| Canada | 0.71 | 3 | 2 | 2 |
| **UK** | **0.70** | **4** | **3** | **3** |
| Sweden | 0.63 | | | |
| Australia | 0.58 | | | |
| Ireland | 0.54 | | | |
| Korea | 0.51 | | | |
| US | 0.49 | 5 | 6 | 6 |
| Germany | 0.36 | 6 | 5 | 4 |
| Italy | 0.29 | 7 | 7 | 7 |

*Source: Ovum*

Price is another index where we see significant improvements by many players, although little movement in rankings. As the markets get more competitive (and also as regulators step in to ensure reasonable rates on products such as local loop unbundling), prices are coming down quickly. Whilst this index is independent of speed (by taking the price of a product closest to 512kbps), service speeds in many of the countries under review are increasing (with 512kbps becoming in many cases the entry level service) whilst prices are staying static, including the UK, the US and France. The latter has also experienced a recent spate of huge price cuts, moving above the UK and Canada as a result. Germany and Italy are again trailing the other G7 countries. We are starting, however, to see more competitive activity in Germany where a mini-price war is ensuing. Deutsche Telekom, for example, is driving a promotion where the connection fee (generally €99.95) is waived. However, compared to the other markets under review, broadband prices remain high.

## 3. Regulation index

The regulation index compares and contrasts the broadband market actions taken by regulators in each country. The regulation index is based on simple, binary scores for the presence (or absence) of regulatory provision for:

- wholesale DSL
- wholesale cable
- local loop unbundling (LLUB) – mandated
- access upstream of MDF

- line sharing
- separation of network ownership.

Figure 2.3: Regulation Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| **UK** | **1.00** | **1=** | **1=** | **1=** |
| US | 1.00 | 1= | 1= | 1= |
| Canada | 0.83 | 3 | 3 | 3 |
| Korea | 0.83 | | | |
| Ireland | 0.83 | | | |
| Japan | 0.67 | 4= | 4= | 4= |
| France | 0.67 | 4= | 4= | 4= |
| Germany | 0.67 | 4= | 4= | 4- |
| Italy | 0.67 | 4= | 4= | 4= |
| Sweden | 0.67 | | | |
| Australia | 0.67 | | | |

*Source: Ovum*

There has been no change in the regulatory index over the last 6 months as a whole. However, there has been some discussion in a number of markets around the need to regulate change more rigorously. In Germany, we still see Deutsche Telekom as the dominant supplier. RegTP has so far failed to issue an order for DT to provide bitstream products to those new entrants requesting access, and wholesale DSL prices are still not settled.

In Australia, the Australian Competition and Consumer Commission (ACCC) recommended that Telstra divest its HFC network and shares in pay TV company Foxtel. But the government has not pursued structural solutions to improve competition, and instead it is seeking to privatise its remaining 50.1% shareholding in Telstra.

In the US, although not altering its score over the last 6 months, there has been much activity. On 20 August 2004, the FCC issued a notice of proposed rule-making concerning unbundled access to network elements (UNEs). The FCC proposed a one-year interim period to draft and issue new and final LLU rules. During this period, starting from the end of August 2004, the FCC essentially required the ILECs to continue provision of LLU and bitstream on the basis of contracts that have been in place since June 2004.

After a court ruling of June 2004, the FCC's LLU rules resulting from the Triennial Review were annulled. As a result, the whole issue of unbundling plunged into chaos. Most ILECs were starting to withdraw LLU elements from their wholesale offers, or seeking pricing reviews with interconnecting parties (mainly competitive local exchange

carriers – CLECs). The regulatory vacuum resulted in a spate of appeals to the state public utilities commissions (PUCs) and state antitrust courts. The FCC is now asking to backdate agreements to 15 June 2004; that is, before the court's order to annul its own rules.

The interim period will be divided into two phases. In the first phase, from August 2004 to February 2005, ILECs will have to ensure provision of UNEs to both new and existing customers at the same prices, terms and conditions as contained in the agreements in place as of 15 June 2004. The only modifications possible are those resulting from a PUC decision, an FCC ruling or a voluntary agreement between contracting parts. In the second phase, from February 2005 to August 2005, the ILECs will have to continue providing UNEs only to existing customers. They will also be allowed to increase prices by up to 15% more than the ones in place as of 15 June 2004.

The FCC interim rules have allowed negotiations to be restarted between ILECs and CLECs for UNEs within a certain framework. For the time being, this should be enough to ensure unbundling take-up and provision of competitive broadband services is given a much-needed boost. However, it will be even more crucial to see what new regulations the FCC has in mind when the interim rule expires in August 2005. The FCC is keeping a very open approach so far, and has called for comments from all interested parties to ensure the new rules take into account effective market dynamics as much as possible.

## 4. Availability index

The availability index is a measure of the percentage of the population with access to a terrestrial broadband solution (naturally a value between 0 and 1).

Figure 2.4: Availability Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| Korea | 0.97 | | | |
| **UK** | **0.94** | **1** | **3** | **4** |
| Japan | 0.92 | 2 | 1 | 1 |
| Germany | 0.90 | 3 | 2 | 2 |
| Canada | 0.86 | 4 | 4 | 3 |
| Italy | 0.85 | 5 | 5 | 6= |
| Sweden | 0.85 | | | |
| France | 0.83 | 6 | 6 | 6= |
| US | 0.81 | 7 | 7 | 5 |
| Australia | 0.80 | | | |
| Ireland | 0.60 | | | |

*Source: Ovum*

Availability is steadily improving, particularly as incumbents enable the copper wire for DSL. In the UK we've seen significant improvements due to BT removing any limit on the length of copper between exchange and end user that is viable for broadband provision. Conditions for DSL are relatively favourable in Germany, with an average copper loop length of 1.5 to 2 km. A high proportion of German telecom customers are using ISDN, which means that the lines are already well qualified for digital traffic and there is a good platform for self-installation. However, despite this, the incumbent has found it difficult to move its terrestrial standard T-DSL coverage beyond 90% for technical and economic reasons, according to Deutsche Telekom in October 2004.

The cable network in Italy covers only a few favoured areas so it cannot make a significant contribution to broadband. Its penetration in Italy has been low with only 2 per cent of households connected at the end of 2001. On the other hand, the average length of the telephone local loop is short, with around 75% less than 2 km, which is favourable for DSL coverage. The short loop length is partly because Italy has a large number of local exchanges, about 11,000, of which the largest 2,000 cover about 85% of the population. Italy also has high population density in its cities, with a high proportion of people living in apartments, and so offers a good opportunity for fibre-to-building solutions. This puts Telecom Italia, the incumbent telecommunications provider, in a strong position to dominate the development of the broadband market in Italy, a tendency the regulators have tried to restrain.

Following a government survey by the Japanese Ministry of Internal Affairs and Communications on the coverage of broadband by prefecture, the nature of the digital divide between urban and rural areas is revealed. Although no figure is given for total country coverage by household, by mapping household statistics against broadband availability per municipality we estimate that figure is 91.9%. In addition, NTT East claims its service is available in approximately 96% of the NTT East service area, and for NTT West, that figure is 86% at March 2004. For this index, we estimate coverage at 92%.

Assessing the availability of broadband in the US is difficult due to the fragmented nature of the market, and even the FCC has trouble defining what this might be.[3] However, according to the National Cable and Telecommunications Association (NCTA), 91% of US homes passed by cable are able to receive broadband cable. There is a question, however, regarding exactly how many homes are passed. The NCTA refers to "Occupied Homes Passed as a Percent of TV Households" and concludes that the Occupied Homes Passed rate is 95%. The National Rural Telecommunications Cooperative (NRTC), however, is disputing this figure, and is urging the FCC to obtain alternate sources of information with respect to actual homes passed.[4] Other estimates range from 79% to 96%. For the purposes of this benchmark, we take a middle figure of 88%. Thus, broadband cable homes passed is estimated at 91%x88% = 80%.

[3] See http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-208A1.pdf

[4] See http://www.nrtc.coop/export/main/news_policy/fccdocs/NRTC.pdf

DSL rollout varies by state and operator; overall it is estimated to have reached over 75% coverage according to press reports during the Bush/Kerry election campaign.

Assessing the total broadband coverage accounting for both DSL and broadband cable is difficult. According to the NRTC, the precise areas covered by broadband cable networks are unknown (at least, publicly), as are DSL coverage areas. At a high level, it is assumed that most of the DSL enabled footprint is a subset of the cable one. Generally, major DSL providers would only go into non-cabled (predominantly rural) areas if they had good strategic reasons, and the cost-benefit was justified. However, we are starting to see few small independent phone companies in small towns, which are rolling out some form of DSL, including VDSL, because there is no cable coverage and therefore no competition. These are not yet considered account for a significant number of lines, but in light of that, total broadband coverage is estimated at 81% to incorporate the additional area covered by these small players.

Ireland is still suffering from lack of infrastructure. In September, Esat BT claimed that 30 per cent of all lines in broadband-enabled areas were failing broadband compatibility tests. The operator also claimed that less than half of all phone lines in the country can get ADSL. Eircom countered that the line failure rate in broadband-enabled areas was closer to 20 per cent.

## 5. Addressable market index

Countries with a high penetration of services that are ‘part way’ towards broadband (i.e. flat rate narrowband, ISDN, digital TV, 3G) have a large pool of subscribers, who may quickly switch over to broadband given certain circumstances. Hence countries with high flat rate, ISDN, or DTV penetration could expect an accelerated growth in broadband penetration either: once broadband prices are close to flat rate prices; the applications for which broadband is essential increase in attractiveness; and/or digital TV becomes a competitive platform for broadband delivery. 3G provides an additional way of providing mobile broadband access, albeit at lower data rates/higher cost per Mbyte transferred.

Figure 2.5: Market Context Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| Korea | 0.75 | | | |
| US | 0.60 | 1 | 1= | 1 |
| Canada | 0.55 | 2 | 1= | 2 |
| **UK** | **0.49** | **3** | **3** | **3** |
| Sweden | 0.44 | | | |
| Japan | 0.42 | 4 | 4 | 4 |
| Australia | 0.40 | | | |
| Germany | 0.34 | 5 | 7 | 7 |
| France | 0.32 | 6 | 5 | 5 |
| Ireland | 0.30 | | | |
| Italy | 0.23 | 7 | 6 | 6 |

*Source: Ovum*

The key drivers of this particular index are seen to be the substantial uptake of 3G in Korea, with increasing penetration in Japan, Canada and the US. The reason German scores well is due to its extensive ISDN penetration. The UK is still leading in digital TV penetration, but other countries are now starting to catch up. Again, the US and Canada score well here, and markets such as Ireland and Sweden are expected to overtake the UK by 2010 (source: New Media Markets).

## 6. Take-up index

The take-up index is a measurement of household broadband penetration (resulting in a value between 0 and 1). To qualify as broadband, a service must be capable of delivering ‘always-on’ services to each individual at data rates above 128kbps.

Figure 2.6: Take-up Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| Korea | 0.70 | | | |
| Canada | 0.45 | 1 | 1 | 1 |
| Japan | 0.36 | 2 | 2 | 2 |
| Sweden | 0.30 | | | |
| US | 0.29 | 3 | 3 | 3 |
| France | 0.23 | 4 | 4 | 4= |
| **UK** | **0.20** | **5** | **5** | **6=** |
| Australia | 0.18 | | | |
| Italy | 0.17 | 6 | 6 | 6= |
| Germany | 0.16 | 7 | 7 | 4= |
| Ireland | 0.08 | | | |

*Source: Ovum*

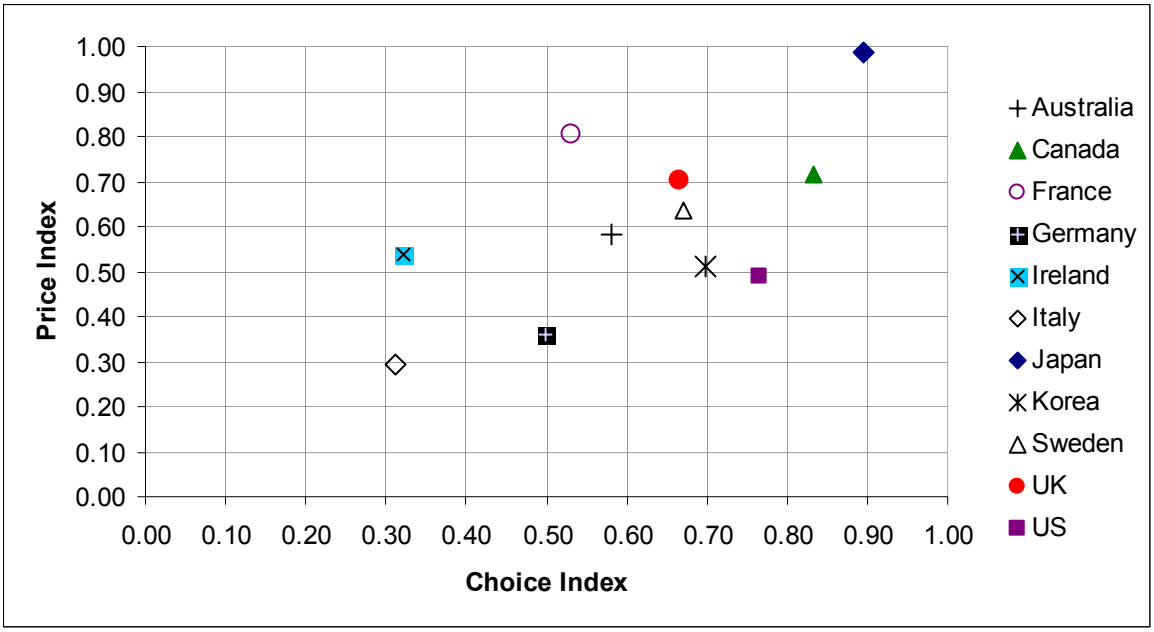
Take-up is the key index that most countries are seeking to drive – from both a commercial and an economic perspective. Apart from near saturation in Korea, and the problems that is bringing for players in terms of levelling revenues (consolidation is occurring as a result with Hanaro recently making the highest bid for competitor Thrunet), there is still plenty of growth left in the market for players to exploit. Canada has seen substantial success to date with strong government-led initiatives to push it out to all. It has been more effective in this respect than other markets with major rural geographies such as the US and Australia, although all three are exploring the use of broadband satellite and wireless broadband to address this issue.

# Comparisons

France demonstrates significant improvements in its price index, despite relatively low choice, but this is due to the aggressive price cuts recently seen, and it is anticipated that the impact of LLU in the market will soon be reflected in the choice index.

Other markets such as Korea where the market is saturated, and reducing prices will only compound declining ARPUs, players are having to think of new ways of attracting users to services, whether that be speed or content.

Figure 2.9: Choice versus price




*Source: Ovum*

# The 2005 Government target

The UK Government target is to have the most competitive and extensive broadband network in the G7 by 2005. The target may therefore be broken down into the two factors – competitiveness and extensiveness – which combine to provide the overall market environment for broadband. We can define these two factors in terms of the relevant dashboard indicators as follows:

- *competitiveness* is defined as a composite measure of the market regulation index (a leading indicator), market choice, and price (a lagging indicator) – these are weighted: regulation (1), choice (3) and price (3)
- *extensiveness* is defined as a composite measure of market context and broadband availability – these are weighted market context (1) and availability (2).

Figure 2.10 illustrates the competitiveness index.

Figure 2.10: Competitiveness Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| Japan | 0.90 | 1 | 1 | 1 |
| Canada | 0.78 | 2 | 2 | 2 |
| **UK** | **0.73** | **3** | **3** | **3** |
| US | 0.68 | 4 | 4 | 4 |
| France | 0.67 | 5 | 5 | 5 |
| Sweden | 0.66 | | | |
| Korea | 0.64 | | | |
| Australia | 0.59 | | | |
| Ireland | 0.49 | | | |
| Germany | 0.46 | 6 | 6 | 6 |
| Italy | 0.35 | 7 | 7 | 7 |

*Source: Ovum*

As discussed above, there have been significant improvements in the pricing index by many players, and its high weighting results in big improvements in the competitiveness index.

The UK holds its position, but is moving closer to Canada's score.

Figure 2.11 illustrates the extensiveness index. Here we see the UK, through growth in availability to 93.9%, moving into first position. The other major change, however, is that we have downsized Japan’s availability index to 0.92 in light of a recent government survey[5].

[5] Source: Kyodo News Service, Japan Economic Newswire December 25, 2004

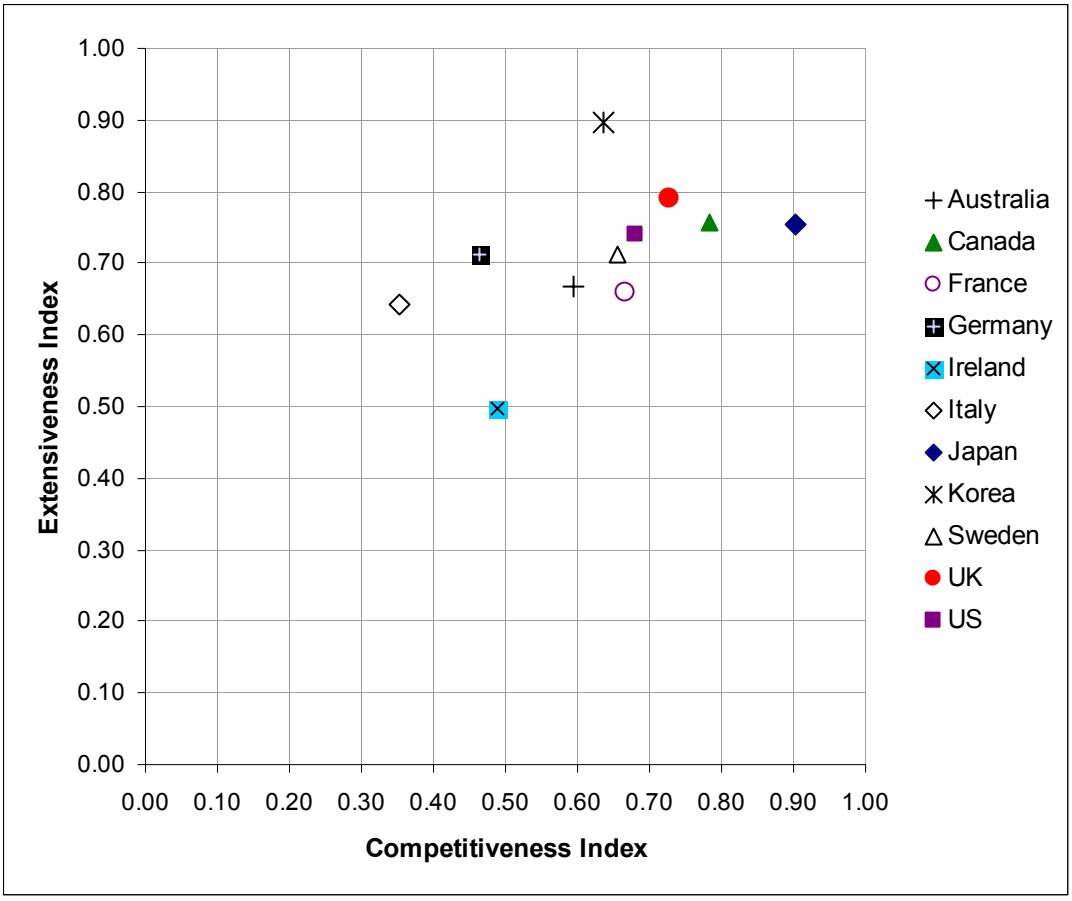
Figure 2.11: Extensiveness Index at Q3 2004

| | Q3 2004 | G7 rank Q3 2004 | G7 rank Q1 2004 | G7 rank Q3 2003 |
|---|---|---|---|---|
| Korea | 0.90 | | | |
| **UK** | **0.79** | **1** | **3** | **3=** |
| Canada | 0.76 | 2 | 2 | 1= |
| Japan | 0.75 | 3 | 1 | 1= |
| US | 0.74 | 4 | 4 | 3= |
| Germany | 0.71 | 5 | 5 | 5 |
| Sweden | 0.71 | | | |
| Australia | 0.67 | | | |
| France | 0.66 | 6 | 7 | 7 |
| Italy | 0.64 | 7 | 6 | 6 |
| Ireland | 0.50 | | | |

*Source: Ovum*

Plotting competitiveness against extensiveness, we see the following effects.

Figure 2.12: Extensiveness versus competitiveness




*Source: Ovum*

Whilst the UK cannot yet match Korea for extensiveness, nor Japan (where price and strong player competition remain key factors) for competitiveness, it is nevertheless in a good position, and further improvements in choice (for example, from unbundling) and price are anticipated.

# 3. Summary of key data

## Broadband market competitiveness

Broadband market competitiveness is defined in terms of choice, price and regulation.

### Choice

A comparison of choice between the UK and other markets is assessed based on the level of infrastructure competition, retail competition and choice of supplier for the end user. It is notable and not unsurprising that the least competitive markets are those with the strongest incumbents. Deutsche Telekom, Telecom Italia, Telstra and Eircom all continue to dominate the broadband space, and all are considered to wield more power than their respective country regulators in determining the market dynamics in which they operate. Strides in LLU in France, and hefty price cuts have helped improve competitiveness there.

However, things are starting to change, and in Europe, the new EU Regulatory Framework that is being implemented at present is set to level the playing field, as we are seeing in markets such as Japan. NTT is a classic example: the drastically reduced local loop unbundling charges introduced by the Japanese telecoms regulator have stimulated growth of broadband and VoIP (led by Yahoo! BB). This resulted in a decline in NTT's call revenues of 15% in 2003 alone, although it was granted an increase in its interconnect rates.

Incumbents have shown that they basically behave in four ways when confronted with regulatory issues:

- **challenge.** Incumbents challenge regulatory decisions that can be very detrimental to their business in court. This has been the case for a number of players for some contentious issues such as local loop unbundling – for example PCCW in Hong Kong, or Eircom in Ireland.
- **slow retreat.** Slow retreat is a tactic where incumbents delay the implementation of decisions by taking the time to agree details or technical issues. Virtually all incumbents have deployed this tactic once forced into local loop unbundling – Deutsche Telekom is just one example.
- **trade.** Some players agree on a concession in return for a relaxation of a certain type of regulation. For example, BT in the UK agreed to wholesale line rental provisioning in return for a relaxation of its retail price controls on voice services.
- **proactive.** Some incumbents have made competitive concessions before being asked by regulators, taking the proactive route. BT is again an example, when it announced a reduction in its shared local loop unbundling charges by up to 70% in May 2004 without being prompted by the regulator.

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With regard to retail competition, we are seeing much more pronounced competition occurring with LLU offering opportunities to new entrants. Incumbent market shares in the retail market are moving below 50%, with notable exceptions continuing to be Germany, Ireland and Italy. Low LLU prices do not guarantee high competition, but it certainly helps. Japan and France have the lowest shared access costs and the highest DSL competition.

Initially slow to develop its LLU offering, aggressive proponents of LLU have emerged in the UK - Bulldog (now owned by Cable and Wireless**)** and latterly Tiscali and Wanadoo.

The UK also offers competitive choice through its cable players, with ntl and Telewest continuing to consolidate their positions. Telewest added 70,000 broadband subscriptions in the third quarter 2004 (to 607,000).

ntl has now launched a new package of phone and Internet services that it will offer to 14.5m homes *outside* its cable network. There are five standalone products and four bundles of telephone, dial-up and broadband (512kbps) Internet services with prices ranging from £4 a month to £29.99 a month. The company is using a combination of carrier pre-selection (CPS) and local loop unbundling.

ntl's latest move adds credence to cable operators push to move beyond their traditional service territories. It is worth noting that this move will bring ntl into competition with Telewest for the first time in history.

Although Italy scores low in this benchmark, it should be noted that competitor Fastweb is proving highly successful in major urban areas, offering competitive differentiation to Telecom Italia in terms of price and services.

## Price

Japan again leads on price: it has the widest range of bandwidth services, from 1.5Mbps to over 40Mbps, and is the cheapest DSL market in this benchmark, and probably the world.

In terms of low entry pricing, many of the countries in the benchmark (notably France) are reaching similar levels (although Germany and Italy are again falling behind). But prices for the high-end services can differ greatly. This difference in price, combined with the different bandwidths available, on the high and low-end products, will provide a varying average price per Mbps. So, whereas the rest of world may have caught up with Asia in terms of entry-level pricing, in terms of average price per Mbps they are still behind.

Cable operators on the whole have not been quick to indulge in cut-throat pricing battles. This stands out in the US particularly, where operators offer a wide range of bandwidths, but are opting for marginal price declines. Along with special offers for an initial free subscription to broadband access, many providers are offering free installation as an incentive. This is often the case in the US and has also been favoured by operators in Sweden.

Pricing has improved considerably in the UK, as competitive forces drive down subscription fees. We see the same in most of the other markets, and although Italy again scores the lowest in the price index, pricing options for services and bundles of services are seen to have made significant progress in the last few months.

## Regulation

#### Implementation of LLU and bitstream access

While most countries introduced provision for LLU (such as full unbundling and line sharing), and bitstream access, there are some cases in which line sharing or bitstream access were not implemented simultaneously with full unbundling or may not be fully in effect. For example, line sharing was not part of Deutsche Telekom's LLU offer, and the German government did not require line sharing until March 2001. In Canada, line sharing is not mandated by regulation but the incumbents have voluntarily implemented the service.

In many of the countries that have introduced bitstream access, the regulatory framework is viewed by ISPs as insufficient. In France, for instance, bitstream access, offered by France Telecom, is considered by operators as an important transitory measure while they roll out their unbundled access and collocation. The Swedish regulator does not regulate the price of bitstream access which is determined between ISPs. The UK is one of the few countries to have actually mandated bitstream access.

Most European countries require unbundling only for local loops, whereas the US requires unbundling of other associated facilities. In Japan, in addition to local loops, there is also a requirement to unbundle splitters for DSL, routing transmission function, optical splitter and media converters for fibre to the home (FTTH).

See below for a summary of status of the unbundling and bitstream access by country.

Figure 3.1. **Availability of unbundling and bitstream by type**

| Country | Full LLU | Line Sharing | Bitstream Access (upstream of MDF) | Sub-loop unbundling |
|---|---|---|---|---|
| Australia | Yes | Yes | Yes | No |
| Canada | Yes | Yes | No | No |
| France | Yes | Yes | Yes | Yes (full unbundling only) |
| Germany | Yes | Yes | Yes (although altnets claim this is not happening) | No |
| Ireland | Yes | Yes | Yes | Yes |
| Italy | Yes | Yes | Yes | Yes |

| Country | Full LLU | Line Sharing | Bitstream Access (upstream of MDF) | Sub-loop unbundling |
|---|---|---|---|---|
| Japan | Yes | Yes | No | Yes |
| Korea | Yes | Yes | Yes | No |
| Sweden | Yes | Yes | Yes | Yes |
| UK | Yes | Yes | Yes | Yes |
| USA | Yes | No | No | Yes |

*Source: Ovum*

# Broadband market extensiveness

Broadband market extensiveness is defined in terms of broadband availability as a percentage of population coverage, and market context, which assesses potential broadband take-up, and takes account of similar technology services such as ISDN, 3G, flat-rate narrowband and digital TV.

## Availability

The availability of broadband has been an issue all over the world, whether in the UK, France, the US, Australia or beyond. Although the pressure is generally unidirectional - from the pressure groups to the operators - there may also be good reasons for the operators themselves to be more aggressive about the deployment of broadband. However, operators are under commercial pressures from shareholders and will tend to roll out infrastructure and services where it is commercially viable to do so or where they envisage a strategic competitive advantage

The pressures on DSL operators are economic and political. On the one hand their shareholders (and creditors) demand swift returns on investment, with many operators now working on a three-year or shorter period as the basis for investments. DSL rollout is an expensive business and the irony is that the smallest and least economically viable exchanges are also the most expensive to upgrade, because they are often more remote. Financial managers will be reluctant to invest in universal DSL coverage if they do not see a clear plan for a return on investment.

This is the issue that most DSL incumbents under review here are now having to address. Most, apart from Ireland, have now reached or exceeded 80% population coverage (although Forfas recently claimed 81% of DSL lines in Ireland were broadband enabled). The remaining exchange areas are likely to be in rural communities and will be expensive to enable.

The emergence of technologies such as fixed wireless access (FWA), FTTH and satellite offer new alternatives to the disenfranchised, although development is slow. In the UK, PCCW, the Hong Kong telecoms group, has recently ruled out a nationwide roll-out of its UK wireless broadband service in the near term. So far the company has invested $14m in acquiring all 15 UK wireless broadband licences, and up to $40 million in rolling a service out to 400,000 households in the Thames Valley area around London – an area already well served by DSL and cable.

Nevertheless, targets for extending broadband penetration have to start taking into account the demographics of the population. Very few incumbents have stated targets of 100% broadband coverage (although BT announced in December 2004 that it intended to achieve 99.4% by Summer 2005). On a more local level, regional authorities and local government are setting more specific broadband rollout targets for their own regions, which in a number of cases have large rural populations.

In the US, which has a highly distributed population, there is a legacy of specific projects aimed at connecting dispersed communities. The FCC has a number of policies aimed at fostering the rollout and uptake of broadband in rural areas, ranging from its Rural Action Plan (multi-faceted broadband programme), to a provision within the 1996 *Telecoms Act* for discounted Internet access to rural schools, hospitals and libraries.

From a public policy perspective, then the common goal for all countries is to get broadband to 100% of the population. But the size and nature of this challenge varies greatly. Figure 3.2 shows how the percentage of the population classified as rural in a cross section of countries (by those countries) ranges from between 9% in Australia to around 40% in Ireland. Take into account differences in GDP per head and demographics (location of businesses, distance of houses from exchanges, make-up of local communities) and it becomes evident that strategies for rural broadband deployment will vary greatly.

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Figure 3.2 Population classified as rural by each country

| | Population (000s), 2001 | Population per square kilometre | Rural population as % of total |
|---|---|---|---|
| Australia | 19,485 | 3 | 8.9 |
| Canada | 31,082 | 3 | 21.1 |
| France | 59,191 | 108 | 24.5 |
| Germany | 82,311 | 228 | 12.3 |
| Ireland | 3,839 | 55 | 40.7 |
| Italy | 57,348 | 190 | 32.9 |
| Japan | 127,210 | 337 | 21.1 |
| South Korea | 47,343 | 476 | 17.6 |
| Sweden | 8,896 | 20 | 16.7 |
| UK | 60,012 | 244 | 10.5 |
| US | 285,023 | 30 | 22.6 |

*Source: OECD. The population of areas defined as rural (i.e. non-urban) in each country, as reported to the United Nations. Definitions have not been harmonised across countries.*

The rural population as a percentage of the total provides an indication that, where some countries may have a very low population density, in actual fact most people do live in densely populated, urban areas e.g. Australia.

To fill the gap between standard exchange-based DSL deployment and 100% coverage, options available include:

- remote DSL cabinets
- broadband fixed wireless access (BFWA)
- multi-service access node (MSAN)
- satellite.

Technologies such as cable modem, fibre to the home and powerline have not generally been considered either due to cost or technology limitations (although powerline is again starting to make the news in places such as the US and Korea).

The advantages and disadvantages of each option are shown in Figure 3.3.

Figure 3.3 Access options

| Option | Description | Advantages | Disadvantages |
|---|---|---|---|
| Remote DSL cabinets | Already used heavily in North America, DSL cabinets can be placed in the street much nearer to the customers than the telecoms exchange building | Reduces the distance between the DSL multiplexer and the customer, thus solving the long loop length issue | Further backhaul infrastructure is required to connect each DSL cabinet<br>Only really works if customers are in tight clusters. If customers are spread out there might not be an optimum position available that will allow all customers to be reached<br>Incumbents fear that they will be forced to unbundle such cabinets<br>Planning permission is required, and utilities such as power need to be found |
| BFWA | Point-to-multipoint broadband radio | No need for access infrastructure<br>Can cover large distances, sometimes up to 30 miles | In the past the equipment was expensive and self-install was not possible - both of which were big barriers to deployment; WiMAX will solve both these issues<br>Line of sight is still a problem for most solutions<br>Network planning can be complicated, but tools are available to help |
| MSAN | Replaces the local exchange with a single box that will provide voice, data and Internet services | Can be more cost efficient than a multi-box solution for rural areas where customer numbers are low | Only cost efficient if existing boxes also need replacing, or in a greenfield situation<br>No better solution than standard DSL for reducing loop length, although can be placed in remote cabinets |
| Satellite | Same principle as satellite TV but for data transmission | Can connect any home or business that can 'see' the satellite | One-way satellite needs an alternative return path<br>Two-way is a better solution but the CPE is expensive<br>Round trip delays can affect delay critical applications<br>Transponders are expensive so the bandwidth needs to be shared by many people; this can mean that contention levels are set high |

Despite these challenges, the UK is expected to achieve near total broadband coverage by 2010, helped by its fairly low rural population for size of country.

### Market Context

In predicting the next wave of broadband adopters, it is useful to examine those consumers of similar digital technologies such as digital TV, 3G, ISDN and flat-rate narrowband services. The UK scores particularly well as an early adopter of digital TV services, increasing our propensity to take-up not just fixed Internet services, but so-called 'triple play' offerings (TV, telephone and broadband Internet).

The common thread of these similar technologies is the use of interactive, content-based services. These will be the ultimate driver of future broadband growth and are therefore important considerations in predicting development and commercial revenues – increasingly important as take-up improves and competitors seek to differentiate their respective services.

## Broadband take-up

As availability and population coverage of broadband approaches 100% in many markets, the key indicator of demand and performance becomes take-up. It is well documented that the UK got off to a late start, but is now making substantial headway in terms of growth.

Whilst there is still some way to go before equalling Korea, Canada and Japan, the UK has seen 17% growth in take up between Quarter 2, 2004 and Quarter 3, 2004.

Current number of broadband lines at end Quarter 3, and resulting penetration is detailed below.

Figure 3.4 Broadband lines and penetration Quarter 3, 2004

| Country | Broadband lines | Households | Penetration |
|---|---|---|---|
| Australia | 1,280,300 | 7,305 | 0.18 |
| Canada | 5,355,551 | 11,825 | 0.45 |
| France | 5,697,360 | 24,691 | 0.23 |
| Germany | 6,111,000 | 38,931 | 0.16 |
| Ireland | 98,914 | 1,317 | 0.08 |
| Italy | 3,988,290 | 22,840 | 0.17 |
| Japan | 17,224,864 | 48,081 | 0.36 |
| Korea | 11,787,976 | 16,756 | 0.70 |
| Sweden | 1,235,900 | 4,175 | 0.30 |
| US | 31,656,848 | 109,283 | 0.29 |
| UK | 5,124,972 | 25,096 | 0.20 |

*Source: Point Topic*

# Country characteristics, comparisons with the UK and learning points

## Australia

Culturally, Australia is very similar to the UK, but the country's differentiator is that it has two major cities (Sydney and Melbourne), which are extremely sophisticated and innovative, whilst much of the rest of the country is rural. The two cities are seen to be acting as a hot bed for new technology development (fibre to the home, fixed wireless access etc), whereas elsewhere it is proving a real struggle for potential users to get access to broadband services.

In this respect, we may consider urban parts of Australia to be on a par with sophisticated Asian markets such as Japan and Korea, while the rest is more akin to the slow moving Ireland.

Whereas the UK is fairly content to continue along the DSL route, the geographic challenges mean that Australia could well become a key player in the development of wireless broadband technologies, driven by the need to increase coverage.

## Canada

One might consider Canada to be similar in some ways to Australia due to the rural challenges, but the market has vastly different drivers. Not least is an underlying desire to be recognised as an equal to the US in the technology space. The technology vendor market is thriving, particularly in the wireless space, and the large cable market provides significant competition to the telcos.

We anticipate Europe as a whole catching up with Canada and the US over the next 5 years. In the meantime, Canada's bullish drive to increase broadband uptake is admirable. It is focused on enabling the more rural areas, fighting for universal access, and *choice* across the country. This is not just about providing 'poor man's access', i.e. a basic service level, in more remote areas. The view is that all citizens should be able to access the same level of sophisticated, value-added services nationwide.

## France

Although France does not score particularly well in comparison to the other markets in this report, due to continued (if declining) dominance of France Telecom, and a focus on DSL rather than other technologies such as cable, it is nevertheless performing well in Europe following substantial LLU activity. The rise of competitors such as Free, Neuf and Noos is improving the country's competitive stance.

The success of LLU in France is something to note and learn from, with (some might say unprecedented) proactive and speedy action by the regulator ART in removing the barriers for ADSL2+ stimulating competition, and allowing greater speeds to be offered at little increase in price to the end user.

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Other activity worthy of note in France is the greater role played by local authorities in the development of broadband infrastructure. Government has encouraged these bodies to build out their own local access loops by offering reduced-rate loans. As a result, many of them are specifying networks, financing roll-out and contracting directly with operators and service providers to build and run them. End users of the network are then customers of those service providers.

## Germany

Germany is a fairly large, well-populated country with one dominant national player, Deutsche Telekom. Although an early mover with DT driving DSL roll-out according to its estimation of financial viability, growth has slowed significantly in the absence of national competition.

Germany's differentiator is that the legacy legislative systems have been based on states or Länder, with business communities and opportunities based in and around these areas. Broadband players have therefore sprung up within these major conurbation areas (e.g. HanseNet in Hamburg, and NetCologne), and whilst their individual subscriber bases (and hence market shares) are generally comparatively small, they are nevertheless providing competition to the incumbent on a region by region basis. One key challenge for DT in this respect is that it is difficult for the incumbent to define competitive national rates, as it is competing with a different player in different regions.

Interesting though this phenomenon is, it is unlikely to be witnessed in the UK where players are likely to seek economies of scale through national roll-out rather than restricting to a single urban area.

The regulatory landscape is still unfavourable for new entrants and competitors, and although we see some signs of the promise of change, the power exerted by DT is still proving a barrier, with LLU weak as a result.

## Ireland

Despite significant investment from EU funds, and initiatives from government, things have not moved significantly in Ireland. Lack of demand, poor infrastructure, expensive services and limited competition continue to hold back growth. ComReg is starting to demand changes on the part of Eircom, but is experiencing strong resistance.

## Italy

Not scoring particularly well against the other country markets in this report, Italy nevertheless is proving an innovative, forward-looking market. Fastweb may not be big on a national scale compared to Telecom Italia, but it is providing a significant competitive threat to the incumbent at a regional level. It is viewed as perhaps the most successful triple play operator outside of Asia with its fibre and unbundled DSL services offering advanced video and interactive services.

Telecom Italia too is building its reputation as an innovator, offering some interesting tarifing models, and propositions for fixed-mobile convergence and migration.

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Characterised by its high quality, value-added services, Italy is demonstrating that it can build a promising market without having a significantly competitive one.

Unlike the UK, there is no cable in Italy, but the unbundled lines used by Fastweb demonstrates a much greater deployment of LLU than in the UK. Italy also demonstrates the most successful use of fixed-wireless access for triple play outside of Asia.

## Japan

Japan is a vastly different market to the UK, and as such is difficult to compare on a like for like basis. It leads technology deployment, such as VDSL, VoIP, and FTTH (where initially it was a late starter). It has a strong competitive market, aided by progressive regulation, with some cable, and is very much demand driven. For example, fixed line voice services was seen to be expensive in Japan, and this led alternative operator Yahoo! BB to provide much cheaper VoIP services. Around 75% of its customers take VoIP as part of their broadband service.

Technology savvy users are driven by one-upmanship – particularly against Korea as well as against their co-citizens. If one subscriber buys a 45Mbps service, then chances are his neighbour will also want that and more.

The Japanese experience is seen as difficult to copy outside of that particular culture, but it is nevertheless useful to study. Unlike Italy and the US, Japan is actually not significantly ahead in the provision of value-added services, but they have the capability and capacity to provide them when they are ready to do so.

## Korea

Korea's main broadband driver was a significant government push to become a leading global force in the broadband space. The Korean Government invested significant amounts of money into the infrastructure to stimulate competition. But what government and service providers failed to identify fully was the business case for broadband. In 2003, Korean telcos suffered substantial losses, and the intense, competitive marketing activity between them resulted in increased churn and costs. Korea Thrunet went into receivership in March 2003. For the first nine months of 2004, it reported net profit of KRW170.5 billion on revenue of KRW268.4 billion. Its debt stood at KRW448.5 billion.

KT has not yet hit breakeven point in its broadband and wireless LAN services, and continues to make losses. Moreover, these operations require further investment in capital expenditure and operating expenditure.

Hanaro, which is seeking to acquire Thrunet, is now majority owned by Newbridge Capital and American International Group Inc. The two companies took a controlling stake in Hanaro in 2003, investing around $500 million. Hanaro's balance sheet now looks healthier as a result. Nevertheless, it is useful for other markets to understand the reasons behind Korea's market difficulties and learn from it.

Korea provides the UK with other learning points, particularly as regards its approach to access agnosticism: many service providers will use the best and most effective

technology available to them, whether it be cable, DSL, FWA or fibre to the apartment. In the UK, cable operator ntl is also considering spreading its own footprint using DSL, and it will be useful to examine the Korean experience in undertaking this.

## Sweden

A major driver for broadband uptake in Sweden is the public sector – enabling schools, universities and other public services is a key concern for the government. In addition, the high number of apartments have made it relatively easy for B2 to install fibre, pushing forward the roll-out of higher speed services.

Sweden's geography is also considered to play a part in driving broadband. Remote areas and short daylight hours in the winter has encouraged the Swedes to find new ways of communicating and as a result, wiring up rural areas has been encouraged.

Sweden is a competitive market, where cable and fibre vie with the incumbent, TeliaSonera – the cable operators UPC and Comhem in particular being quite aggressive about broadband roll-out.

In terms of best practice, the UK can learn from Sweden's public sector push where significant investment is being made into public services with direct involvement of private, commercial companies.

## US

The US has a handful of large players (though none are particularly dominant nationally), and over 100 incumbents throughout the country. This makes for a market that appears highly competitive at a superficial level, as players tend to operate on a regional basis and resulting market shares calculated in terms of national subscriber numbers are fairly low.

The other competitive characteristic is that cable is extremely strong. The players have thrown substantial investment at upgrading networks and rolling out value added services such as video-on-demand, digital cable TV, VoIP, HDTV – even targeting the SME population, normally the preserve of telcos.

Players are driving to deploy fibre to the curb, VDSL, IP infrastructure, and are investing heavily in guaranteeing their future in the broadband market.

Like Italy, the US is to an even greater extent focused on value-added services, notably *content*. The strong presence of TV (satellite as well as cable services) fits with the importance of interactive information and entertainment, and it has to be sophisticated to satisfy an advanced and demanding audience.

In some ways, the US may be seen as too competitive. The FCC is currently experiencing some quandaries in regulating open access to networks. It has decided for the moment not to require fibre providers to open their networks. This might be negative in terms of competition, but the alternative is that if players are mandated to open up, they will refuse to cooperate or to invest at all.

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The US is, of course, forward looking, deploying new technologies such as IP over ethernet, and faster DSL technologies in order to provide better quality services such as VoD.

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