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International Broadband Market Comparisons

Update January 2006

Covering the period April 2005-September 2005

A Report for the Department of Trade and Industry

Contents

1. Executive Summary

The UK broadband market has continued to show positive signs of development over the six month period April 2005 to September 2005. Overall it is performing very well against the other G7 countries, plus Australia, Ireland, South Korea and Sweden. There continues to be very little change in the ranking of the individual indices. However, during the period March 2005 to September 2005, the UK experienced 25% broadband growth which is one of the highest among all countries. By the end of September 2005, there were 8.86 million broadband connections in UK. Also, the UK has extended its lead on extensiveness, primarily due to the much-improved coverage of DSL across the country to reach 99.6% of households, with cable and fixed-wireless access bringing the total reach to 99.7% .

The competitiveness index reflects performance on choice, price and regulation. The UK maintains its third position overall, behind Japan and Canada – pulling away slightly from the US as prices fall further. France too continues to make small improvements in the competitiveness index, which may be mainly attributed to the increase in choice within the market, although it has lost some ground with regard to pricing. The regulatory picture has remained fairly constant over the preceding six months. The US regulatory landscape has again seen some upheaval, as the FCC implements its decision to remove wholesale broadband access obligations on ILECs (Incumbent Local Exchange Carriers) and classes wireline broadband Internet services as 'Information Services', in line with the cable market. This is considered to be something that will affect competitive market conditions going forward. However, these developments do not change the regulation index scoring, and the UK retains its first position jointly with the US.

Choice has continued to improve in almost half of the countries – although there have been no changes in country rankings. The UK's score has remained static as BT Wholesale hits the 6 million mark for broadband subscribers, and whilst there is stiff competition in the retail market, BT's share of the wholesale market suppresses any growth in the choice index. The impact of LLU in the UK is still to be seen. Japan and France continue to be the most progressive countries currently in offering LLU opportunities for alternative operators.

The UK remains in fourth position in the price index – behind Japan, France and Canada. Despite continued improvements in pricing, the UK has been unable yet to catch these countries. Except in France where Wanadoo has increased rates, prices have continued to fall – particularly in terms of the installation fee as many operators have now waived this one-off charge and special promotions offered by ISPs. Japan retains its top position as probably the cheapest broadband market in the world, and it remains to be seen how long it can sustain such competitive pricing – France seems to have had trouble doing this resulting in price increases. Canada has also improved its score, as the competitive marketplace causes both cable and DSL providers to offer special discounts for customers who subscribe to more than one of their services. However, the greatest differences in the price index are reported in the cases of Ireland and Italy. In both cases the incumbent operator has come with

significant price cuts in their entry broadband service offerings. In Italy, Telecom Italia who controls over 80% of the retail market has reduced prices by 20% in its Alice Flat (640kbps downstream) offering while in Ireland Eircom, also with over 80% market share, reduced prices in its broadband home starter (1Mbps downstream) service by 10%.

The market context index reflects the potential addressable market for broadband (the market context) and its 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 second position behind the US, mainly as a result of its strong digital TV market, with 66% of households now take a digital satellite, cable or terrestrial service, as well as emerging interest in 3G mobile services.

The UK continues to demonstrate a strong performance in the availability index retaining its first position. We have 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. In addition, BT has continued to DSL-enable exchanges, which has meant that more communities now have access to broadband. Indeed, 99.6% household coverage of DSL in the UK at September 2005 has exceeded BT's promise is of 99.4% coverage by the end of 2005. Japan has extended coverage to 96% of the country, according to NTT East and NTT West and France has considerably improved its position (joint second) mainly due to FT's action after pressures from regulator. According to the latest report by the FCC, US availability has significantly increased to almost 94% of the country, and broadband coverage is reported to be 81% now in Ireland (although there is still some debate as to how many broadband lines can actually carry 512kbps services).

The combined score of market context and availability ensures that the UK maintains its top position in the extensiveness index, a position it is anticipated to keep over the course of the next year.

Take-up has been a major challenge for the UK, although during the last six months significant improvements have been made and UK is rapidly catching up with France with 35% household penetration. This momentum is expected to continue to the end of the year – the UK experienced the second greatest percentage point increase in its score among all countries under review. Canada retains its first position among the G7 countries with 53% penetration. Although Canada is expected to keep this top position by the end of the year, the UK is expected to improve its position enabling it to move into third position with an estimated 39% penetration.

Going forward, if the UK is to improve its positioning among the G7, the focus must remain on competitiveness – primarily choice available to end users. The more choice of suppliers available, the greater the impact on 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 services from which to choose that will perhaps fit better with their own particular lifestyles.

2. Broadband market indices

2.1 Measuring success: key metrics

This Report, covering the period from April 2005 to September 2005, 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. It is in support of the Government's overarching objective for the UK to have the most extensive and competitive broadband market in the G7 by the end of 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. Ovum has used the same indices in analysing the findings for this 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 the end of 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.

2.2 Definition of indices and country rankings

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 2005.

2.2.1 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.

The scores and rankings for the choice index are provided in Figure 2.1.

Figure 2.1: Choice Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
Japan	0.91	1	0.94	1	1
Canada	0.84	2	0.83	2	2
US	0.76	3	0.78	3	3
South Korea	0.69		0.70		
UK	**0.66**	**=4**	**0.66**	**4**	**4**
France	0.66	=4	0.54	5	5
Sweden	0.65		0.66		
Australia	0.62		0.59		
Germany	0.54	6	0.48	6	7
Italy	0.29	7	0.38	7	6
Ireland	0.27		0.19		

Source: Ovum

Since March 2005, choice of supply has improved slightly in only half of the examined markets, with a number of the more competitive countries even falling slightly as players jostle for market share. In Ireland, Eircom is embracing broadband more fully, and the country has seen a significant increase in subscribers. New entrants are

starting to emerge, but have yet to make any substantial impact on Eircom's market share. The UK's score was steady again as all ISPs increased subscriber numbers. BT's Retail DSL subscribers increased from 1.9 million at the end of June 2005 to 2.1 million at the end of September 2005. Its broadband end users, however, reached 6.2 million on 30 Sep 2005, demonstrating its continuing strength in the wholesale market.

The increase in France's index is primarily due to the decrease of France Telecom's broadband infrastructure share to less than 70%. On the other hand, the choice index for Italy has been significantly reduced due to the increase of Telecom Italia's retail market share during these six months back to over 80% and its continuing stranglehold on the supply of broadband services, despite promising developments from competitors such as Fastweb. Uptake of LLU will continue, driven primarily by Fastweb which continues to extend its footprint, but until then, Italy still remains in last position on choice among the G7.

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 almost 90% of the market. However, each of the phone companies and each of the cable companies has a discrete geographic coverage area, so that in any given part of the country the market is largely fought over by one local phone company and one cable company, creating a series of local duopolies. Competition based on regulated access to networks is minimal, although a handful of players, mostly serving business customers, have made this their business.

Nevertheless, the market is looking healthy in the US, with a 12% growth in broadband subscribers between March 2005 and September 2005. The growth of DSL continues to outpace cable modem with a 28% growth between March 2005 and September 2005, compared to a 13.5% growth of cable modems. DSL providers are continuing to extend the footprint of DSL services. For example, in SBC's case, it already reaches more than 80% of the homes in its territory and plans to expand availability of its services. However, cable modems continue to remain the dominant broadband technology. In 2004 cable broadband held a 58% share of the total broadband market. Ovum estimates this will decrease to 54% by the end of 2005 and that DSL broadband will pick up most of the remaining share.

Competition in South Korea remains intense although there has been slight decrease to its score. SK Telecom and KT plan to offer mobile wireless broadband service, WiBro, that will allow users to access the Internet when travelling at speeds up to 60 kilometers-per-hour (36mph). If the mobile subscriber station (a car, for example) exceeds that limit, it may still receive WiBro services but quality will likely be degraded, depending on how high the speed is, and the surrounding environment.

Access points are being built in Seoul and 19 other cities for a launch next year. KT is working with HP and Intel to develop handsets for this. Hanaro originally said it would invest in WiBro also, but has since decided not to pursue it. Instead, Hanaro express the desire to concentrate on its acquisition of troubled rival provider Thrunet, which is

expected to help the company better compete with market leader KT.

2.2.2 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.

The scores and rankings for the price index are provided in Figure 2.2.

Figure 2.2: Price Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
Japan	0.98	1	0.98	1	1
France	0.85	2	0.94	2	2
Canada	0.80	3	0.77	3	3
UK	**0.76**	**4**	**0.72**	**4**	**4**
Ireland	0.75		0.67		
Italy	0.70	5	0.50	6	7
Australia	0.69		0.63		
Sweden	0.65		0.63		
US	0.62	6	0.62	5	5
South Korea	0.54		0.53		
Germany	0.46	7	0.41	7	6

Source: Ovum

There have been significant improvements by many countries in the Price index, although little movement in rankings except for Italy which has now overtaken the US. 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 the average speed offered by many operators now at 1Mbps) whilst prices are staying fairly static, including the US and South Korea.

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

In the last report we highlighted that France had improved its position considerably after a spate of huge price cuts, moving above the UK and Canada as a result. However, during the last 6 months France's price index has fallen again (although it is still healthy) mainly due to price increases introduced by Wanadoo.

Although the UK remains in fourth position, price cuts have continued. All of the UK operators covered in the benchmark continue their special promotions that result in waiving installation expenses.

The greatest differences in the price index are reported in the cases of Ireland and Italy. In both cases the incumbent operators have effected significant price cuts in their entry broadband service offerings. In Italy, Telecom Italia, which controls over 80% of retail market has reduced by 20% prices in its Alice Flat (640kbps downstream) offering, while in Ireland Eircom, also with over 80% market share, reduced prices in its broadband home starter (1Mbps downstream) service by 10%.

2.2.3 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.

The scores and rankings for the regulation index are provided in figure 2.3.

Figure 2.3: Regulation Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
UK	**1.00**	**1=**	**1.00**	**1=**	**1=**
US	1.00	1=	1.00	1=	1=
Canada	0.83	3	0.83	3	3
South Korea	0.83		0.83		
Ireland	0.83		0.83		
Japan	0.67	4=	0.67	4=	4=
France	0.67	4=	0.67	4=	4=
Germany	0.67	4=	0.67	4=	4=
Italy	0.67	4=	0.67	4=	4=
Sweden	0.67		0.67		
Australia	0.67		0.67		

Source: Ovum

There has been no major change in the regulatory index over the last 6 months as a whole.

However, in the US market, the FCC has made a number of significant decisions regarding the regulation of wholesale broadband Internet access that will affect the US broadband market. Specifically, on 5 August 2005, the Federal US regulatory body decided that wireline broadband Internet access services are 'Information Services', which implies a much lower degree of regulation on their providers, according to the US telecoms act. In particular it relieves them from the obligation to unbundle the transmission components and grant access to other ISPs.

The FCC decision has levelled the playing field for the regional bell operating companies (RBOCs), granting them the same degree of freedom as cable companies, who are not legally required to lease access to competing providers of high-speed Internet access, after the 'Brand X' ruling by the US Supreme Court in May 2005. Independent ISPs will have a one-year transition period during which they will still be able to use existing facilities from facilities-based providers since the ruling will be implemented by the end of 2006. After this period they will have to completely re-think their business and role in the US broadband market today.

2.2.4 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).

The scores and rankings for the availability index are provided in figure 2.4.

Figure 2.4: Availability Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
UK	**1.00 (0.997)**	**1**	**0.98**	**1**	**1**
South Korea	0.97		0.97		
Japan	0.96	2	0.95	2	2
France	0.95	3	0.90	3=	6
US	0.94	4	0.89	6	7
Germany	0.91	5	0.90	3=	3
Sweden	0.90		0.90		
Italy	0.90	6	0.90	3=	5
Canada	0.89	7	0.86	7	4
Australia	0.85		0.80		
Ireland	0.81		0.74		

Source: Ovum

Availability continues to improve, particularly as incumbents enable the copper wire for DSL provision. 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. In addition, BT has continued the DSL-enabling of exchanges which has meant that more communities now have access to broadband. Indeed, availability of DSL in the UK exceeds all other markets and it is in line with Government's earlier commitment of 100% broadband availability by the end of 2005[3].

Assessing the availability of broadband continues to be difficult in the US due to the fragmented nature of the market. However, according to the FCC's report published in July 2005, at the end of 2004 the service providers that report to the Commission had at least one high-speed service subscriber in 95% of the nation's zip codes. By considering the fact that 99% of the country's population lives in these zip codes it can be inferred that broadband availability reaches almost 94%.

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 continues to find it difficult to move its terrestrial standard T-DSL coverage beyond 91% for technical and economic reasons.

[3] http://www.dti.gov.uk/ministers/speeches/timms121103.html

The cable modem market is still very small in Germany, but with new investment and consolidation of players this might change in the near future. However, the formidable costs of upgrade that are still to be faced and the incumbent's head start mean that growth will be hard to win. Now that Deutsche Telekom has sold its stakes in cable networks, the sector has a second chance to make a broadband mark. An influx of investment and rapid consolidation means upgrading of networks for broadband should accelerate. However, the costs are daunting and any sustained recovery of the sector with regard to broadband will demand considerable long-term investment.

In Italy, Telecom Italia has rolled out DSL to cover 90% of the population, with mainly satellite plugging the 10% shortfall. Despite the fanfare around Fastweb's deployment of fibre for high bandwidth access, the vast majority of broadband deployment will be focused on xDSL going forward. Fastweb has switched to xDSL for extending its footprint (although it will deploy fibre to business premises in some cases) and with LLU having proved a viable option, most competitors will take advantage of this in the short to medium term.

A major factor in the focus on xDSL and the higher than average speeds from providers is the shortness of loop lengths within Italy. The average loop length is 1.5 kilometres, and 50% of households are within 1 kilometre of the local exchange. The cable network in Italy covers only a few favoured areas so it cannot make a significant contribution to broadband.

Sweden has benefited from a proactive government and regulator promoting broadband, as well as a large proportion of the population living in multi-tenant units (MTUs) making it easier and cheaper to reach a large percentage of the population. In Q3 2005 the country's broadband coverage reached almost 90%. There are 290 municipalities and 200 of them have their own network. The goal of the Swedish Urban Network Association is to have an open infrastructure, reduce the amount of digging by co-ordinating the laying of fibre and to create robust networks for government and public use. The government wants to have broadband available to 99% of Swedish residents by 2006.

France has significantly improved its position with regard to availability over the last 6 months – moving into joint second place with Japan (95%) mainly due to infrastructure investments from FT coming after pressure from the regulator. France Telecom has entered the third phase of its "Broadband for Everyone" plan. The programme was initiated in June 2003 and has achieved its goal of making broadband available to 95% by the end of 2005[4]. To extend its coverage beyond 95%, France Telecom will probably need to seek external funding. Cable modem services are also available to around 33% 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.

[4] http://www.ieee-im.org/ColletKeynote.pdf

Ireland has reportedly improved in terms of Digital Subscriber Line (DSL) coverage and it is estimated by the Irish Consumer Strategy Group that broadband coverage has increased to 81% of the country, ensuring that every town in Ireland with a population over 1,500 may be connected to broadband (although there still remains some concerns that not all enabled lines are yet capable of supporting 512kbps services). Eircom has also announced that it plans to achieve 90% broadband coverage in Ireland by March 2006 and is calling on Government to help deliver the remaining 10% so that Ireland can have 100% broadband availability by 2007.

In Japan, both NTT East and NTT West claim to have coverage of 96%[5], where coverage is considered to be the ratio relative to the number of landline phones installed in the NTT's service area. NTT's broadband FLET'S ADSL service is available in approximately 96% of the NTT East service area.

2.2.5 Market context 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. The Market Context index is calculated as a sum of the estimated percentage of households with DTV, ISDN, flat rate Internet subscriptions and broadband, plus 3G users. The total is divided by 200%.

The scores and rankings for the market context index are provided in figure 2.5.

[5] http://www.ntt-east.co.jp/product_e/05/2.html

Figure 2.5: Market Context Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
South Korea	0.81		0.79		
US	0.69	1	0.63	1	1
UK	**0.65**	**2**	**0.58**	**=2**	**3**
Canada	0.61	3	0.58	=2	2
Sweden	0.55		0.50		
Australia	0.54		0.49		
Japan	0.54	4	0.47	4	4
Germany	0.42	5	0.38	5	5
France	0.40	6	0.36	6	6
Ireland	0.39		0.32		
Italy	0.34	7	0.27	7	7

Source: Ovum

In all countries, the market context index has significantly increased between March and September 2005. The main driver for that is the increase in household broadband penetration for all the countries examined. Other key drivers of this particular index continue to be the substantial uptake of 3G in South Korea, with increasing penetration in Japan and the US. The UK is still leading in digital TV with a penetration rate of 66% of households, but other countries such as the US, Canada, Sweden and Ireland are now starting to close the gap – although the UK is still some way ahead.

2.2.6 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.

The scores and rankings for the take-up index are provided in figure 2.6.

Figure 2.6: Take-up Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
South Korea	0.71		0.72		
Canada	0.53	1	0.50	1	1
Japan	0.43	2	0.41	2	2
Sweden	0.40		0.34		
US	0.37	3	0.33	3	3
France	0.36	4	0.31	4	4
UK	**0.35**	**5**	**0.29**	**5**	**5**
Australia	0.31		0.25		
Italy	0.25	6	0.23	6	6
Germany	0.21	7	0.19	7	7
Ireland	0.13		0.11		

Source: Ovum

As broadband availability is approaching 100% in many countries, the major focus is shifting towards increasing the take-up of broadband. 2004 and 2005 so far have been a key year for many countries in terms of broadband growth.

The countries with the highest broadband growth between December 2004 and September 2005 are Australia (52%), UK (48%) and France (35%). In these markets broadband penetration has reached the mass market.

The growth in take-up in the UK is driven by a combination of factors including:

- BT removing the 6km distance limit of ADSL, meaning that homes and businesses beyond 6km from an exchange could have access to broadband services
- reductions in pricing for shared LLU by both Ofcom and BT fuelled price cuts by ISPs
- the continuing DSL-enabling of exchanges meant more communities had access to broadband
- LLU by players such as Bulldog created competition at the higher speed broadband service.

According to Point Topic the UK was still just behind France in broadband numbers at the end of September, with a total of 8,860,000 lines as against 8,927,000 in France. Germany is now third in European broadband with 8,411,000 lines at the end of September.

The UK added nearly 2.8m broadband lines in the first nine months of 2005 while France added only 2.2m. Point Topic expects the trend to continue with the UK adding at least 200,000 more lines than France in the last quarter.

The broadband market in South Korea is nearing saturation – this is evident in the lower growth in take-up over the last 9 months of just 0.61%. Note that Korea scores slightly lower in the index due to the correlation of minimal growth in broadband connections set against slightly higher growth in the estimated number of households. Broadband players in South Korea have traditionally focused on the technology to drive growth – i.e. offering higher speeds for similar prices as lower speed services. The focus now must start to shift from an access price war towards increasing ARPU by segmenting their customer base, offering 'tiered' services and facilitating the provision of content and services.

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. In May 2005 the Minister of the Environment, on behalf of the Minister of Industry and several other federal partners, announced that the 'Centre des technologies de l'information et des communications' would receive C$6.9 million in funding from the Government of Canada to deploy broadband, or high-capacity Internet to an estimated 51 municipalities.

By end 2005, Japan aims to have 'always on' broadband connections to at least 30 million homes, and ultra high-speed access networks to at least 10 million homes. Japan's infrastructure is one of the most advanced in the world but as yet has not reached full utilisation. Japan came late to the broadband world, but subscriptions subsequently rocketed due to pro-competitive polices. Another key driver for broadband growth is the availability of value added services including video on-demand, music on-demand, games on-demand, TV and others.

In August 2005, Japanese government officials announced plans to develop a new communications satellite to provide broadband services that are as fast as fibre optic cable in order to increase broadband availability and choice to end-users. Japan's Internal Affairs and Communications Ministry said the new satellite will make it possible to send and receive data at a maximum speed of 100Mbps in mountainous areas and remote islands, as well as aboard Shinkansen bullet trains, aeroplanes and ships.

2.3 Comparisons

The UK's score has improved slightly when comparing price against choice.

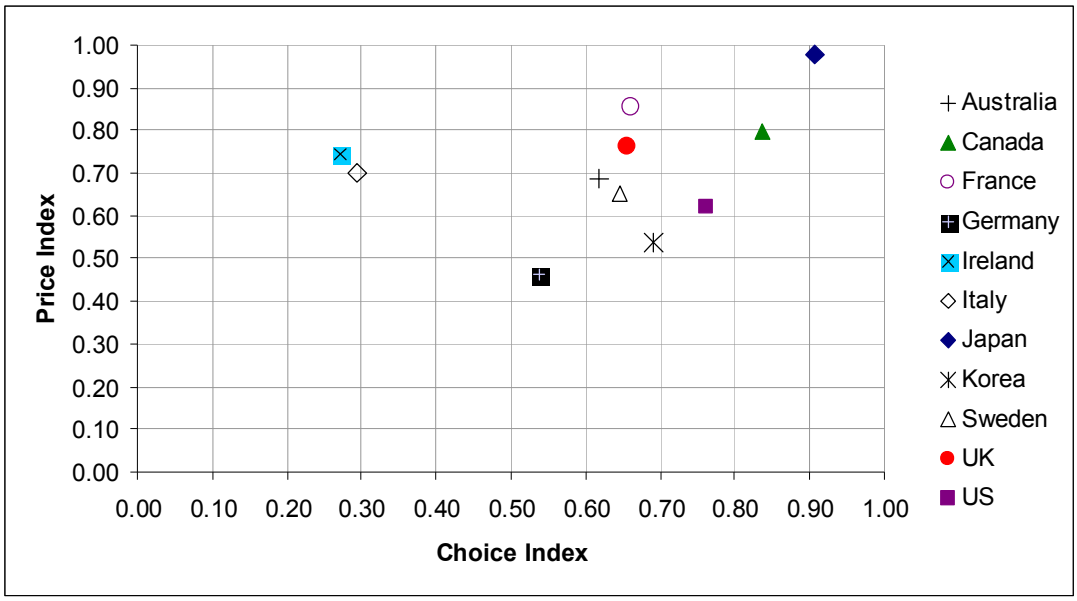
Australia has improved its overall position and caught up with the pack due to increase in the price index resulting from reductions in BigPond's offered broadband services. In Ireland, Eircom has started to really push broadband services with pricing

having improved due to decrease in prices offered by the main player Eircom in the market.

France continues to improve on choice following significant LLU activity earlier in the year. It has, however, dropped back in the price index due to some price increases – perhaps as a result of the unsustainability of overly cheap offerings at the start of the year.

Italy has continued to improve on price but dropped back in the choice index due to the intensified position of Telecom Italia in the broadband infrastructure arena.

Figure 2.7: Choice versus price



Source: Ovum

2.4 The 2005 Government target

The UK Government target is to have the most competitive and extensive broadband network in the G7 by the end of 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: choice (3), price (3) and regulation (1)
- *extensiveness* is defined as a composite measure of market context and broadband availability – these are weighted availability (2) and market context (1).

Figure 2.8 illustrates the competitiveness index.

Figure 2.8: Competitiveness Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
Japan	0.90	1	0.92	1	1
Canada	0.82	2	0.80	2	2
UK	**0.75**	**3**	**0.74**	**3=**	**3**
France	0.74	4=	0.73	5	5
US	0.74	4=	0.74	3=	4
Sweden	0.65		0.65		
Australia	0.65		0.62		
South Korea	0.64		0.65		
Ireland	0.55		0.49		
Italy	0.52	6	0.47	7	7
Germany	0.52	7	0.48	6	6

Source: Ovum

As discussed above, there have been significant improvements in the pricing index by many players, and its high weighting results in improvements in the competitiveness index – particularly for Italy and Ireland (although they remain low overall).

Figure 2.9 illustrates the extensiveness index. Here we see the UK, as a result of improvement in availability to 99.7%, retaining its first position among the G7 due to significant improvements in broadband availability during the last six months.

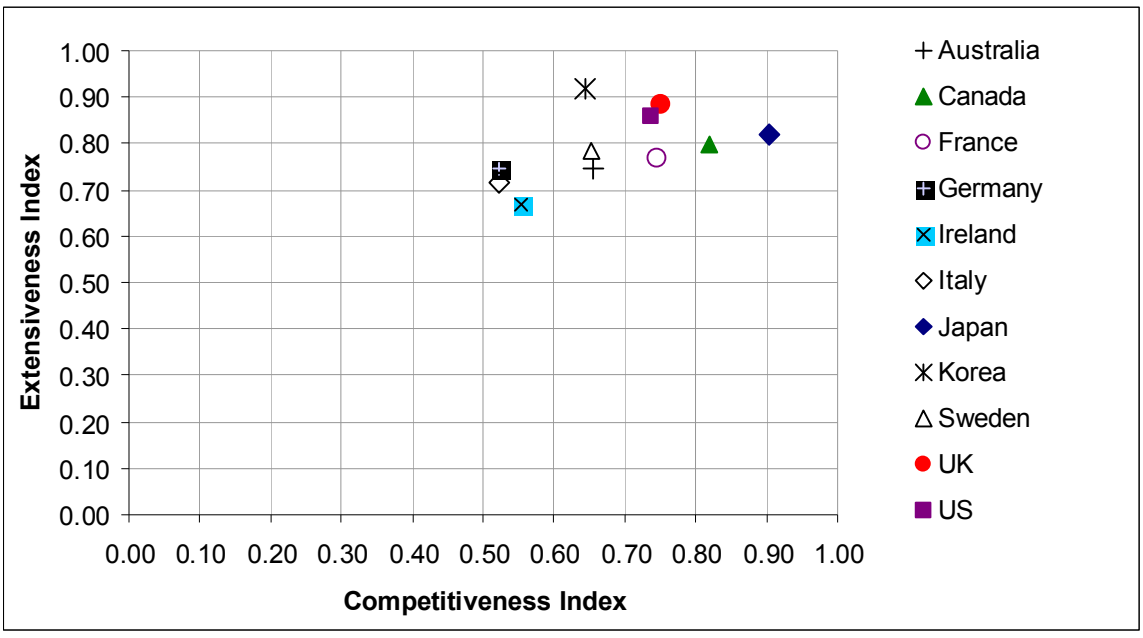
Figure 2.9: Extensiveness Index at Q3 2005

	Q3 2005	G7 rank Q3 2005	Q1 2005	G7 rank Q1 2005	G7 rank Q3 2004
South Korea	0.92		0.91		
UK	**0.88**	**1**	**0.84**	**1**	**1**
US	0.86	2	0.80	2	4
Japan	0.82	3	0.79	3	3
Canada	0.80	4	0.77	4	2
Sweden	0.78		0.77		
France	0.77	5	0.72	6	6
Germany	0.75	6	0.73	5	5
Australia	0.75		0.70		
Italy	0.71	7	0.69	7	7
Ireland	0.67		0.60		

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 South Korea for extensiveness (high 3G penetration and existing broadband being factors here), nor Japan for competitiveness (where price and strong player competition remain key factors), it is in a good position. Indeed, it has increased its score in the extensiveness index due to its higher availability, as well as growth in 3G and digital TV, which improves its market content index. Further reductions in pricing along with improvements in the choice index are further required in order to position itself in first place for competitiveness.

3. Developments, plans and initiatives

This chapter summarises some of the key developments, plans and initiatives in each of the country markets under review during the period April-September 2005.

Below we have listed in country order some of the key announcements made during this period.

3.1 Australia

Optus plans its broadband infrastructure

Optus in Australia unveiled additional details in May of its new broadband rollout plan, saying it would initially cost A$80 million and cover about 1.2 million homes.

In September 2005, however, the operator announced it would spend A$150 million on the development of its broadband infrastructure. The planned network will give Optus access to nearly 3 million potential home and business customers and will directly challenge Telstra, which runs the only current nationwide broadband network in Australia. Optus had been negotiating an access agreement with Telstra before deciding instead to directly challenge for market share with a proprietary network that would allow them to undercut Telstra's consumer rates. (*UPI, September 2005*)

Cirrus Communications launched its broadband services

Also in September 2005, Cirrus Communications, a central coast wireless telecommunications company, launched its new broadband service at East Gosford. Cirrus Communications has started on the coast with the aim of providing unserviced areas throughout regional Australia with broadband services. *(Nationwide News Pty Limited, September 2005)*

BigPond to provide broadband services

In August 2005, BigPond confirmed the launch of a mobile broadband service that will be largely identical to that offered by Telstra, BigPond's parent company. Telstra's mobile plan is considered pricey and is offered in primarily urban areas. It runs at speeds of 300-600 kbps in areas enabled for 1xEVDO standards. *(UPI)*

Internode installed ADSL for Telstra

In July 2005, after an 11-month delay, Australian broadband-services provider Internode started installing ADSL equipment in the east-coast exchanges of Adelaide ISP Telstra. The Internode equipment will be built into the Sydney-area exchanges at Newtown and Redfern and also in Canberra. *(UPI, July 2005)*

Australia's Austar swaps spectrum with Unwired

Australian pay-television company Austar United Communications Ltd said in July it entered into a spectrum swap deal with Unwired Group Ltd that will deliver interoperable wireless broadband services in both metropolitan and regional Australia as networks are rolled out.

In a joint statement, the two companies said the agreement will see Austar trade a portion of its 2.3GHz spectrum licences to Unwired, while Unwired will trade a portion of its 3.5GHz spectrum licences to Austar. Licence boundaries will be redrawn, with new licences issued. Unwired will also pay Austar A$15 million cash.

The agreement will see Austar holding 2.3GHz and 3.5GHz licences in areas that roughly align with its current subscription television market in regional Australia, while Unwired would hold the 2.3GHz and 3.5GHz licences for the majority of metropolitan Australia. *(Dow Jones Newswires, July 2005)*

Optus signs up iBurst, holds talks with Unwired

Optus said in May 2005 it had entered a partnership with Personal Broadband Australia to provide mobile broadband access to corporate customers using iBurst technology. At the same time Optus was also in talks with Unwired Australia on a similar deal for wireless broadband.

The iBurst technology was developed by U.S. firm ArrayComm Inc especially for mobile access to the Internet. Its first-ever commercial service was in Australia by PBA, a company ArrayComm helped establish as part of a consortium after it acquired rights to spectrum in the Australian 3G auction in 2001.

PBA launched commercially in March last year in Sydney and it has now spread to Melbourne, Brisbane and the Gold Coast with the company owning spectrum in Adelaide, Perth, Hobart and Darwin. It sells unlimited access to laptops through the use of PC card modems supplied by ArrayComm's long-time partner, Kyocera.

Optus said it is also currently working on two wireless broadband trials - one for consumers (with partner UTStarcom) and one for businesses (with partner Siemens). *(Total Telecom, May 2005)*

Australian Government announces Connect Australia programme

In August 2005, the Australian Government announced A$1.1 billion for the *Connect Australia* package, and the establishment of the A$2 billion Communications Fund. *Connect Australia* includes A$878 million for *Broadband Connect* to provide Australians in regional areas with affordable broadband services, A$113.4 million for *Clever Networks* to fund broadband networks in regional areas to improve health, education and other essential services, A$29.5 million for *Mobile Connect* to improve mobile coverage, and A$89.9 million for *Backing Indigenous Ability* to improve vital communications services for remote Indigenous communities.

The Communications Fund has been established and will be used to deliver an income stream to fund Government responses to the recommendations of future legislated reviews into regional telecommunications. The first regular review will commence in 2008, and the time between reviews will be no more than three and a half years.

The *Connect Australia* programmes and Communications Fund are key elements in the Government's strategy to future proof telecommunications services in regional Australia. (*tel:info, August 2005)*

3.2 Canada

Canadian Regulators Move on Broadband Over Power Line

Broadband over power line (BPL) proceedings just begun by Industry Canada will likely produce technical standards on par with the FCC's, giving the utility industry a much-needed spur to embrace BPL. But, since Canada's broadband penetration is higher than that in the US, some officials and analysts voice doubt about BPL's potential to become the 3rd broadband platform or even the one serving rural areas. Only a single major access BPL trial has been reported in Canada. That trial is being run by PUC Telecom, an affiliate of a power utility owned by the city of Sault Ste. Marie, Ontario. Some utility officials said they're banking on BPL's internal applications, such as automatic meter reading and outage reporting, to drive power company interest.

Similarities in the Canadian and US power grids mean BPL equipment manufacturers will view the 2 nations as a "common marketplace," Industry Canada said in a BPL consultation paper. Technical harmonisation with the US will spur deployment in Canada. Canada has no BPL-specific standards, but the Radiocommunications Act provides for steps to resolve interference complaints. Saying it needs to develop technical standards and set operational requirements, the regulatory body said it's developing a new Interference Causing Equipment Standard for access BPL equipment. To ensure compliance, Industry Canada proposed an equipment certification process that will include submission of a test report. Australia, Austria, China, Finland, Hungary, Ireland, Italy, Japan, S. Korea and Switzerland are among countries studying BPL or are conducting trials of the technology. Results have been mixed, with some governments banning BPL and others allowing conditional deployments. *(Warren Publishing, Inc. / Communications Daily, September 2005)*

Inukshuk launches Canada broadband network

Rogers Communications and Bell Canada announced in September 2005 the formation of Inukshuk Internet, a joint venture that will build and operate, according to them, one of the most robust and extensive wireless broadband networks in the world. Under the plan, Inukshuk will provide the network services for both Rogers and Bell Canada while operating on a cost-recovery basis. Pooling their resources, the two companies said in a statement, will allow them to both cut costs and expand

broadband coverage to two-thirds of Canada at the same time. The project will cost about C$200 million over three years and will bring wireless broadband to more than 40 cities as well as underserved rural regions. *(The Canadian Press, September 2005)*

Industry minister pushes broadband

In September 2005, the Australian Industry Minister David Emerson said he would be seeking increased federal funding for initiatives to improve the country's broadband infrastructure, an essential component of high-speed Internet communications. He believed that Canada's competitive advantage in terms of broadband communications had begun to slip and that it was time for the federal government to make a renewed push to ensure the country doesn't fall behind. (*Canadian Press, September 2005)*

Ministry of Industry announced the funding for Broadband Internet Service for Unserved Communities

The Minister of the Environment, on behalf of the Minister of Industry and several other federal partners, announced that the 'Centre des technologies de l'information et des communications' is receiving C$6.9 million in funding from the Government of Canada to deploy broadband, or high-capacity Internet to an estimated 51 municipalities.

The Government of Canada's funding includes contributions from Industry Canada's Broadband for Rural and Northern Development Pilot Program, Indian and Northern Affairs Canada, Canada Economic Development for Quebec Regions, Health Canada and Industry Canada's First Nations SchoolNet. (*Canadian Corporate Newswire, May 2005*)

3.3 France

Free considers VoD options in France

French telco and ISP Free has been considering launching video-on-demand (VoD) services into the French market. The operator, which has more than 1.4 million French ADSL customers, is offering a combination of voice, broadband and TV services for euro30 a month. In terms of its digital television strategy, Free's major challenges appear to be in the content arena. *(Inside Digital TV, September 2005)*

Free acquires Altitude to launch WiMAX in France

France's main alternative broadband ISP, Free Telecom, announced in September it is to acquire privately-held Altitude Telecom, the owner of the sole national 3.5GHz licence, for an undisclosed amount. Free is acquiring Altitude's 3.5GHz licence and its residential ISP business, while Jean-Paul Rivière, the current CEO and main shareholder of privately held Altitude, is re-purchasing the enterprise and public

authorities businesses, which will operate under the Altitude Développement (AD) brand. According to French newspaper Les Echos, AD will pay Free for use of the WiMAX spectrum. (*Ovum, September 2005*)

Merger of Neuf Telecom and Cegetel

Neuf Telecom and Cegetel merged to form Neuf Cegetel in August 2005. Neuf Telecom's shareholders had previously approved SFR's entry into the capital of the company through a capital increase and the issue of convertible bonds, in exchange for SFR's contribution of 100% of Cegetel. The Louis Dreyfus group and SFR thus each hold 28% of the capital, the remaining 44% being held by neuf telecom's historic minority shareholders. *(LouisDreyfus, August 2005)*

New broadband wireless access frequencies to be allocated in France

ARCEP, the French telecoms regulator, partly unveiled its conditions for allocating new licences in the 3.4-3.6GHz band in July, which will enable the development of wireless local loop (WLL) networks providing broadband access services. The allocation procedure for the two additional licences will be conducted independently for each of France's 22 regions.

The whole procedure will take place in two phases. Phase one will see candidates indicate their interest for a licence in one or more regions. This is supposed to allow for co-ordination between the different players. In regions where there are more candidates than licences, ARCEP will conduct a second phase to select two licensees. This phase will be a mixture of a beauty context and a tender. Three criteria will determine ARCEP's choice: how the project contributes to the development of broadband in local territories; how it will foster competition in the broadband access market; and how much the licensee is willing to pay. (*Ovum, July 2005*)

Internet Television at the centre of Neuf's triple-play strategy

According to Informa in June, Internet Television will remain at the centre of the triple-play strategy of the French Internet service provider to be formed by the merger of rivals Neuf and Cegetel. The new Neuf Cegetel will move into third place in France's broadband market, after France Telecom, and Free Iliad. Cegetel had previously announced that it would join France's growing market for internet television by launching a hybrid set-top box for both digital-terrestrial and internet television that would plug into its ADSL modems.

Neuf, which targeted 100,000 television subscribers by the end of the year, is already in the market using a different approach: a digital-terrestrial decoder from Netgem with an integrated ADSL modem. *(Informa, June 2005)*

French government to force FT open its broadband wholesale access

The European Commission announced that it has approved the French government's plan to force France Telecom into granting its competitors wholesale access to its

broadband Internet network for one year. The local government said it intended to make sure that France Telecom rivals could use the existing network and sell Internet services to retail customers. The Commission said the measure would apply until competing operators have built a sufficiently wide backbone network and a large enough customer base to allow them to invest further in high-speed services. (*Europeantechwire, July 2005*)

3.4 Germany

Deutsche Telekom initiate WiMax field trials

Deutsche Telekom's T-Com unit started field trials of a WiMax technology that can be used in areas out of the reach of standard DSL service. T-Com's trial serves about 100 customers near Bonn with a Breeze MAX 3500 system produced by wireless-solutions provider Alvarion. The trial runs through to next March. The tests are part of a wider evaluation by T-Com of WiMax technology to provide wireless service over large areas. *(UPI, September 2005)*

Redback Networks provide infrastructure to Telefonica Germany

Redback Networks, a provider of next-generation broadband networking systems, announced in September 2005 that Telefonica Germany had selected Redback's SmartEdge(R) Service Gateway platform to upgrade and extend their wholesale DSL service. Redback is working through a local reseller to implement the solution. The Redback SmartEdge Service Gateway systems, equipped with high capacity interfaces, are being deployed throughout the Telefonica Germany broadband network to perform the switching of subscriber initiated broadband sessions to various resale ISPs. (*Business Wire, September 2005*)

HanseNet launches national DSL offering in Germany

In July, Telecom Italia's German broadband operation, HanseNet, launched a national DSL resale offering. In addition to its unbundled offering in 15 cities, the company decided to provide nationwide offerings, but on a resale basis, from July 2005 onwards.

In early 2005, HanseNet expanded outside its home market of Hamburg to offer unbundled DSL in Berlin, München, Frankfurt am Main, Stuttgart und Lübeck, Rostock, Karlsruhe, Lüneburg, Offenbach, Essen, Wuppertal, Solingen and Oberhausen. More than half of its new subscribers come from these cities, underlining its growth potential outside its home base. In these cities it provided unbundled offerings, as it does in Hamburg. (*Ovum, July 2005*)

Deutsche Telekom cut monthly broadband rate to euros 14.95

Deutsche Telekom's T-Online unit decided to reduce the monthly rate for its best-selling DSL package to euro 14.95 per month from euro 29.95 beginning in July. The

company fears the impact on its customer base by competitors such as Vodafone, freenet.de and United Internet. *(The Online Reporter, July 2005)*

German cable landscape consolidating

In June, the German antitrust authorities gave the green light regarding the merger of the number two and four cable TV providers in Germany. Iesy with 1.2 million subscribers is likely to take over ish which has four million subscribers. The combined entity will have revenues of about euro 500m and an EBITDA margin of about 40%. Hesse-based cable provider iesy is set to acquire North-Rhine Westphalia based cable provider ish. The transaction is said to be cash based and is valued at around euro 1,550 million, including ish's debt of euro 600 million. The deal is not new, but has now cleared the regulatory hurdles. However, BC Partners, which already holds 20% in ish, has also signalled an interest to ramp up its stake in ish. (*Ovum, June 2005*)

German regulator cuts local loop unbundling

RegTP, the German Telecom Regulator announced in Q2 2005 a cut in the local loop unbundling monthly rental of 9.75% from euro 11.80 to euro 10.65. The new price will be imposed retroactively starting from the 1 April 2005 and will last for two years until 31 March 2007. In August, the regulator, now newly branded as the Bundesnetzagentur and covering all utilities regulation, announced a one-off cut in local-loop charges and line-sharing monthly charges. This reduction was in the area of 5%. (*Ovum, August 2005*)

KDG announces plans to speed up investments in broadband

In April, German cable television network operator Kabel Deutschland (KDG) announced plans to speed up investment in equipping its network with high-speed internet connections. Until now, KDG has held back from Internet activities as it involved high levels of investment and modernising its network was a laborious process. Originally, KDG expected to spend more than euro 500 million on fitting around three million Internet connections to its cable network by the end of 2006.

KDG, which provides direct services to around 6.8 million households, stated that with new technology it can fit out its network in half the time and at half the price. The cable company says the new strategy will provide more competition in Germany’s broadband market, which is currently dominated by Deutsche Telekom. The modernised network will also enable KDG to move into the market for Internet telephony. *(Frankfurter Allgemeine Zeitung, April 2005)*

German Government decided to increase use of broadband

The German government is aiming to increase the proportion of the population that has access to broadband services, to close the gap between Germany and other countries in this sector. In July it was estimated only 18% of households in Germany

had broadband Internet access. Wolfgang Clement, the German minister of economic affairs, stated that he wished to raise this to over 50% by 2010.

In particular, Mr Clement criticised the weak position of cable services in the market. He said that talks were being held between cable network operators and television companies and that he was supporting these. (*Frankfurter Allgemeine Zeitung, July 2005*)

3.5 Ireland

Digiweb to provide 3Mbps broadband services

Digiweb launched in September a 3 Mbps wireless broadband service in six major locations in Ireland. The initial deployment of its Metro broadband service was in place in Dublin, Galway, Cork, Waterford, Limerick and Dundalk. Irish officials said that Metro will boost broadband competition. Digiweb boasts that Metro offers Ireland's most extensive DOCSIS 2.0 cable modem system delivered on advanced wireless platforms. The initial package includes full telephony service, and enhanced packages of 4 Mbps and 6 Mbps are available. *(UPI, September 2005)*

Irish exporters demand more broadband

Slow roll-out of broadband is putting Irish Exporters at a serious disadvantage over trading partners for the next five years - according to a publication launched by the Irish Exporters Association. The IEA publication, entitled, 'Barriers to E-Business development in the Regions', found that as of December 2004, the take up of broadband in Ireland was the 7th lowest in the 30 OECD countries. Michael Counahan, president of the Irish Exporters Association, said Irish exporters were particularly vociferous in demanding broadband services, particularly DSL. Ireland DSL broadband penetration is estimated by the IEA to be 5%. According to IEA in order to reach the average of their key trading partners over the next three years well over 700,000 new DSL lines will have to be installed. At Eircom's current roll out rate of 6,000 DSL lines per month, it will take over 5 years to reach the current OECD average. The IEA report covered an analysis of broadband take up and availability in the regions including Northern Ireland, where broadband availability is nearly 100%, compared to 52% in Dublin, 26% in Leinster, 29% in Munster and 20% in Connacht. *(Business World (Digest), July 2005)*

Capped high speed Internet package by Eircom

Eircom launched a capped high speed Internet package. The Broadband Time is charged at euro 24.99 a month including twenty hours of use. An additional minute is charged at euro 0.04. Subscriptions taken out before September will receive a euro 5.00 bonus. *(UPI, June 2005)*

Irish government announced euros 40m investments in ICT

Noel Dempsey, Ireland's Minister for Communications, Marine and Natural Resources, announced in the beginning of November that Ireland has allocated euros 40 million for communications, broadband infrastructure and multimedia initiatives in its 2006 budget.

The funding represents further delivery of the Broadband Action Plan announced in December 2003. The Plan's main objective is to make high-speed connectivity available to over 350,000 people in Ireland. With the newly announced funding, the country plans to have a broadband infrastructure rolled out to all towns in Ireland with a population over 1,500 by 2007. (*Dmeurope, November 2005***)**

3.6 Italy

Italy broadband connections reached 5.6m in June 2005

The number of broadband connections in Italy stood at 5.6 million at June 30, 2005, compared to 1.1 million at the end of 2002. Some 4.1 million Italian families and 1.4 million companies have broadband access and the remaining 100,000 connections are used by Italy's local administration. According to expectations, the combined turnover generated by broadband Internet providers in Italy will reach euro 1.8 billion for the entire 2005 and the number of broadband connections will increase by 1.5 million over the next 12 months. About 19% of the Italian families, or half of all that are connected to the Internet at home, have broadband access. Some 10% of 4.0 million companies in Italy had broadband access in 2002, compared to 37% in the first half of 2005. *(UPI, June 2005)*

Telecom Italia is testing 50 Mbps Broadband Services

Telecom Italia chairman Marco Tronchetti Provera revealed in June that the Italian incumbent was testing broadband services of 50 Mbps. The Chairman revealed that his company was also working on a cheap way of installing a fibre-optic network that would bring 100 Mbps broadband speeds to the residential market. *(World Markets Analysis, June 2005)*

Alice Mega is phased out

Telecom Italia phased out its 'Alice Mega' product with a speed of 1.2 Mbps at a monthly cost of $44.52 to launch 'Alice Flat' in the second half of 2005. Although the latter provides (with 640 Kbps) only half the speed, it is 46% cheaper than its 'Alice Mega' at $24.04. *(Point Topic)*

Wireless broadband comes to rural Italy

Wireless broadband based on Wi-Fi and WiMAX technologies will soon arrive in small towns in south Italy that are financially depressed, as a result of a government initiative, according to Innovation Minister Lucio Stanca.

Stanca told a Siemens conference in Italy that greater use of broadband in more areas of Italy is part of the government's competition strategy for the development of the Italian system. Even though telecommunications have been privatised, it is still the role of the Government to see that the whole of Italy is covered by broadband and that the technological approach is neutral.

The Italian government had already set aside euro 300 million so that all of Southern Italy would have broadband access. (*The Online Reporter, May 2005*)

3.7 Japan

NTT Broadband and Intel to Deploy Wireless LAN Platform on Tsukuba Express Train

Metropolitan Intercity Railway, a railway company, began to service the new line Tsukuba Express in August. It reached an agreement with Intel and NTT Broadband Platform on July 14 to offer wireless Internet access on the express train. The three companies would deploy wireless LANs in stations and on trains, and start a trial service in selected stations and on trains on August 24. The commercial service was to be expanded to cover all the stations and trains between Akihabara and Tsukuba by year-end. *(JCNN, August 2005)*

GlobeTel to form communications venture in Japan

GlobeTel Communications Corp. and Kashiwabara Token Corp. plan to form a wireless broadband and communications system venture in Japan. GlobalTel said in September the letter of intent its Sanswire Networks LLC unit signed is a prelude to deployment of a Japanese broadband network. Sanswire said Kashiwabara, Iwakuni City, Japan, already has the cellular and cable infrastructure needed to immediately deploy a broadband wireless system. *(Dow Jones Newswires, September 2005)*

BNS lands major content deal with National Data/United Power in Japan

In June 2005, Hong Kong based IPTV solutions provider Broadband Network Systems Ltd (BNS) landed an extensive long-term deal with National Data Japan and United Power to provide broadband content for their STB-based VOD service portal Joy channel at Rakuichi.net.

BNS will aggregate high quality family entertainment suitable for the broadband platform starting with over 200 episodes of TV hits from Europe, North America and China, including unscripted comedy, reality, animal, adventures, magic and sports.

Joy channel at Rakuichi.net was launched on 1st March 2005 and is a community-based service available across the whole of Japan. *(Broadband Network Systems Ltd, June 2005)*

Telecom Italia signs WiFi roaming deal with NTT

Telecom Italia SpA said in May 2005 it signed an agreement with Japan's NTT Communications for international roaming on Wi-Fi technology. All Telecom Italia customers will be able to surf the Internet and use broadband services in more than 1,500 NTT Com Wi-Fi hot spots all over Japan using their normal Telecom Italia subscription. In the same way, all NTT Com customers travelling to Italy will be able to use Telecom Italia Wi-Fi access in about 700 sites with no need for a new registration. *(Dow Jones Newswires, May 2005)*

Japanese government officials announced plans to develop a new communications satellite to provide broadband services that are as fast as fibre optic cable

Japan's Internal Affairs and Communications Ministry said a new communications satellite will make it possible to send and receive data at a maximum speed of 100Mbps in mountainous areas and remote islands, as well as aboard Shinkansen bullet trains, aeroplanes and ships. The ministry plans to incorporate research and development funding in its fiscal 2006 budget request and plans to begin services by 2015.

Officials noted since satellites are immune to damage by earthquakes or floods, they can be used to send live images of disaster-stricken areas and provide information to disaster victims.

The satellite will have a dish antenna measuring 66 feet in diameter. It will be four times larger in diameter and 16 times larger in surface area than a conventional satellite antenna. The satellite will be able to receive weak signals - even a cell phone with relatively low power output would be able to communicate at a maximum speed of 10Mbps, or at least four times faster than existing third generation cell phones. (*Physorg, August 2005*)

3.8 South Korea

Significant increase in the number of broadband users

Powercomm has ventured into Korea's broadband market by launching in September a fast Internet service with a speed of 100 Mbps. Under the banner of 'Xpeed', Powercomm offers a 100Mbps service in apartments with optical local area network (LAN) and a slower 10Mbps in houses. The optical LAN-based speed of 100Mbps enables customers to download a two-hour high-definition video file in less than 5 minutes. With a current 10Mbps-class connection, the video download would take more than 30 minutes. Powercomm insists the new high-speed Internet service will make a difference in the market because it will retail at a price lower than the 4Mbps feature of other broadband operators such as KT and Hanaro Telecom. *(Newsweek, September 2005)*

KT to offer WiBro next year

Korea Telecom (KT) plans to offer mobile wireless broadband service called WiBro that will allow users to access the Internet when travelling at 60 kilometres-per-hour (36mph). Access points are being built in Seoul and 19 other cities for a launch next year. Top access speed will be 1 Mbps. KT will offer the WiBro service to mobile phones, which will give users VoIP, high-speed Internet access and digital media broadcasting capabilities. KT is working with HP and Intel to develop handsets for this. The Korean Electronics and Telecommunications Research Institute claims that WiBro will increase country's production by $ 21bn and exports by $ 7.25bn. (*The Online Reporter, June 2005)*

Hanaro Telecoms abandons plans to move into WiBro

Hanaro Telecom, Korea's second largest broadband Internet provider, announced in May 2005 its plans to abandon its move into wireless broadband and instead concentrate on its main business of providing fixed-line high-speed Internet access. Despite this new strategic direction for its broadband business, Hanaro Telecom has indicated that it will monitor development of WiBro in the market and if necessary provide fixed and wireless convergence services via strategic alliances with relevant wireless service providers. Hanaro Telecom expects the move to save the 800bn won ($ 804m) it planned to spend developing Wibro service. *(IAC (SM) Newsletter Database (TM) May 2005)*

South Korean government supports WiBro

The South Korean government believes WiBro (Wireless Broadband) services will become the mobile equivalent of broadband DSL (Digital Subscriber Line) connections. The Ministry of Information and Communication (MIC) believes that standardisation of the technology later this year could help international adoption. Korea's WiBro offers 3Mbps download speeds at distances up to 1km from an access point for devices travelling at up to 60km/h.

It's based on the same technology as the WiMax family of technologies that come under IEEE 802.16. WiMax, which is being pushed by Intel and others, is a wide-area wireless networking technology that promises to deliver wireless broadband access over a range significantly greater than that of IEEE 802.11 WLAN (wireless LAN) technology.

Commercial WiBro services are expected to debut in South Korea in June 2006 and the technology is expected to attract 9 million subscribers in the country by 2011, according to the MIC.

MIC is hoping for bigger things for WiBro once the international IEEE 802.16e standard for the technology is approved. Vendor support for WiBro should follow standardisation, and this should help promote the technology outside South Korea. For example, Intel is very interested in the technology, and is working with Samsung Electronics Co. to promote it. (*WISP Centric, July 2005*)

3.9 Sweden

TeliaSonera reduced broadband prices

TeliaSonera reduced the price of its broadband service offerings by up to 19% in June 2005. Broadband packages ranging from speeds 250 kbit/s to 24 Mbit/s have all had a reduction in prices. All plans had a connection fee of SEK 695 and are for a 12-month contract. A free modem is also being offered for new packages until the 30th of June for 18-month contracts. *(Tarifica, June 2005)*

Telenor to acquire broadband suppliers in Sweden and Denmark

Telenor announced in May its intention to buy Swedish and Danish broadband suppliers for more than US$1 billion. The company said it was buying Sweden's second-largest broadband supplier Bredbandsbolaget for $820 million and the smaller Danish provider Cybercity for $236 million. Both acquisitions were to be completed in June. Telenor said both companies will continue to operate under their own brand names. *(Comtex News Network, May 2005)*

Swedish broadband environment

Much of the fibre to the home deployments in sparsely populated areas in Sweden are done by the local energy utility, which is owned by the municipality. Although many fibre projects are supported by public funds, there are strict rules imposed by the European Union governing the use of the publicly funded networks. Access has to be wholesaled to commercial service providers on an open, non-discriminatory basis. This guarantees that there will be private companies participating in the exploitation of the network and also ensures that there is competition. The Swedish Government's goal is to deploy an open network and seed the market. This seems to be the preferred public-private partnership model in Sweden, in large part because of strict EU rules governing the use of public funds for broadband infrastructure.

Sweden is sparsely populated. Most people live in the southern part around Stockholm and closer to Denmark. There are 290 municipalities and 200 of them have their own network. The goal of the Swedish Urban Network Association is to have an open infrastructure, reduce the amount of digging by co-ordinating the laying of fibre and to create robust networks for government and public use.

Today, Swedes pay on average euro 20 per month for 10 Mbps symmetrical bandwidth. The government wants to have broadband available to 99% of Swedish residents by 2006. (*Muni Wireless, July 2005*)

3.10 USA

Sprint and Nextel merger

The Sprint Nextel merger went through in August with a key decision by the FCC that is likely to create a major "third" broadband route into the home and perhaps finally achieve the FCC's desire to see genuine competition in the provision of US broadband lines. That key decision was the way the FCC not only allowed the combined company to keep its 2.5GHz spectrum, but laid down conditions that should see broadband services based on it be within reach of at least 30 million US homes before the end of the decade. The two argued that their respective 2.5GHz spectrum was "fundamental" to the merger, and that it will be used to bring a third triple play to the US home, competing directly with both the RBOC telephony wiring and the cable operator's co-axial, probably using WiMAX technology.

This is one of the first times that the FCC has imposed genuine rollout limits on its spectrum, a practice that is common in other parts of the world. As a result of not previously issuing these types of mandates, much US spectrum is purchased by the RBOCs (regional Bell operating companies) only to remain idle, more defensive purchasing, than the genuine offer of services.

The Department of Justice said an investigation of the $70 billion merger transaction, which was announced at the end of 2004, found that the deal did not give the companies market power in areas in which they already competed and that consumers would continue to have a wide range of choices following the combination of the companies.

Sprint Nextel is required to offer services using this spectrum to reach at least 15 million Americans within four years, and an additional 15 million potential subscribers within six years.

The company will be free to use the service to offer fixed as well as mobile broadband wireless, and can use the spectrum to augment its US third-place cellular efforts as well as open up new routes to compete on voice-over-IP telephony. *(The Online Reporter, August 2005)*

4. Summary of key data

4.1 Broadband market competitiveness

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

4.1.1 Choice

A comparison of choice between the UK and other markets is assessed based on the level of infrastructure supplier 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. By the end of September there were over 2.5m unbundled lines in France , but only 122,000 in the UK.

In the East, fierce facilities-based competition from low cost local loop unbundling (LLU), cable and fibre operators means Asia-Pacific leads the world in the highest speeds at the lowest prices. The markets of Korea and Japan now offer speeds of 50Mbit/s, 100Mbit/s and even 1Gbit/s, with fibre and VDSL deployment made easier by their densely populated urban environments. In contrast, in Australia, incumbent Telstra capped wholesale and retail DSL speeds at 1.5Mbit/s. However, here again competition is stimulating higher speed deployment: growth in LLU deployment of ADSL2+ is pushing Telstra to fibre-to-the node (FTTN) deployment. As a consequence, offers of 8Mbit/s to 25Mbit/s are emerging.

In the West, 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 exceptions continuing to be Ireland and Italy. Even T-Online in Germany has dropped below 50% share for the first time. Low LLU prices do not guarantee high competition, but it certainly helps. France has one of the lowest shared access costs and the highest DSL competition. Indeed, we have seen the choice index for France improve substantially over the previous 6 months as the effects of a strong LLU push starts to show results.

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. In June, Bulldog started offering an 8Mbps service with both pay-as-you-go and unlimited flat-rate services in areas where it has exchanges equipped for its unbundled-loop ADSL offering (although only for those customers in close proximity of the exchange itself). The upstream speed remained at 400k. Monthly prices start at just over £15.50 - but with a short-term promotion for the first two months to entice new customers.

The UK also offers competitive choice through its cable players, with ntl and Telewest continuing to consolidate their positions. Telewest added 88,000 broadband subscriptions in the first quarter 2005.

Although Italy scores low in this benchmark, competitor Fastweb is proving highly successful in major urban areas, offering competitive differentiation to Telecom Italia in terms of price and services. Fastweb has been resolutely tagged with the triple-play label. This is far from wrong. The company is one of the few to have had a network fully geared up for delivering video from its launch, and has taken full advantage of this (note that 20% of its customers take voice and TV without broadband). It has certainly proved itself a trailblazer in deploying video-based services, and has gone far in establishing good relationships with content companies.

Fastweb's intention to launch a 'single-play' broadband service confirms that it is seeking to increase the flexibility of its consumer packages and emphasise its role as a communication and distribution player rather than a 'media' company.

Sweden has a good mix of retail, LLU, cable modem and other types of broadband competition.

In the US, much of the success of the DSL providers can be put down to an improved competitive positioning by these providers vis à vis the cable operators. Additional competition comes from alternative DSL providers which provide service over the RBOCs' local access networks, and from a handful of players which have built their own infrastructure. However, this last category remains marginal in the US market today. Satellite providers such as DirecTV are also increasingly playing a role in the broadband market, using their TV distribution networks and taking advantage of Ka-Band technology to offer two-way transmission at broadband speeds.

South Korea has an extensive choice of broadband service providers available to individuals – the Government was a major catalyst in the rapid rise of the domestic broadband market. It created a highly competitive market framework in terms of the player landscape, with limited regulatory controls and provided targeted incentives for start-up companies. Its vision and strategy was a key factor in providing confidence to private companies and investors entering the market. . This lowered the barriers to entry: by 2002 there were over 100 cable TV providers, plus six main broadband network operators, many of whom were leasing network capacity from the utility company, PowerComm. The government's direct and indirect incentives included:

- **encouragement of facilities-based competition**. Cable modem service providers either constructed their own hybrid fibre-coaxial (HFC) networks or more often leased cable TV (CATV) network from Powercomm, a leased line network operator. In addition, the local loop bottleneck prevalent in other markets didn't exist in South Korea to the same extent as it does in other mature telecoms markets. In South Korea, the landlord (not the incumbent) owns the block wiring in apartment complexes, which eased the burden of interconnection at an access level. This meant that KT, as the incumbent, faced fewer regulatory restrictions and presented opportunities for new entrants such as Hanaro

- **high-capacity backbone infrastructure constructed**. New high-capacity backbone infrastructure was constructed using more than $1.5 billion of direct Government funding. This allowed broadband to become accessible to non-profit organisations such as government bodies, schools and research institutes
- **soft loans issued**. The South Korean Government provided more than $1 billion in soft loans to operators from 1999 to 2005. In 2000 and 2001 this was targeted at operators building out in less densely populated towns and rural areas
- **a certification programme**. The government introduced a certification programme for broadband buildings and apartments, which allowed property developers to incrementally charge more for higher-grade broadband services in their apartment blocks. This resulted in a plethora of partnerships between construction firms, ISPs and operators building broadband-ready complexes and offering low-price promotional deals
- **launching e-government, education and training initiatives**. The 'Ten Million People Internet Education Programme' was introduced in June 2001, providing Internet education courses to those who could not otherwise afford the Internet. It was targeted to those less technically adept.

In South Korea, industry players have argued that the government's open regulatory policy led to 'over-competition' and to market instability. However, this is hard to quantify. The outcome may have been different if the South Korean Government had created entry barriers. Yet the government didn't dictate the number of competitors; it simply created and encouraged the competitive framework. While the Government did invest in infrastructure and offer soft loans, at $1 billion these were a fraction compared to the estimated total broadband investment of $10 billion by 2002 and $30 billion by 2005. The South Korean Government encouraged a highly competitive market - but it was always up to individual operators to determine the business case and viability of their entry strategy.

And new players are indeed still entering the Korean market. Powercomm, which was established in 2000 through the separation of the optical cable and cable TV transmission business from state-owned Korea Electric Power Corporation (KEPCO), launched retail broadband services in September 2005. Having a nationwide (111,058km) optical network and (54,431km) hybrid fibre coaxial (HFC) networks, it wholesales services to mobile operators, fixed operators, cable system operators (SOs) and ISPs. As the broadband market in Korea is already saturated with over 70% household penetration, Powercomm's entry into the market will be a disruptive factor.

KT apart, many of the broadband players in Korea rely on leased lines from Powercomm for between 30% and 90% of their networks. Therefore, there are also concerns that Powercomm may not look after the best interests of other players. Nonetheless, despite the adverse industrial sentiments the regulator, the Ministry of Information and Communication (MIC), does not have any legal rationale for not granting the licence to Powercomm. Instead, the MIC has attached licence conditions that will guide fair competition. These rules specify how Powercomm should maintain the quality and bandwidth of leased lines and that it must open its network

management system to competitors. The regulator will review this once a year for the coming three years.

The Japanese government aggressively promoted LLU, which means the shared unbundled price of the local loop in Japan is one of the lowest globally. As a result, 47 Japanese operators offered ADSL services at the end of 2002. The government agenda for fibre deployment coupled with NTT's next-generation network strategy is driving growth in fibre-to-the-node (FTTN) and fibre-to-the-premises (FTTP). Japan's FTTx connections accounted for about 15% of broadband connections with more than 2.8 million subscribers in Q1 2005

Telstra in Australia conforms more to the UK and Germany than its Asian counterparts. The incumbent may have a lower retail market share of less than 40%, but has considerable wholesale market power. Until 2004, Telstra had capped wholesale DSL speeds to 1.5Mbit/s, leaving alternative operators limited scope to compete on either speed or price. However alternative operators are now heavily pushing LLU, using the higher speeds of ADSL2+ DSLAMs to differentiate services.

The broadband speeds available from cable continue to grow. Cable operators have responded to stiff competition in Korea and Japan by providing 30Mbit/s. However, cable operators such as J Com are being left behind as fibre players offer 100Mbit/s.

In Europe and in North America, cable companies have maintained pace in matching DSL, indeed on some occasions outdoing the incumbents – as in the UK, where Telewest has launched 10Mbit/s.

Canada made an early start with broadband and has managed its development relatively well. Of the seven biggest industrialised countries it is still the one with the highest overall broadband penetration, and is holding its place more effectively against competition from Asia-Pacific and Europe than the US has been able to. Cable modems are the most popular way to receive broadband, representing 51% of broadband connections. A lot of this success is down to strong government backing for broadband development. Federal and provincial governments in Canada have encouraged the deployment of broadband infrastructure and services. The government initiatives have included seed funding to community projects, capital funding for infrastructure projects, research and development tax credits to equipment manufacturers, funding trials for broadband applications and developing and supporting online content.

Canada is also home to some of the leading broadband fixed wireless access (FWA) vendors, and spectrum has been licensed for fixed wireless services. Many communities also receive broadband services via satellite.

4.1.2 Price

Some studies demonstrate a direct correlation between the intensity of competition and the shift to higher-speed broadband, particularly as markets mature. Competitive broadband markets have raised their offerings from 256kbit/s and 1.5Mbit/s to

between 2Mbit/s and 5Mbit/s. In highly competitive markets, such as Canada and France, this is increasing to 6Mbit/s and 8Mbit/s or even up to 20Mbit/s.

Asia-Pacific's advanced markets represent the extreme. Korea and Japan now offer speeds of up to 100Mbit/s at an average price per Mbit of $4.65 and $2.64 respectively, the lowest rate globally.

In Ovum's view, price discounting reflects the commoditisation of the basic access product which remains the central broadband proposition in Asia-Pacific. Falling access prices and slower growth in value-added services means speed has become the standard by which operators benchmark and differentiate themselves, particularly in strongly technology-driven societies such as Korea and Japan. Initially this makes sense: the difference in performance and functionality between 256kbit/s and a 4Mbit/s performance is considerable. At least 4Mbit/s are required to deliver higher-value broadband services such as IPTV. However, many of these functional benefits become less apparent at very high speeds - 20Mbit/s are more than adequate for most applications and content that is currently available. More than this is about fashion and status. There are cost drivers for an upgrade to next-generation networks, which simplify network architecture and lower operational costs. However, in many cases operators' existing network assets have not been fully utilised.

There are a wide variety of broadband offerings in the US, ranging in speeds from 256kbit/s to 8Mbit/s, and in value from $15 to $68. Comcast offers the fastest cable broadband speed at a competitive value of only $10 more than its 6Mbit/s offering. Other operators also offer relatively cheaper tariffs for the fastest services that they offer. This encourages the consumer to pay a little bit extra for the faster service. Verizon has recently launched a fibre service called FiOS. The service provides broadband speeds of up to 30Mbit/s at a cost of $179.95.

Broadband operators in Canada offer a variety of broadband speeds ranging from 128kbit/s to 7Mbit/s. The pricing which compliments these services is very competitive. Even though the fastest speeds offered by each operator are different, they are all priced around the $40 mark. The cable operators Rogers Communications and Shaw Communications offer faster speeds and cheaper tariffs than their DSL competitor Bell Canada, in an attempt to gain more subscribers.

Italy has emerged as one of the leading markets in terms of innovative broadband tariffs. Aggressive triple-play bundling from Fastweb initially led to strong bundled offers from Telecom Italia.

Pricing has continued to improve in the UK, as competitive forces drive down subscription fees. As a result, we have seen a substantial increase in the uptake of broadband services as they become more affordable to wider sections of society.

Most operators have now introduced download limits, charging for extra Mbit/s or Gbit/s of volume usage. More strikingly, in some markets the balance has been tipped to more time-based charging. For example, Italy has seen a dramatic return to metered products with reduced contract fees and non-contract options, and no 'unlimited' usage. Telecom Italia only offers one product with a flat-fee monthly contract. Out of the Alice branded offers, there are two with no contract fees charged

by the hour or minute and two with metered usage. Fastweb has also changed its product offerings in favour of metered options with evening- and weekend-only options.

One result of such a shift is a potentially negative impact on broadband usage around the home for applications such as streaming radio, network-based home monitoring applications and webcams i.e applications which are run for an indefinite period.

New Korean player Powercomm's price is positioned slightly lower than Hanaro whose tariff is about 8% cheaper than KT. However, as Hanaro offers additional savings in bundling with telephony services, Powercomm's price competitiveness will be diluted. Moreover, while other players provide dedicated portals for their users, Powercomm does not have such value-added features. This could be a critical drawback for its main target group, which knows the value of premium content.

4.1.3 Regulation

There have been a number of key regulatory developments of note within the countries in this study – particularly around local loop unbundling, and pricing thereof. A selection of these are provided below

AUSTRALIA

ACCC issues final view on future Telstra price controls

On 30 March 2005, the Australian Competition and Consumer Commission (ACCC) welcomed the public issuing by the Minister for Communications, Information Technology and the Arts, senator Helen Coonan, of its report on the price control arrangements that should apply to Telstra after 1 July 2005.

The ACCC has consulted with a wide range of interested parties through two stages of written submissions and in 12 public meetings in metropolitan and regional areas of Australia.

The ACCC's recommendation is that price cap regulation should continue on the services to which it currently applies. However, the ACCC considers that services to businesses with more than five lines should no longer be subject to price controls.

In particular, the ACCC recommends that:

- a basket containing line rental, local calls, domestic and international long-distance calls and fixed-to-mobile calls should decrease in price by 4% per year in real terms; that is, be subject to a price cap of CPI-4% (consumer price index)
- the price of connection services should not increase by more than the CPI.

In relation to line rental prices, the ACCC recommends a price control over Telstra's most basic local access products, currently branded HomeLine Part and BusinessLine Part. It also recommends that the price of line rental in these products should not increase by more than the CPI. The ACCC will assess the proposed line

rental increases before implementation to ensure Telstra complies with the price controls.

The ACCC's recommendation is that the next price control arrangements should apply for three years.

CANADA

In Canada, in 1999, the CRTC decided not to regulate the Internet. Although, at the same time it did decide that cable operators should be required to make available for resale their retail high-speed Internet services.

Decision CRTC 99-11 states that cable operators must make available the retail Internet services for resale, and that the resale must be provided at a discount of 25% of the lowest retail rate offered by the cable operator in its service area during that month. All resellers are required to register with the CRTC to be able to resell Internet services. Currently there are 96 resellers for Internet services registered with CRTC.

CRTC rules on VoIP

On 12 May 2005, the Canadian telecoms regulator, CRTC, issued a ruling on Voice Over IP (VoIP) regarding an entire review of the subject. The Canadian regulator established the principle whereby VoIP is to be regulated to the same extent as the PSTN, as long as it is provided and used as a local telephone service.

Peer-to-peer VoIP, which involves computer-to-computer communication through the unmanaged Internet network (the Skype VoIP type), is excluded from the regulatory framework as a pure Internet service. Other types of VoIP are not regarded as new services in the light of the Canadian regulator, as long as they are offered and perceived by users as a substitute for traditional phones.

ILECs or other competitive carriers offering VoIP services in Canada will have to abide by a regulatory framework that is almost identical to the one regulating PSTN. The ruling issued by CRTC is complex and includes a series of obligations: registration of VoIP resellers, access to numbers, local number portability, directory listings, equal access, and tariff filing requirements.

Interestingly, the CRTC points out that the decision is in line with the *Canadian Telecommunications Act* principle that focuses on services rather than on technology. This sounds very close to the principle of technological neutrality included in the new European framework regulation, but European regulators have so far taken a different route with regard to VoIP.

FRANCE

In the *Comite Interministeriel pour l'Amenagement Du Territoire* (CIADT) plan presented in September 2004, the French government presented a wide-reaching action plan for increasing broadband uptake. France had a penetration rate of 12.7% in mid-2004, which was over the EU average (10.4%). A massive increase in local

loop unbundling resulting in lowered prices and increased capacity laid the foundation for the comparatively high penetration rate. The CIADT plan has been designed to continue this development through targeting both supply and demand factors. Demand-side initiatives include the establishment of a euro1 million fund to support ICT integration into industries, particularly SMEs, and support for telework and telecentres, and the establishment of projects supporting telework and the creation of telecentres. It also includes a euro 3m fund over three years (euro 2.7 million for the building of telecentres within enterprises and euro 300,000 to support teleworkers).

France Telecom to offer WLR in 2006

From April 2006 France Telecom will be offering wholesale line rental (WLR) to alternative operators in the fixed market. Current prices for monthly rental on France Telecom wholesale offers are set to euro 10.9 for 2006, and will increase to euro 11.7 from July 2007.

ARCEP, the French national regulatory authority, made it clear that the obligation to offer WLR stems from France Telecom's SMP status in fixed wholesale markets. The outcome of this market analysis has just been approved by the EC Article 7 Taskforce. ARCEP will issue a separate decision specifying tariff regulation on WLR, but it needs to complete current studies on the cost of copper before this, which is likely to have an impact on WLR pricing. Following this, ARCEP will need to modify France Telecom's currently outstanding proposal.

Alternative operators could be taking up France Telecom's *vente de gros de l'abonnement* (VGA) offer in order to provide a 'single bill' solution for end users who may want to sever all ties with France Telecom. VGA will only be made available to offer a 'line plus calls' product (for example, carrier pre-selection plus line rental), but not for 'carrier selection' only, or as a standalone product.

GERMANY

Bnetza cuts local loop unbundling fees

On 3 August 2005 the newly branded Bundesnetzagentur, the German Federal network agency (formerly called RegTp) now covering all utilities regulation, announced a one-off cut in local loop unbundling (LLU) charges and line-sharing monthly charges.

Mathias Kurth, the president of the agency, declared that the decision creates a prerequisite for boosting competition in the broadband market, and it is now up to the industry to speed up the rollout of broadband lines in Germany.

These one-off reductions, although being significant (transfer of a two-wire copper pair provisioning reduced by 10% and charges for terminating supply when an end user switches to new providers or returns to Deutsche Telekom have been slashed by 71%), do not change an unviable business case into a money-making opportunity for alternative broadband providers.

The small 5% reduction on the monthly rental shared access (the fees that alternative operators need to pay in order to access the highest part of the frequency in the local loop, and used to provide alternative retail broadband offerings) does not imply a drastic change. Previous monthly rental was euro 2.43 and now stands at euro 2.31, which will not make a huge difference. German shared-access monthly rental fees were already amongst the lowest in Europe. Despite this, the market for DSL offerings is still heavily concentrated in the hands of the incumbent, and broadband penetration is amongst the lowest in Europe.

ITALY

Agcom publishes wholesale broadband market analysis

In March 2005, Agcom, the Italian telecom regulator, published its market analysis for the wholesale broadband market. Telecom Italia was found to have significant market power in the national wholesale broadband access market. Among the remedies proposed was the introduction of DSLAM interconnection obligation and the requirement to offer the latter, along with the ATM interconnection service, at cost-oriented prices. In Agcom's proposals, cost-orientation will also apply to the metropolitan transport service associated with bitstream access that Telecom Italia has to offer. The regulator's proposals will be subject to a consultation and to the review of the EC.

ADSL dispute goes to court

In November 2005, the Court of Appeal in Milan ruled on disputes involving Telecom Italia and other alternative operators on some issues concerned with ADSL provisioning. What is striking is that alternative operators and their lawyers are pursuing the ordinary justice system to see telecom regulation being enforced rather than appealing to the national regulatory authority (NRA).

Tele2 required Telecom Italia to provide access to 41,370 lines. Access to these lines was previously denied by Telecom Italia on the grounds that an ADSL line was already provided to the end users on those lines, and/or the end user did not reveal their intention to cease the services. Tele2 provided evidence that in hundreds of cases end users were not at all aware of such activation, and that therefore the 'phantom ADSL lines' were only a trick to stop alternative operators from selling their products - allegedly an anti-competitive practice put forward by Telecom Italia. The court forced Telecom Italia to provide access to those lines in 42 days - the exception made for those lines were customers that were already using other ADSL services or that were explicitly denied the Tele2 offer.

Other pending disputes currently linked with Telecom Italia provisioning include Alice Free, the pay-as-you-go retail broadband offer, and naked ADSL provisioning. With the latter, supported by Eutelia, a VoIP operator, the court supported the principle whereby ADSL can be provided on a line where the customer does not pay line rental. However, application of this principle is limited to only those users that already have an alternative ISDN line.

On a general note, alternative operators in Italy lament the inadequacy of the structure and resources of Agcom, the Italian telecom regulator, and its inability to enforce rules in such a delicate period, when the competition among players to grab new ADSL customers is at its peak.

The inadequacy of Agcom is considered by alternative operators to be so evident that they need to use the ordinary justice system - in this case, the Court of Appeal in Milan - rather than making a referral to Agcom. Past experience shows months of delay without any significant steps being made by the NRA.

IRELAND

ComReg proposes 'retail minus' for wholesale broadband access

On 19 August, ComReg, the Irish telecoms regulator, unveiled its plans to impose *ex ante* price controls on Eircom's wholesale broadband access (WBA) services. Earlier this year, ComReg had found Eircom to possess significant market power (SMP) in the WBA market, and imposed interim price control obligations. 'Retail minus' price control was indicated as the best approach, and the current consultation was launched to identify the best possible approach. ComReg does not feel that *ex post* price controls are sufficient to ensure competitive pricing. The regulator will require Eircom to lodge its prices *ex ante,* and will then check them for regulatory compliance.

ComReg proposes a yearly review of Eircom WBA pricing. The price control will be forward looking, considering costs and revenues over a certain period of time. The margin squeeze tests will be applied on a service-by-service basis.

SWEDEN

TeliaSonera to implement naked DSL

The Swedish incumbent TeliaSonera has been ordered by the Swedish regulator PTS to offer naked DSL. If Telia fails to comply with this, it will be liable for a SKr100 million fine. PTS initially decided that Telia had an obligation to offer broadband access independently of whether the consumer holds a landline in February 2005. Telia stated that a lack of demand has led to the failure to comply with the PTS ruling. However, it is to offer this option to its own customers from 30 September 2005, triggering the new ruling from PTS.

One of the main reasons for PTS pushing through this regulation now is that Telia is making naked DSL available to its own customers, leaving wholesale customers at an unfair disadvantage. The ruling also states that, in cases where customers wants to transfer their current service to a naked DSL service, Telia must provide for this, and therefore not require the consumer to end its current contract and enter into a new one. PTS wishes to avoid an unfair competitive situation, where ultimately the consumer pays, and where alternative operators are marginalised due to competitive disadvantages.

USA

In August 2004, US regulator, the FCC, issued a notice of proposed rule-making concerning unbundled access to network elements (UNEs). These rules were finalised in December 2004, and issued in February 2005. Some important matters were addressed. Firstly, fibre loop will continue to be excluded from unbundling: incumbent local exchange carriers (ILECs) may deploy fibre-to-the-curb (FTTC) local infrastructure without having to grant unbundling rights to competitors over it. Also, mass-market switching will be progressively phased out and will not be available on an unbundled basis from December 2005. Unbundling of high-capacity loops (DS1 and DS3) as well as dedicated transport (including dark fibre) will continue to be available, but only for low-density loops. For high-density loops, Competitive Local Exchange Carriers (CLECs) will now have to invest directly or buy a tariffed offer from ILECs. Shared access is now available again, after being excluded from the Triennial Review. Bitstream is now available as part of the LLU package on a commercial basis. The new framework also requires competitors to step up their investments in infrastructure for broadband access.

The Triennial Review, along with the subsequent interim rules, contributed to creating a climate of uncertainty over the destiny of unbundling in the US, which these new rules should bring to an end. In practice, the FCC has tried to find a compromise between the interests of ILECs and those of CLECs. The market will ultimately decide whether this fine line is the right one to foster the US broadband market.

FCC removes wholesale broadband access obligation on ILECs

On 22 September 2005, the FCC issued an order implementing its new policy for wireline broadband Internet access. These services have been reclassified as ‘information services’, which implies a much lower degree of regulation on their providers, according to the US telecoms act.. As such, common carrier requirements no longer apply. In practice, the order removes the obligation for ILECs to offer wholesale broadband transmission on an unbundled basis. Moreover, the FCC feels that there is enough inter- and intra-modal competition in the provision of broadband access, so an analysis of dominance is not necessary. There will be on a one-year transition period before the service can be completely withdrawn and it is expected that the US broadband market will be significantly affected by that decision.

By reclassifying ILECs’ xDSL services as ‘information services’, the FCC removes the obligation to offer regulated wholesale broadband access to alternative operators and Internet service providers (ISPs). The move is made possible because, until recently, the service was not regulated under the common carrier framework governing unbundling and interconnection, but under a framework governing computing and information services (the so-called *Computer Enquiry* regime). Wireline broadband access transmission, together with the unbundled elements of the ILECs’ network and owned or leased backbone transmission infrastructures, allows alternative operators and ISPs to offer a competition to ILECs’ own retail xDSL services, and is an essential input for independent ISPs competing with ILECs’ own ISPs. This new decision leaves them with one less option for competing with the ILECs.

The FCC decision has levelled the playing field for RBOCs, granting them the same degree of freedom as cable companies, who are not legally required to lease access to competing providers of high-speed Internet access, after the 'Brand X' ruling by the US Supreme Court in May 2005. Cable modems are still the widest employed means of fast Internet access in the US, and players have never been subject to any common carrier-type regulations to offer wholesale access to their networks.

The analyst community in the US calls this a clear win for the RBOCs and a clear hit on independent ISPs. ISPs will have a one-year transition period during which they will still be able to use existing facilities from facilities-based providers. After this period they will have to completely re-think their business and role in the US broadband market today.

The decision comes as no surprise. After the Supreme Court decision on cable operators in May, incoming FCC chairman Kevin Martin made it clear that he wanted to create the same regulatory conditions for telecoms companies.

4.2 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.

4.2.1 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 now have to address. Most have now reached or exceeded 80% population coverage. The remaining exchange areas are likely to be in rural communities and will be expensive to enable.

The emergence of technologies such as broadband fixed wireless access (BFWA), FTTH and satellite offer new alternatives to the disenfranchised, although

development is slow. In the UK, PCCW, the Hong Kong telecoms group, has ruled out a nationwide roll-out of its UK wireless broadband service in the near term, although new trials have been implemented in the last few months.

We have seen above that many countries are looking to WiMax to extend the reach of broadband. Services using WiMAX 802.16-2004 will certainly help BFWA operators in the markets that they already operate in. The main advantages will be cheaper equipment and freedom of choice for customer premise equipment (CPE) - allowing the operator greater bartering power. In the future there will be further advantages as equipment becomes available in a range of frequency bands, but this is a little way off as yet.

WiMAX is a cost-effective alternative to wired technologies in rural areas and countries where the existing wired infrastructure is poor or even non-existent. As a consequence, it is in developing countries that the main opportunity lies for service providers willing to quickly deploy a wireless infrastructure to provide fixed services. In these emerging countries, all the categories of service providers could be interested in deploying WiMAX networks: new entrants, fixed incumbents (as a complement to their existing infrastructure) and even mobile operators in order to compete with fixed operators in the fixed broadband field.

In developed countries, WiMAX 802.16-2004 will remain a niche market, mainly used to fill in the gaps of DSL for incumbents. In those under-served areas, new entrants and BFWA players have to target businesses that can constitute a lucrative niche market. Thanks to public funding, these operators can also provide WiMAX services to consumers. As well as Internet connectivity services, fixed WiMAX is also an alternative to using traditional and expensive last-mile technologies for supporting backhauling. Some service providers plan to combine WiMAX and WiFi, using WiMAX simultaneously as a backhaul solution for their WiFi services and as an extension to offer broadband wireless connectivity services from their WiFi network coverage ('WiMAX hotzones').

In emerging countries, WiMAX is more appealing but service providers might prefer to wait for 802.16e, as the technology offers support for mobility as well as almost the same benefits as 802.16-2004 in terms of quality of service (QoS), throughput and range capabilities. Furthermore, the integration of 802.16e chipsets into laptops is a critical advantage for service providers because this will significantly expand the addressable WiMAX market without any need for costly subsidisation.

Broadband availability by country

Below we outline the status of broadband availability by country at the end of September 2005.

Australia

Despite the increasing uptake of broadband, many believe that availability is still a major barrier to broadband uptake. Industry lobby groups such as the Australian Telecommunications Users Group Ltd (ATUG) and Service Providers Association Inc

(SPAN) have regularly suggested that regional broadband penetration is being stifled by a lack of competitive offerings. Initiatives such as the 'broadband exchange' aim to accelerate broadband deployment and uptake.

Theoretically, broadband is now available to all Australians. Both Telstra and Optus market a satellite product offering nationwide coverage. The Federal government launched the 'Higher Bandwidth Incentive Scheme' to subsidise the cost of these services. The A$100 million scheme resulted in a halving of prices, though with the cheapest at A$69 per month, it was still well above ADSL prices. On paper, ADSL should be available to most Australians, but feedback from a number of resellers suggested approximately 30% of customers who would like to subscribe to DSL services could not gain access.

However, in early 2005, Australia announced an A$234 million spending package to encourage high-speed Internet deployment. This funding is to encourage the effective delivery of important government services while creating new market opportunities and building the Australian economy. The spending is part of Australia's broadband strategy, which aims to improve education and health services.

In September 2005, Optus decided to proceed with an investment of $150 million into development of its own broadband infrastructure. The planned network will give the Singapore Telecom subsidiary access to nearly 3 million potential home and business customers and will directly challenge Telstra, which runs the only current nationwide broadband network in Australia. Optus had been negotiating an access agreement with Telstra before deciding instead to directly challenge for market share with a proprietary network that would allow them to undercut Telstra's consumer rates.

In February, Telstra announced that it was planning to spend A$210m to install new technology in its exchanges that will allow broadband customers to download movies and watch TV over the Internet at higher speeds than currently available. The announcement was made on the back of a report by the Australian Competition and Consumer Commission (ACCC) which found the take up of broadband services in Australia in 2004 had surged as prices fell.

The upgrade of Telstra's national ADSL network with the latest broadband copper-wire technology, ADSL2+, began in January 2005 and will provide higher speed broadband Internet access. Telstra is planning to spend A$60 million to enable 200 exchanges covering about 500,000 premises by the middle of this year and a further A$150 million to enable the remainder by the end of 2006. In July 2005, Telstra Big Pond announced that the DSL coverage currently reached 85% of households and that there are plans to expand coverage to up to 90% by the end of 2006.

Canada

Canada made an early start with broadband and has managed its development relatively well. Of the seven biggest industrialised countries it is still the one with the highest overall broadband penetration, and is holding its place more effectively against competition from Asia-Pacific and Europe than the US has been able to. Cable modems are the most popular way to receive broadband, representing 52% of

broadband connections with the vast majority of the rest being DSL. Canada is home to some of the leading broadband fixed wireless access (FWA) vendors, and spectrum has been licensed for fixed wireless services. FWA services are available in some areas, but as in other countries, their progress has been limited.

Based on a report published by the Canadian Radio-television and Telecommunications Commission (CRTC) in October 2005, broadband service was available to approximately 89% of Canadian households. In urban areas, representing 72% of all Canadian households, there is 98% broadband availability, falling to 68% for rural households.

The government has a stated goal to bridge this digital divide and federal and provincial governments in Canada have encouraged the deployment of broadband infrastructure and services. The government initiatives have included seed funding to community projects, capital funding for infrastructure projects, research and development tax credits to equipment manufacturers, funding trials for broadband applications and developing and supporting online content. These communities are in some of the remotest regions of British Colombia, Manitoba, Ontario and Quebec.

The government set up an agreement with Telesat Canada to provide broadband services via satellite. The National Satellite Initiative will cost $155 million and was announced in October 2003 as a joint project with Infrastructure Canada, Industry Canada and the Canadian Space Agency

France

DSL services were available to almost 95% of the population in France at the third quarter of 2005 according to France Telecom. Cable modem services are also available to around 33% of the country although this is unlikely to increase in the foreseeable future. FWA and satellite services are available although the extent of roll-out remains small.

France Telecom has entered the third phase of its "Broadband for Everyone” plan. The programme was initiated in June 2003 and has now achieved its goal of making broadband available to 95% by the end of 2005. Since January 2004, broadband services have been made available in nearly 5,600 additional towns and cities, according to dmEurope.com.

Through this programme, France Telecom hopes to make very-high-speed Internet access available in business and industrial parks. The operator’s move involves some 2,000 business and industrial parks, home to 120,000 large enterprises and smaller businesses. All these companies will benefit from more attractive rates and swift introduction of a broad array of very-high-speed services as their needs evolve. An accelerated build out plan calls for pre-wiring of these business zones with fibre optic links. This will give businesses located in the zones access in the very near term to capacity of up to 100 Mbit/s and even 1 Gbit/s for companies located in France’s 20 largest cities. France Telecom, which already has an extensive fibre optic network in France, is to build an additional 300,000 km of fibre optic infrastructure. These networks are already available to businesses in the Lille and Paris areas. The main

benefit of the investment plan, totalling Euro 250 million over three years (2005-2007), will be lower fibre optic connection costs for all companies in the coverage areas. Equally important, more enterprises will have access to high-speed and very-high-speed DSL services, encouraging the spread of new access technologies (Symmetric SDSL up to 8 Mbps and ADSL2+, providing 16 Mbps in 2005).

The EU announced in May 2005 that it will back the Government's plans to open France Telecom Network (US$109 million) in public funding for an open broadband infrastructure in France's Limousin region. The project will be co-financed by EU funds and will enable telecom operators to provide broadband services to residential areas - a model already followed in Sweden. In this way, the French government believes that broadband coverage can be significantly increased in shorter period.

Operator Neuf stated that to date it reaches almost 60% of the French population with its unbundled offering and operator Free believes that its unbundled offering will reach over 50% in late 2005.

Germany

Broadband coverage in Germany can be chiefly attributed to Deutsche Telekom's DSL services. DSL coverage alone already amounts to 91%, according to a report published in the second half of 2005 by Deutsche Telekom. Furthermore Deutsche Telekom offers satellite DSL access where terrestrial DSL is not available.

Conditions for DSL are relatively favourable in Germany, with an average copper loop length of 1.5–2.0km that consist the majority of population within range of exchanges. High proportions of German customers have historically used ISDN, which means that the lines are already well qualified for digital traffic and there is a good basis of experience for self-installation. There are approximately 7,700 local exchanges, in Germany, of which 6,000 upgraded.

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. In terms of cable broadband connections, although some 86% of German households are passed by cable television networks, commercial services using cable modem represented just 10% of total connections by September 2005.

However, German cable television network operator Kabel Deutschland (KDG) announced plans, in April 2005, to speed up investment in equipping its network with high-speed internet connections. Until now, KDG has held back from Internet activities as it involved high levels of investment and modernising its network was a laborious process. Originally, KDG expected to spend more than euro 500 million on fitting around three million Internet connections to its cable network by the end of 2006.

Along with governments world-wide, the German Government recognises that wide availability and take-up of broadband access is central to economic development and

is endeavouring to accelerate broadband deployment, but limited competition is still proving an inhibitor.

Ireland

Ireland has one of the lowest broadband penetrations in Europe. It was one of the last countries in Europe to launch broadband access. However, during the third quarter of 2005, Ireland has improved in terms of DSL coverage and it is estimated by the Irish Consumer Strategy Group that coverage has increased to 81% of the country.

Despite that, Government's stated goal that Ireland's broadband connectivity will be *"among the top 10% of OECD countries by 2005"* and that Ireland will be *"the first European country to have widespread 5 Mbps Internet available"* has not been fully realised.

The lobby group Ireland Offline and the Internet technology magazine siliconrepublic.com claim that less than half the 1.7 million lines in the Republic are capable of carrying a DSL line**.** Esat BT also claimed in September that less than half of all phone lines in the country could get ADSL – a statement rejected by Eircom, who nevertheless admitted that line failure rate on broadband compatibility tests in broadband-enabled areas was close to 20%.

Eircom has announced the rollout of the next phase of its DSL broadband service to 200 rural communities across the country, broadband enabling 90% of its phone lines by March 2006. Eircom has confirmed that it will keep its promise to bring broadband to every town in Ireland with a population more than 1,500. Eircom also announced a new target of 500,000 DSL broadband connections by December 2007, which would position Ireland above the EU average for DSL broadband penetration. The company said Ireland has become one of the fastest growth markets for broadband in the EU due to its Eircom's aggressive marketing and promotional campaign. Eircom currently has in excess of 3,000 customers signing up for broadband each week.

Italy

The Italian environment for broadband is oriented around DSL and FTTH. With regard to fibre, Italy is one of the more advanced countries in Europe in developing fibre-to-the-building technology and services.

At the end of 2005, Telecom Italia expects its broadband coverage to reach 91% of the population, up from 85% at the end of last year and expects 10% coverage via satellite, according to Dow Jones Newswires. Satellite has been a higher priority in the Italian market than many others; this is partly due to a relatively high proportion of mountainous terrain in Italy. It also announced that in mid 2005 it would boost its high-speed Internet access to 1.2 Mbps, from 640 kbps.

Fastweb's footprint currently covers 27% of Italy's population (5.9 million households). However, with rival Wind's future in a state of flux and Telecom Italia hitting back hard, particularly in the residential market, Fastweb is wasting no time in consolidating on its success. It has stepped up the pace for expansion plans,

negotiated access with Telecom Italia to 300 central offices and has undertaken a major rollout push during 2005. This will result in coverage of 45% of the population by the end of 2006 (four years earlier than anticipated in the original business plan) and is intended to firmly nail its position as the number two operator in the Italian market. As the company increases its footprint to cover new areas of Italy, it will continue to target primarily high-spending customers.

The cable network in Italy covers only a few favoured areas so it cannot make a significant contribution to broadband. Cable coverage is estimated to be as low as 9% at 2004 according to the OECD. The two main operators offering cable TV services are the Telecom Italia subsidiary Stream and the Canal Plus affiliate Canal Piu, but neither offers voice or Internet services via their networks. With low cable TV penetration, the potential for the development of a broadband industry based on cable remains low.

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 (as of end 2004, fibre penetration to households was 1%). 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.

Japan

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. Both NTT East and NTT West claim to have coverage of 96%[6], where coverage is considered to be the ratio relative to the number of landline phones installed in the NTT's service area. NTT aims to establish broadband connections with virtually all households and businesses in Japan by the end of 2006[7].

Several other operators, such as Yahoo!BB and KDDI, provide DSL services although these are generally targeted in urban areas and do not add to overall coverage.

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 66% of households.

[6] http://www.ntt-east.co.jp/product_e/05/2.html

[7] http://www.ofcom.org.uk/consult/condocs/telecoms_p2/tsrphase2/annexO.pdf

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 70-80% of local exchanges and FTTH is likely to be available in all municipal cities in 2005.

By 2005, the e-Japan initiative, launched in 2001, aims to have 'always on' broadband connections (at 30 Mbps) to at least 30 million homes, and ultra high-speed access networks (100 Mbps) to at least 10 million homes. Japan's infrastructure is one of the most advanced in the world but as yet has not reached full utilisation.

South Korea

DSL coverage in South Korea is almost totally in urban areas. The South Korean government has allocated money to ensure universal roll-out by the end of 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 South Korean households.

According to operators, today overall coverage of broadband in South Korea is an estimated 97%, or more. The MIC is pressing Korea Telecom to achieve 100% coverage as early as possible in 2005.

The impressive level of broadband penetration has been assisted by South Korean demographics. Over 50% of South Koreans live in apartment blocks and more than 90% of the population are within a 4km range of the local exchange, radically reducing the amount of infrastructure needed.

The South Korean government is the most interventionist in the world in relation to broadband. Its policy objective is to have broadband connections of 155MB to 5GB available nationally by the end of 2005. The government has made a direct investment of KRW 325 million to promote digital content and is to pump KRW 17 billion into its infrastructure by 2010 in a combination of government and private investment.

Government regulation has also assisted the growth in broadband penetration. The Korean Information Infrastructure Plan (a government initiative) requires carriers to offer universal access to broadband Internet with speeds up to 1Mbps to 84% of South Korean households by the end of 2005. The South Korean government also introduced a certification programme for broadband buildings and apartments, which allowed property developers to incrementally charge more for higher-grade broadband services in their apartment blocks.

Korea Telecom (KT) announced during the third quarter of 2005 its plans to offer mobile wireless broadband service (WiBro) that will allow users to access the Internet when travelling at 60 kilometers-per-hour (36mph). WiBro is also fully supported by the Korean government. Access points are being built in Seoul and 19 other cities for

a launch next year. Top access speed will be 1 Mbps. KT will offer the WiBro service to mobile phones, which will give users VoIP, high-speed Internet access and digital media broadcasting capabilities.

Sweden

Sweden has always been one of Europe's broadband leaders. Early market liberalisation coupled with a proactive regulator keen on promoting competition and high demand have ensured it is one of the world's top ten broadband countries, with a broadband penetration of 40% of households by the end of September 2005. FTTH from operators such as Bredbandsbolaget (B2) has gained a firm foothold, despite the overall domination of DSL. Cable has recently played a more important role here too; the divestiture of cable operator Comhem (as a condition of the TeliaSonera merger) has boosted the company's broadband growth and cable modem subscribers now account for one-third of the market.

Nowadays, the country's broadband coverage reaches almost 90%. Sweden, compared to the Netherlands and Belgium, is sparsely populated. Most people live in the southern part around Stockholm and closer to Denmark. There are 290 municipalities and 200 of them have their own network. The goal of the Swedish Urban Network Association is to have an open infrastructure, reduce the amount of digging by co-ordinating the laying of fibre and to create robust networks for government and public use. The government wants to have broadband available to 99% of Swedish residents by 2006.

Fibre to the Home (FTTH) makes up 16% of (residential) broadband infrastructure in Sweden. Operator B2 has been the most aggressive in pushing fibre out to Sweden's large number of multi-tenant units. The Stokab initiative for example, means Stockholm is now one of the most fibre-rich cities in the world.

By contrast fixed wireless access has failed to make an impression since the award of fixed wireless licences to Telia, Telenordia Access, Quadracom Wireless, Europolitan and Utfors.

US

The vast geography and population spread of the US makes the provision of broadband services over fixed networks more problematic than in many of the other countries studied here.

Cable TV networks pass almost all households in the US except in the most sparsely populated areas. Roughly 88% of US households can now have access to broadband services through a cable modem[8].

According to a recent study published by the FCC on broadband coverage in July 2005, by the end of 2004, the service providers that report to the Commission had at

[8] Source: NCTA

least one high-speed service subscriber in 95% of the nation's zip codes. Also, 99% of the country's population lives in these zip codes which implies broadband availability of at least 94% of households.

The threat from cable-television operators has provided an impetus to the big phone companies to expand DSL coverage to most of their customers. In SBC's case, it reaches more than 80% of the homes in its territory.

BellSouth recently announced that it is planning to provide about 80% of households in its nine-state territory with super-fast Internet access in the next two to three years, as the phone company steps up its battle with cable rivals. The move would cost BellSouth an estimated $2 billion over the period. BellSouth will not increase its capital spending to pay for the move but will allocate a growing percentage of planned expenses each year from its operations.

Also, Verizon said it has launched broadband DSL services in three new states and has expanded the service in 11 existing markets via its Online subsidiary. The company said it is now offering DSL services for the first time in Idaho, Ohio and South Carolina.

Total lines at the end of September 2005 amounted to over 40 million, up from just over 34 million by the end of December 2004 (18% increase). Also the recent trends reported in previous report that broadband lines surpass dial-up lines and that DSL lines' growth surpass cable lines' growth have been further verified during these six months. The growth of DSL continues to outpace cable modem with a 28% growth between March 2005 and September 2005, compared to a 13.5% growth of cable modems. In addition, there are a number of other trends, such as changes in pricing, in downstream and upstream speeds and new technologies like fibre and wireless broadband that are beginning to make their mark. A recently announced FCC decision to remove the obligation for incumbent local exchange carriers (ILECs) to offer wholesale broadband transmission on an unbundled basis will certainly transform the market once again.

4.2.2 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, with 62% of households taking up 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.

4.3 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. The number of broadband lines around the world has now exceeded 200 million, according to Point Topic, which estimates there will be a total of 205 million DSL, cable modem and other broadband connections world-wide as of 31 December 2005.

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 South Korea, Canada and Japan, the UK has seen 25% growth in take up between March 2005 and September 2005. The UK was still just behind France in broadband numbers at the end of September, with a total of 8,860,000 lines as against 8,927,000 in France (equating to 16% growth since end March 2005). Germany is now third in European broadband with 8,411,000 lines at the end of September (12% growth since end March 2005).

The UK added nearly 2.8m broadband lines in the first nine months of 2005 while France added only 2.2m. Point Topic expects the trend to continue with the UK adding at least 200,000 more lines than France in the last quarter. Point Topic is forecasting at least 940,000 for Q4 - which is usually one of the better quarters of the year, and estimates that the UK will have 9.8 million broadband lines by New Year's Day 2006, while France will have 9.7 million.

The slowest-growing region during Q3 was Asia Pacific (2.3%) where major countries such as Japan are showing signs of saturation. Broadband lines in South Korea are flatlining, if not actually falling, although the reported number of broadband lines did actually decline slightly from 12.3m lines in Q2 to 12.0m in Q3 2005. On the other hand, countries that are coming from behind such as Australia are now showing rapid growth.

In the USA, the DSL providers added over 1.38 million lines during Q3, 90,000 more than cable modem growth. This represents a 8.67% increase for Q3 against only 5.8% for cable. Canada and Sweden, however, saw cable modems with fibre and other technologies catching up on the quarterly DSL line growth in absolute terms.

The number of broadband lines at end Quarter 3, 2005 and resulting penetration is detailed in Figure 4.1.

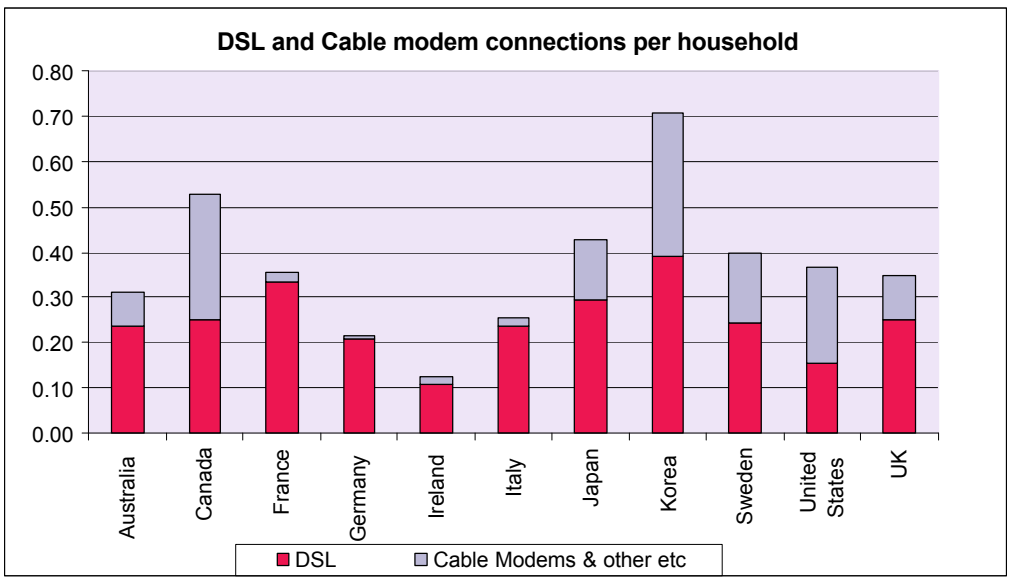
Figure 4.1 Broadband lines and penetration Quarter 3, 2005

Country	Broadband lines	Households (000)	Penetration (%)	Growth in lines since Q1 2005
Australia	2,364,000	7,534	31%	29%
Canada	6,332,000	12,047	53%	8%
France	8,927,000	25,067	36%	16%
Germany	8,411,000	39,346	21%	12%
Ireland	174,000	1,369	13%	15%
Italy	5,905,000	23,192	25%	12%
Japan	20,913,000	49,120	43%	6%
South Korea	11,994,000	17,000	71%	-1%
Sweden	1,682,000	4,223	40%	18%
US	40,876,000	111,220	37%	12%
UK	8,860,490	25,440	35%	25%

Source: Point Topic, Ovum

Figure 4.2 presents the broadband subscribers per household, by technology, as of end September 2005 (Source: Point Topic).

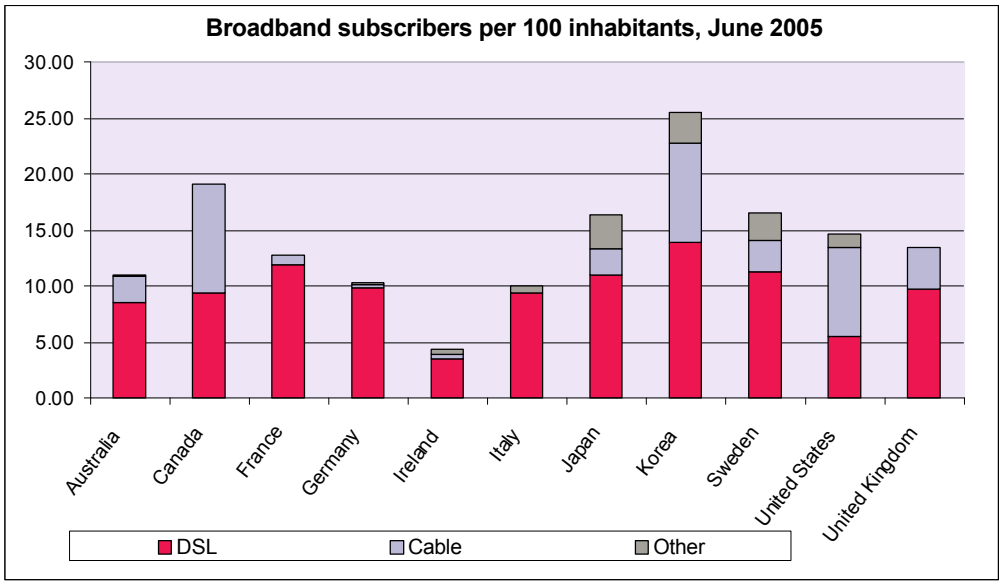
Figure 4.2 Broadband subscribers by technology per household, September 2005



Source: Point Topic

Figure 4.3 presents the broadband subscribers per 100 inhabitants, by technology, as reported in June 2005 by the OECD.

Figure 4.3 Broadband subscribers per 100 inhabitants, by technology, June 2005



Source: OECD

4.4 Country characteristics, comparisons with the UK and learning points

4.4.1 Australia

Culturally, Australia is very similar to the UK, but the country's differentiator is that it has two major cities (Sydney and Melbourne) and state capitals (Canberra, Darwin, Perth) which are sophisticated and innovative, while much of the rest of the country is rural. The urban centres are testbeds for new technology development, such as fixed wireless broadband and fibre. TransAct in Canberra has a mixed fibre-to-the-kerb solution but otherwise it is greenfield ventures driven by Telstra, whereas elsewhere it is proving a struggle for potential users to get access to broadband services.

After years of very slow growth, broadband is finally taking off in Australia making it one of the fastest growing markets in the Asia Pacific region, and achieving more than 31% household penetration by September 2005 due to strong price competition. Unbundled local loop and line sharing has been available for some years, but only now are alternative operators deploying their own infrastructure in the Telstra exchanges. However this is confined to urban and metropolitan areas. Telstra is possibly the most vertically integrated incumbent in the world, dominating every sector in which it operates despite increasing competitive pressures.

Access-based competition alone will not sustain alternative operators building out their own infrastructure. Few have the scale compared to Telstra, with subscribers numbering in the thousands or tens of thousands at best. First movers may be able to capitalise on the bandwidth capability and speed offered by ADSL2+, but this window of advantage will soon be eroded. The need for scale becomes greater in the residential market, where margins are much smaller.

Australia's broadband sector is competitive on services, but remains heavily reliant on wholesale access and resale arrangements with Telstra. There has been massive investment in inter-capital transmission networks, with five to seven competing networks. There is also trunk capacity between major regional centres, although competition here can vary. However, facilities-based competition at the access level is fragmented, primarily confined to business districts and metropolitan centres with the focus on business customers.

Mobile broadband is seen as a growth market by a plethora of vendors, operators and investors. Its promise is built on the theory that two of the strongest themes in telecoms over the last decade, bandwidth and wireless, will converge. However, coverage is still predominantly confined to Sydney, Melbourne, Canberra, the Gold Coast and Brisbane, with very limited scale in some of these cities. Nevertheless, 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.

4.4.2 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.

This proactive approach is continuing as Canada expresses some concerns recently that its lead in the global broadband market is being eroded. In May 2005 the Minister of the Environment, on behalf of the Minister of Industry and several other federal partners, announced that the 'Centre des technologies de l'information et des communications' would receive C$6.9 million in funding from the Government of Canada to deploy broadband, or high-capacity Internet to an estimated 51 municipalities. In May 2005, the Canadian Government also allocated C$10 million to expand broadband connectivity in northern Ontario. In July 2005, Bell Canada partnered with Nortel Networks to develop high-speed broadband networks in rural

Canada demonstrating a keenness for the commercial sector to get involved in seeking new opportunities in rural regions.

4.4.3 France

France has made great strides over the last year in improving and consolidating its position as a leading broadband market – predominantly however in the DSL space. It is performing well in Europe following substantial LLU activity. The rise of competitors such as Free, Neuf (newly merged with Cegetel), NC Numericable and UPC France (which acquired Noos) is improving the country's competitive stance.

Since the end of 2004, there has been consolidation in the market due to the high-level of competition (as a result of a combination of low prices and continuous focus on higher performance and innovation). Telecom Italia bought Tiscali France (April 2005) and Neuf Telecom and Cegetel merged to form neuf cegetel in August 2005. Similar consolidation continues in the cable sector and a single operator will likely emerge before long – probably UPC.

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

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.

4.4.4 Germany

Germany is a fairly large, well-populated country with one dominant national player, Deutsche Telekom. Although an early mover with Deutsche Telekom driving DSL roll-out according to its estimation of financial viability, competition has started to increase over the past year.

Germany's differentiator is that the legacy systems have been based on the federal 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 (although players such as HanseNet are starting to build out into other cities). One key challenge for Deutsche Telekom 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. In June 2005, Deutsche Telekom's T-Online unit reduced the monthly rate for its best-selling DSL package by 50% in response to competitors' price cuts.

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 regulator RegTP (now called the Bundesnetzagentur) is trying to address the balance of power of a particularly strong incumbent. In August it announced a one-off cut in local loop unbundling (LLU) charges and line-sharing monthly charges in an attempt to boost competition in the broadband market. Nevertheless, Deutsche Telekom continues to dominate the market, and will likely do so for some time.

The cable broadband sector remains relatively weak due to continued fragmentation- this despite a modest rate of network modernisation and some consolidation. The situation will persist for a while yet, leaving DSL to dominate as the main broadband technology. Germany struggles with infrastructure competition despite very widespread availability of cable TV services. It therefore bears little resemblance to the UK in this respect.

4.4.5 Ireland

Despite significant investment from EU funds, and initiatives from government, broadband has been slow to develop in Ireland. Poor infrastructure, and limited competition continues to hold back the market, although prices are now falling, stimulating renewed growth over the last six months. ComReg is however increasingly demanding changes on the part of Eircom, imposing *ex ante* obligations and interim price controls on wholesale and bitstream products.

In March 2005 the regulator announced the response to its consultation on shared access. ComReg suggested that Eircom only receive the incremental costs of providing shared access to the local loop. With this thinking ComReg calculated a charge of euro 0.39 per month for shared access - 96% lower than the previous charge of euro 9.00. This would be the lowest price in Europe. Notwithstanding this, Eircom continues to dismiss the importance of LLU to broadband and maintains a rather diffident approach towards its regulator.

Significant investment and initiatives from government are hoped to make Ireland a country with 100% broadband coverage by 2007. As of August 2005, the government had invested over euro 7.4 million in 265 communities covering over 165,000 of the population, in its Group Broadband Scheme. Also, 81 projects had been approved by the government under the second phase of GBS. Eircom has a goal of having 500,000 ADSL customers by the end of 2007.

4.4.6 Italy

Not scoring particularly well against the other country markets in this report, Italy nevertheless is proving an innovative, forward-looking market. Fastweb has brought forward its development plans by four years and now expects to make its service available to 10 million homes across large swathes of Italy by the end of 2006. 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 tariffing models, and propositions for fixed-mobile convergence and migration. Characterised by its high quality, value-added services, Italy is demonstrating that it can build a promising market without having a significantly competitive one.

Broadband access services in 2005 have been characterised by more à la carte pricing including pay-as-you-go offers, flexible contracts and a strong push on wireless broadband from Telecom Italia in particular.

Wireless broadband based on Wi-Fi and WiMAX technologies is touted as a scheme for providing Internet access to rural areas, places where no other medium is available. The Italian government had already set aside euro 300 million so that all of Southern Italy would have broadband access.

At the end of June 2005, 61% of government institutions in Italy had broadband access, which included 52% of municipalities, 73% of schools, and 85% of health system structures

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.

Reasonable prices in the areas of local loop unbundling (LLU) and wholesale DSL mean uptake has been relatively successful, with aggressive deployment from Fastweb and Wind. Uptake of LLU will continue, driven primarily by Fastweb, which continues to extend its footprint. Operators will also continue to push VoIP in order to compete on voice tariffs and benefit from internal cost savings.

4.4.7 Japan

Japan is a vastly different market to the UK, and as such is difficult to compare on a like for like basis. It prides itself on being at the forefront of technological evolution, and 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, national fixed line voice services was seen to be expensive in Japan, and this led alternative operator Yahoo! BB to provide much cheaper VoIP services. Over 90% of its customers take VoIP as part of their broadband service.

Technology savvy users and the strong early adopter culture are driven by one-upmanship – particularly against South 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 (although there seems to be a lot on offer, from video games to electronic books, music downloads to Voice over IP), but they have the capability and capacity to provide whatever is demanded.

Government programmes to drive IT literacy and online education have accelerated this.

While the government has driven facility-based competition through its e-Japan strategy, effective deregulation such as local loop unbundling (LLU) has enabled service-based competition, inviting more players to the market. Under such environments, the competitors have been successful in adding rich value-added services at competitive prices by manipulating 'build or buy' options.

From a technological angle, the market is shifting from xDSL to FTTx. Although more than 70% of broadband access is implemented through xDSL, fibre has shown rapid growth in recent years due to increased demand for converged multimedia services. The Japanese Government also set a target of 10 million ultra-high-speed broadband customers by the end of 2006 as part of its e-Japan initiative.

Despite considerable improvement in revenues and profitability in recent years, most broadband businesses in Japan rely heavily on other lucrative business such as mobile, except for eAccess, which relies on its broadband business as its cash-cow and plans to enter the mobile market.

4.4.8 South Korea

South Korea's main broadband driver was a strong government push to become a leading global force in the broadband space. The South Korean Government invested significant amounts of money into national backbone infrastructure to stimulate competition. It also provided major tax-breaks for broadband operators. But what government and service providers failed to identify fully was the business case for broadband. In 2003, South Korean telcos suffered substantial losses, and the intense, competitive marketing activity between them resulted in increased churn and costs. The financially distressed cable operator Thrunet was acquired by Hanaro in 2005 – as a direct result of over-indulgence in promoting ultra-cheap broadband at the expense of sound business.

Nevertheless, Korea is still one of the most advanced markets for broadband, and it is useful for other markets to understand the reasons behind South Korea's market difficulties and learn from them.

With around 71% of South Korean households having broadband, the technology is pervasive and getting faster. It is changing the accepted business models for creative sectors in a country where digital music downloads already vie with CD sales, and the online video games market is larger than that of VHS and DVDs combined. Online gaming is the emerging star of South Korea's broadband sector. It is a cultural phenomenon, which spreads beyond the home to high-street cafes and beyond the traditional male skew of western games markets.

Addressing the desire for ever more pervasive broadband, Korea Telecom plans to offer a mobile wireless broadband service called WiBro that will allow users to access the Internet when travelling at 60 km/h. Access points are being built in Seoul and 19 other cities for a launch next year and the top access speed will be 1 Mbps.

South 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 South Korean experience in undertaking this. Other useful lessons relate to new pricing models and capped rates being undertaken by major South Korean operators.

4.4.9 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. By the end of 2004, only 10 municipalities, out of 283 in total, did not have infrastructure in place to support broadband services and some have developed open access fibre networks. For example in Västerås an open access fibre network has been developed and any operator can use it (Telia already does so).

In addition, the high number of apartments has made it relatively easy for B2 to install fibre, pushing forward the roll-out of higher speed services. Landlords have made high-speed broadband services a key differentiator in the residential property rental market.

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.

4.4.10 US

The US broadband market is dominated by ten players, six cable operators and four local phone companies, which between them have almost 90% of the market. However, each of the phone companies and each of the cable companies has a discrete geographic coverage area, so that in any given part of the country the market is largely fought over by one local phone company and one cable company, creating a series of local duopolies. Competition based on regulated access to networks is minimal, although a handful of players, mostly serving business customers, have made this their business.

The cable operators entered the broadband market first, followed by the telcos using DSL, and cable has maintained a majority share ever since, though the gap is slowly closing due to rapid DSL growth. Cable services tend to be offered at higher speeds for a higher price, while DSL is typically offered for slightly slower speeds and lower

prices. Part of the reason for the latter is that long local-loop lengths has limited the availability of higher speed services. Cable TV covers the vast majority of households in the US, and broadband availability is at 88% of cable deployment. The US provides an interesting example of inter-modal, or facilities-based competition, a situation which has come about despite early attempts by regulators to foster service-based competition.

The quest for a triple, or quadruple, play defines the competing operators' current and future plans. On the one hand, the cable operators, whose heritage is cable TV, have launched first broadband Internet access and more recently voice over IP services. On the other, the local phone companies are rolling out advanced broadband networks to support TV over broadband services.

Most of the cable operators now offer VoIP services – the earliest deployments began in 2004. These are now displacing some of the original TDM-based voice services. Take-up rates vary among the major cable operators but an estimated two million cable VoIP lines are now in service and good potential remains - the incumbents are expected to lose further market share to the cable players and independents like Vonage.

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-to-the-home 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 co-operate or to invest at all. In addition, the FCC's recent decision of removing the obligation from ILECs to unbundle the transmission components and grant access to other ISPs will likely transform the US broadband market over the next year.

Annex

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