

newstatesman

Special
Supplement

Whatever happened to

Broadband?

with
Richard Reeves,
Patricia Hewitt,
David Cox,
Ellen MacArthur,
Bamber Gascoigne,
James Crabtree
and others

In association with



Creating a broadband market

by **BEN KING**

When he took office in February 2002, BT's chief executive, Ben Verwaayen, made it clear that broadband would be at the top of the company's agenda. Two years on, after some heavy investment and dramatic price cuts, the customer figures are starting to look promising.

More than two million people have fast connections to the internet over BT's broadband lines, and more than 90% of UK homes and businesses have access to broadband services – an achievement that clearly makes Verwaayen proud. "It's going gangbusters. We do about 35,000 a week now," he says. "So that is fantastic. We are truly creating a market."

So far, so good – but now comes the complex part. A broadband connection is only as useful as the services it can connect you to. So if the whole Broadband Britain project is going to deliver on its promises, government and enterprise have to start delivering those services, and people have to start using them. And somehow BT has to make money from it.

Take small businesses, for example. "I find the uptake in small to medium enterprises (SMEs) most encouraging," says Verwaayen. "For a long time it has been one of the points of worry that

30 per cent of SMEs don't have a computer. And that number is going down rapidly.

"Now, what you want is a really connected economy where people can really transact with each other. Not just look things up – you could do that for a long time – but to make a safe, secure transaction. I think that will allow SMEs to get access to a large number of services that today are only available to large enterprises."

SMEs spend a lot of time dealing with various forms of officialdom – the taxman, local planning departments, and so on. So it's vital to get those government bodies to deliver their services electronically.

Broadband is not just a tool to help small businesses deal with red tape. Verwaayen sees broadband as an important engine of social change. "It will enable our doctors and nurses to be much more efficient. They'll always have access to up-to-date, accurate information, at any point in time, anywhere in the UK.



"Or look what you could do in the education system. I could pass my exam over broadband. These are fantastic changes. But you have to get the vision right and then put all the focus on the execution."

The swift growth of broadband seems to have few opponents. But BT is in an odd position. If it's too successful, it leaves itself open to being called a monopolist, stifling exactly the thing that is meant to guarantee a healthy broadband market – competition.

"BT is the biggest player in town, so we have certain responsibilities. But at the same time, we have millions of shareholders in the UK who need to be accounted for."

The company took huge risks with the roll-out of broadband, he says, and its shareholders should get their fair share of the reward. "When we started [investing in broadband] we were jumping off a cliff without a parachute. And now everyone else is saying they should have the right to take advantage." Which means that BT should be allowed to have a share of the market proportionate to the risk it took. Given the size of the investment, that would be a dominant position. "There has to be a balance," says Verwaayen. "I know a big company like BT saying that is unpopular, but that is the reality."

Broadband progress

January 2002 Ben Verwaayen joins BT as chief executive

February 2002 Ben puts broadband "at the heart of BT strategy"; sets targets of one million customers in 2003, two million in 2004 and five million by 2006

April 2002 BT slashes wholesale broadband prices

June 2003 BT Openworld and Yahoo! join forces to create new customer product

June 2003 One million customer target hit

September 2003 80% UK broadband coverage achieved

February 2004 Two million target hit

April 2004 BT confirms it will achieve 99.6% UK broadband coverage by summer 2005

May 2004 90% coverage achieved

Milking cash from the broadband cow may not be as easy as it sounds. BT still loses money on broadband, and reversing that flow won't be easy in a market with constantly falling prices. But Verwaayen is confident that it will happen.

"The shareholders will get their payback from three sources," says Verwaayen. "From old-fashioned access; from aggregation platforms, where you allow others to bring the services; and from bundled services. All of them will be very important."

But to make that happen will be no mean feat. "This is a huge leap of faith for us," he says. "But I honestly believe that this company and this market will benefit long term from the transition from narrowband to broadband. It is, however, a long way, because you have to make the transition work in economic terms. And that will require all kinds of new services to have a pick-up rate that is much higher than what we have today."



‘Broadband is like the jet engine’

RICHARD REEVES on the profound implications behind the hype PAGE XII



‘You can always use the off button’

ANTHONY CAPSTICK on working from home PAGE XVIII

‘South Korea has left competition far behind’

ANTHONY TOWNSEND on an Asian miracle PAGE XXXI



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Published by New Statesman Limited. A supplement to the **newstatesman** issue 31 May 2004. © All rights reserved. Registered as a newspaper in the UK and USA. Address: 52 Grosvenor Gardens, London SW1W 0AU

This supplement can be downloaded from the NS website at www.newstatesman.com/supplements

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It’s taken a lot to convince me. All too often I have sat at my home computer, tapping on the desk, stamping on the floor, glaring at the bottom of the web browser and willing it to hurry up “Connecting”, “Receiving” or “Looking for the page”. Frequently the internet connection gets as bored and annoyed as me and hangs up. Then I have to start all over again. It makes me swear, loudly. It’s not like I’m trying to do anything too complicated – just check my e-mails at work, consult a rail timetable (if I wait for it to download, I am likely to miss the train) or get my doctor’s telephone number (by the time I find it, a therapist would be more useful). When it disconnects, I shout downstairs: “We really do need broadband.” “Then sign up for it,” comes the reply. He’s annoyed because I kicked him off the computer half an hour ago saying I’d only be five minutes.

So why haven’t I signed up? It’s not like there isn’t a crying need. Partly it’s a simple matter of time – my connection’s too slow for me to bother filling in the form over the net. Then there’s the pessimist in me that is sure we won’t be able to get it anyway. Where we live is not exactly remote, but nor is it the sort of place that new technology (or rather the companies trying to sell it) find their way to with any great speed or enthusiasm. We can just about get Channel 5, though not well enough to encourage you to watch it even if you quite wanted to. And although the local supermarket sometimes stocks digital boxes, we can’t get digital TV.

Perhaps the biggest obstacle between me and broadband has been my suspicion, deep down, that it probably wouldn’t make an awful lot of difference. Now, however, I’m pretty sure it would – I certainly want to give it a try. As Graeme Wearden describes (page vii), by hook or by crook, people are gaining access to broadband, even in the most rural parts of the country, and if Anthony Capstick (page xviii) can get it on the Isle of Skye, I should be able to manage it somehow. The determination of individuals and businesses to get broadband suggests there must be something in it. Indeed, most, if not all, of the contributors to this supplement envisage it could have quite a profound impact on both our daily lives and society in general – for example, in our hospitals and schools (Michael Cross, page xx, and Kathryn Corrick, page xxiii) and on the nation’s cultural life (David Cox, page xxv). Richard Reeves and Simon Roberts (pages xii and xv) observe that it will soon be absorbed into our lives just like the telephone before it. We may not notice its effects, but that doesn’t mean it has none.

Thinking about it, I would be able (boss permitting) to work from home more and travel less. I’d be richer in time and money. Broadband, it seems, might just do all those wonderful things that the gurus promised the plain-old internet would do. I am already enthusing about what it could do for me. The question is, what could it do for you? Read on to find out.

Emily Mann, supplement editor

Only connect . . .

Britain has long seemed a broadband basket-case, with low availability, high prices and a stifled market. Finally things are looking up, writes **JAMES CRABTREE**

Who would have thought it? We are actually good at something. A recent survey suggested that Britain is the second most wired country in the world, trailing only the super-connected Danes and trumping, most importantly, the US. Add to this a study last year indicating that the government very nearly met its target to make Britain the best place in the world to do e-commerce, and our natural pessimism over our technological development begins to look like false modesty. Even more surprising is the claim that broadband – or fast, always-on internet access – is a big part of this success. Although other countries have more users, the density and competitiveness of our broadband market has helped push the UK into second place.

For those who follow “Broadband Britain”, this is indeed shocking news. We have accused ourselves of being a broadband basket-case, with low take-up, slow connections, an uncompetitive marketplace and few public services that take advantage of faster connections. So what has changed? Is there cause for optimism? And what exactly is all the fuss about what the Prime Minister has called “the transforming technology of our age”?

To understand the impact broadband can have, you need to see it in action. Tony Blair would approve of one particular family from Sidcup. They are not e-literate geeks, but they are none the less model Broadband Britons. Two years ago, they decided to put a broadband connection into their four-bedroom semi, and liked what they found. The father, a teacher at a local school, uses the net to prepare his lessons; his wife uses it to organise local charity events. Their son regularly logs on to lust over cars, while their daughter decided to use it to trace their family tree: “We have always been interested in it, but before we had broadband it took so long.”

Each member of the family uses broadband in ways that make sense to them. They think their lives are much better for having it, and wouldn't want to go back. They are the type of family the government wants to see up and down the country. Politicians have been promoting this vision for longer than you might think. The Labour Party's 1983 manifesto, known more for suicidal inclination than technological vision, promised that “a publicly owned British Telecommunications would be given the sole responsibility to create a national broadband network which integrates telecommunications and broadcasting”. In the mid-1980s, a newly privatised British Telecom (BT) offered to do exactly that, only to be turned down by the Conservative government.

A decade and a half later, little had changed. Labour's manifesto in 2001 still promised that the government would be working “to ensure that broadband, which allows fast internet access, is accessible in all parts of the country”. And there were precious few broadband users. At the turn of the millennium, having been

accused of dragging its feet, BT had launched a broadband service for ordinary consumers. Within a few weeks, thousands had declared an interest, journalists had written numerous articles predicting sweeping changes to the way ordinary Britons lived and worked, and the head of BT Openworld, Ben Andradi, had declared that “the advent of broadband . . . is creating a second internet wave”. Yet just over a year later, in the autumn of 2001, this optimism looked premature. Britain was in a fierce scrap with Estonia and the Czech Republic for 21st place in the world broadband rankings. Only around 200,000 people had signed up, putting the UK significantly behind most comparable European countries and trailing way behind the world-beating South Koreans.

The government, reacting to growing unease in the industry and media, called a crisis summit. The outcome was a new target for Britain to have the “most competitive and extensive” broadband market in the G7 by 2005, and a new industry body (the Broadband Stakeholder Group) to try and get Britain's house in order. A number of futuristic technologies – for example, 3G phones – have been stillborn without raising alarm. But broadband is different. In theory, it can make businesses more competitive and nations more productive, and give citizens better access to public

In homes, workplaces and the wider economy, broadband has become a measure of a nation's success

services. The speed of broadband can dramatically improve people's experience of the internet: it “enables” activities (such as e-commerce) and applications (such as downloading music or videoconferencing) that work clumsily on a dial-up connection. Most importantly, it turns the internet into an always-on, multi-purpose tool for families and businesses.

In homes, schools, surgeries, workplaces and the wider economy, broadband has become a measure of a nation's success in the 21st century. At a government-sponsored “e-summit” in 2002, Blair laid out why lagging is unacceptable. He hopes that the UK “has the potential to become a great technological powerhouse, matching the great achievements of the 19th-century industrial revolution with a 21st-century information revolution”. (He also enthused about the web's ability to create open government, noting the “one million people from all over the world who accessed the government's dossier on Iraq within hours of its release on the No 10 website”.) To get Britain moving faster, he pledged to provide broadband for every school, doctor's surgery and hospital,

and promoted a number of measures to make sure that no region of the country was left unconnected.

If the recent survey is any guide, it seems to be working. So what exactly has changed? First, availability has improved dramatically. For most people in Britain, broadband is available either from cable companies or through a technology called ADSL, which involves upgrading traditional BT phone exchanges. The problem at the outset was that lots of people didn't live in cable areas, and most of Britain's 6,000-odd exchanges weren't enabled. This left millions of people without access.

In July 2002, BT, accused by its rivals of stifling competition and harangued by consumers in areas with no connection, established a system of demand "triggers". When enough people said they would sign up, the company would wire up the area. This policy was not without difficulty, and more recently BT announced that it had decided to wire up the lot instead. By the middle of next year, unless you live in a very remote area, the chances are you'll be able to get broadband if you want it.

The second major change is that the price has come down. When broadband launched, it cost more than £40 a month to get connected. But prices have gradually fallen to the point where most companies will now offer connection for £20 a month or less, while some also offer even cheaper (but not quite as fast) versions. At present, there is even something of a "broadband boom", with companies competing with each other to offer cheaper prices.

Third, more people have taken it up. Today, around three million people have broadband, and some analysts suggest that the number will keep growing strongly to reach 14.5 million in 2010. Britain is forecast shortly to overtake France to become the second biggest market in the EU, and most commentators expect the government to meet its target of having the most competitive and extensive market in the G7 by 2005.

So things are looking up? Yes, but there is a long way to go. The early years of broadband have been dominated by problems on the supply side of the market – availability, cost, a ropey service – most of which have been solved. Now the industry must turn its attention to the demand side. While three million users have converted to broadband, there are tens of millions who still can't see the point. And for every family who log on and find broadband useful, there are others who pay for the product and don't change their habits much at all. Convincing those without broadband that it's worth the bother, and persuading those who have it to use it more, will remain a significant problem for government and industry.

Some tricky but familiar issues also remain on the supply side of the market. The super-regulator Ofcom is carrying out a major review of the British telecommunications market and will have to grapple with two long-running problems: how to "unbundle the local loop" and what to do about BT's monopoly position. The first of these deals with the problem that BT still has a near-total monopoly on the "last mile" of infrastructure between local telephone exchanges and homes. The former telecoms regulator



David Edmonds tried to get other companies to put lines into BT exchanges. After four years, he admitted that "unbundling has been a painful and often miserable process". It was also a total failure. Now Ofcom, noting a recovery in the telecoms market, seems bullish about trying to get BT to lower its prices and open up this part of the market.

The second, much more difficult question is what to do about BT itself. Advocates of breaking the company up have long suggested the creation of a Railtrack for telecoms infrastructure, with the bit of BT that controls the pipes being separated from the bit that sells the connection. Most analysts seem to think that splitting BT in two would be a complicated and traumatic process: too much pain for too little gain. But the option remains on the table, and the industry will await the conclusions of the regulator's review with great interest.

As if this weren't enough, a cluster of fuzzier issues also needs to be tackled. As more people take up broadband, there will be debate about how it should be priced. Advocates claim broadband should be seen as a utility, no different from water or electricity. At the moment, anyone who signs up pays a flat fee per month, but other utilities cost more the more you use them. This puts broadband providers in a difficult position. If their customers use their connections more, they could find themselves with an unsustainable pricing model.

Even if the current pricing system works, providers have yet to work out exactly how much bandwidth consumers are likely to need, and by when. More pessimistic commentators mutter that other countries already offer connections five or ten times faster than the best available in Britain. ADSL, the current dominant technology for access, only goes so fast: industry experts are already asking what comes next.

So how fast is fast enough? What will people really use their connections for? And what happens to the rest of society as the most connected speed off into the future? We don't yet know the answers. And even if Britain's position has improved compared to other countries, techno-Eeyores shouldn't stop their hand-wringing just yet. Broadband changes quickly. We are at the end of the beginning of the journey, and there will be plenty more to worry about on the way.

James Crabtree is an associate of the Institute for Public Policy Research's digital society programme (www.ippr.org)

On the political agenda

Technology policy in an election year? Don't hold your breath. And anyway, President Bush is no techno-phile. His most coherent thought on the network society came during the 2000 race. Mocking Al Gore for a claim he never made – that he “invented the internet” – Bush asked: “But if he was so smart, how come all the internet addresses start with W. Not only one W, but three Ws?”

Strange, then, that the president, in a high-profile speech on his campaign trail, promised to bring “broadband technology to every corner of our country by the year 2007”. With an expected recovery in the telecoms market, perhaps the Republicans have an eye on wealthy Silicon Valley campaign donors. Although the announcement produced what one commentator called “only a polite golf clap”, in the words of another it was “better than nothing”.

Bush didn't say exactly how he will achieve 100 per cent. The Democrats picked up on this immediately. The Republicans, they argue, don't “do anything to provide the new resources that will be needed to deploy broadband in rural and urban areas, and are not addressing the regulatory barriers that prevent deployment”.

The question is, could broadband also find its way up the political agenda over here? The division between Bush and John Kerry is mirrored on this side of the Atlantic (see party policies in boxes). In as much as the Conservatives have a specific broadband policy, they disagree with public intervention and promote competition. Labour is very keen on competition, too, but more willing to consider regulatory and fiscal mechanisms to promote access and take-up. Its approach also gives a role to Regional Development Agencies and other regional bodies that are unpopular with the Conservative Party.

Both opposition parties have promoted broadband access in rural areas, but this should become less of an issue with near-universal access forecast by the time of the next election. It will be interesting to see which vision for the next five years the parties promote, and what promises they make. But few would expect any party to nail its colours to the broadband mast.

There is one issue, however, that could push technology right up the political agenda. Outsourcing – sending services and jobs abroad – has been spectacularly divisive in the current US campaign. Lots of broadband access makes moving jobs abroad easier, and jobs in the technology sector are among the first to be exported. The possible impact of outsourcing hasn't yet hit home, but when it does, voters are unlikely to warm to parties that seem impotent in the face of aggressive global job relocation. So broadband may not be much of a political issue at the moment. But the man on the Bangalore omnibus might turn it into one.

James Crabtree

For more on the US, see page xxxii

“The Labour Party's overall target is for the UK to have the most competitive and extensive broadband market in the G7 by 2005. Our approach will be in allowing more and more competition to develop, to provide more choice, increase investment and drive availability. The new regulatory framework under Ofcom is already reaping dividends. We shall be the only country in the G8 with near-universal coverage provided by a competitive private sector. The next challenge is for government and industry to work together to provide reasons for people to use broadband. The government is investing more than £1bn towards providing key public services with broadband connectivity.”

“Liberal Democrats believe all UK citizens should have access to sufficient bandwidth for their needs at a reasonable price, and this should be seen as an ongoing process rather than a single target to ‘do broadband’. The evidence to date is that the market is delivering services to most areas. Regulators should now ensure that this develops into a truly competitive market. The next challenge is to reap the social and economic benefits this can bring. Public services can become both more cost-efficient and more effective. Businesses can gain a competitive advantage. The primary role for government will be to provide education in how to take advantage of new technology.”

“The Green Party is in favour of the use of telecommunications for travel substitution including telecommuting and videoconferencing, and we would introduce measures to aid growth in these sectors. We see the internet as a powerful liberating force, providing large amounts of valuable information at low cost to people almost everywhere. So we would press for broadband to be provided everywhere across the country, like gas and electricity. This would help reduce the pressure on people to move to the more economically active areas such as the south-east – so helping ameliorate high house prices there and low ones elsewhere.”

“The Conservative Party believes the government's failure to create an adequate competitive environment is damaging, and that it should have a duty to promote competition and reduce regulation. The government's approach can be seen in its grant of £30m for broadband to the RDAs, which are the last bodies the government should use. The government should create a more competitive environment to encourage new entrants to the market, and should entrust the regulator with a remit to protect against market abuse until a competitive market evolves. It is for the regulator to protect consumers of national services and utilities, and to encourage progressive liberalisation of the marketplace to bring about universal access and a uniform and transparent tariff.”

How the people have made it happen

Communities trapped on the wrong side of the broadband divide have handed out leaflets, created websites and filled village halls in the fight for equal access. By **GRAEME WEARDEN**

The countryside is a great place if you want to avoid the stresses of the city, enjoy beautiful views, drink real ale in quaint pubs and breathe deeply without choking on exhaust fumes. But if a high-speed link to the internet is your goal, life in the country will have been less idyllic in recent years. Because rural areas have fewer homes and businesses than urban areas, they are a less attractive market to telecoms companies. So while broadband services were swiftly made available to many town and city dwellers, millions of others found they had no access and, in many cases, no idea of how or when they'd be able to get it.

However, rather than accepting such iniquity, thousands of individuals have taken action to bring broadband to their areas, and Regional Development Agencies have stepped in with subsidies. It is surely thanks to their efforts that the OECD now believes Britain is poised to lead the world in the availability of broadband, which was unthinkable two years ago.

BT, often painted as a villain by those trapped on the wrong side of the broadband divide, has in fact played a crucial role in harnessing the pent-up demand. In the summer of 2002, it began telling local communities how many hundreds of people would have to register their interest in getting its high-speed ADSL service (which runs down a customer's existing phone line) before it would agree to upgrade their local telephone exchange. The setting of these trigger levels gave the public a chance to help create a healthy broadband sector in the UK. At that time, around a third of homes and businesses were not covered by the high-speed networks of BT or cable firms NTL and Telewest. Those who were missing out could now do something about it.

Around 3,000 campaign groups sprang up across Britain, as people realised that if they could persuade enough neighbours that their life would also be enriched by a zippy internet connection, then BT would send their engineers round. Leaflets were printed and distributed, websites created and meetings held in village halls, all promoting the benefits of broadband.

Over the past two years, nearly 900,000 people have registered their interest in getting broadband

through BT's scheme and more than 2,000 trigger levels have been hit. This has helped to drive ADSL availability from 66 per cent to 90 per cent.

BT now benefits from a much larger broadband market than before without having had to put in all the work to build it. Instead, its new customer base has conceived itself and come willingly into its arms. There are more than a hundred internet service providers selling an ADSL-based service, but in most of the country – and virtually all rural areas – the only wholesale provider is BT.

The trigger levels have been so successful that BT has in fact abolished the scheme. All but 600 of its exchanges will be upgraded to offer ADSL by summer next year and broadband will be available to almost all of us.

Around 3,000 campaign groups sprang up, helping to drive availability from 66 per cent to 90 per cent

So the future for Broadband Britain is looking rosy. Today, however, ADSL availability is still spread unevenly across the country. It is largely the case that the further you are from London, the less likely you are to live in an enabled area. The take-up of broadband also differs widely across the country. And again, urban areas lead the way. In London, ADSL take-up is as high as 15.3 per cent, followed by the south-east region with 13.2 per cent. Take-up in every other area is below the national average of 10 per cent, with the north-east trailing in last place with just 6.6 per cent.

It would be easy to look at a league table of ADSL take-up and conclude that high-speed internet access is most suited to people who live in the capital and the prosperous south-east. And there's certainly some truth in that. One of the attractions of a high-speed connection is that you can work from home and have decent access to your ▶

ADSL coverage and take-up around the country

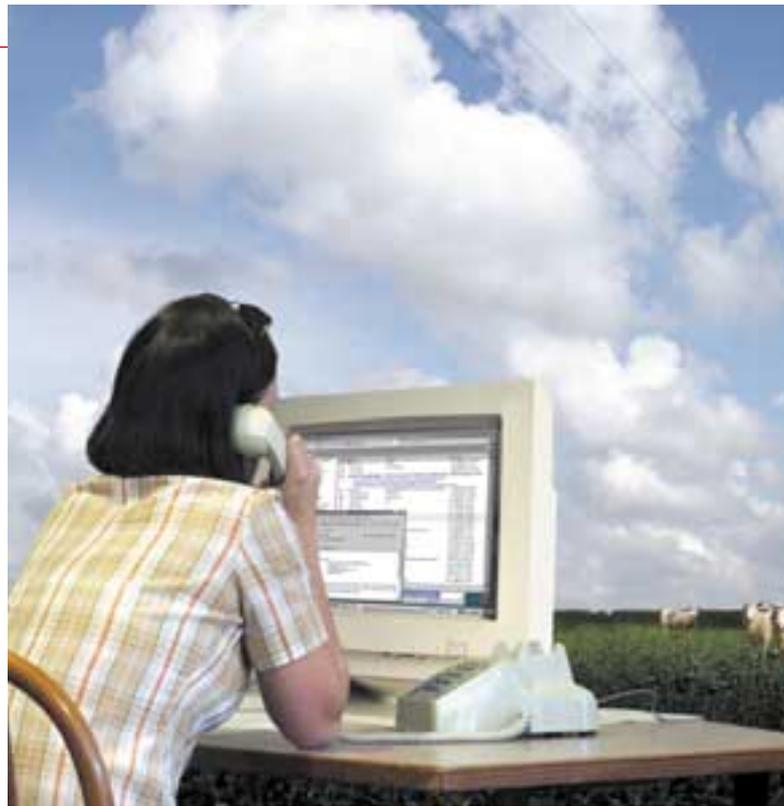
Area	Coverage (%)	Take-up (%)
National	90	10.1
East Midlands	88.2	7.9
East of England	85.1	10.1
London	100	15.3
North-east	89.7	6.6
North-west	95.7	8.3
Yorkshire and Humberside	84	7.5
Northern Ireland	76.1	7.9
Scotland	77.5	8.1
South-east	94.5	13.2
South-west	83	9.1
Wales	78	7.2
West Midlands	91.2	7.6

► employer's computer system, and there are rather more desk-based white-collar jobs in the Home Counties than in Newcastle. BT, however, claims that there's another reason for the north-east's low showing – the presence of NTL and Telewest, which it says dominate the region. The two cable companies made significant gains before BT got its act together and ADSL was twice as expensive as it is today. Both companies agree that they perform well in the north-east. "Those Geordies know a good deal when they spot one," said one cable insider. But BT is fighting back in the region. A scheme called One North East aims to upgrade every local exchange soon and is targeting local businesses with advice about how they could benefit from a broadband network.

One North East follows an earlier initiative in Cornwall called Actnow, which combined public subsidy and private investment. Before the scheme started in April 2002, ADSL availability in Cornwall was as limited as you'd expect in one of Britain's poorest areas. To address this, £10m – half from the European Regional Development Council and most of the rest from BT – was spent on upgrading exchanges and educating small firms.

Just over two years on, Cornwall is turning into a broadband powerhouse. In the areas where Actnow is running, 26 per cent of small businesses have a broadband connection, compared to a national average of just 8 per cent. There are hefty subsidies available to firms that take part in the scheme. Even so, it is estimated that Actnow has boosted the area's GDP by £22.5m – more than twice the amount that's been spent on the project – and that it has created 1,300 new jobs.

Today, around 50 similar schemes are running across the UK. However, some of the most exciting and creative broadband projects are being built without BT's assistance. Community-based networks have been formed all over rural Britain, and some of



them are managing to offer more than just high-speed web access.

Cumbria's Alston Cybermoor project is a leading example of broadband's potential benefits. Government money was used to build a high-speed wireless network in this remote part of northern England, which now boasts a broadband take-up rate of around 33 per cent. This has helped the area to develop a thriving

Different ways to get broadband

ADSL

90 per cent of homes and businesses are connected to BT Wholesale's ADSL (asymmetrical digital supply line) network, but a small percentage are too far away from their local exchange for the technology to work. More than a hundred internet service providers, including BT, sell ADSL, and there are nearly 2.5 million users in Britain. A 150Kbps connection (about three times as fast as dial-up) costs around £16 per month, and a 1Mbps connection can cost as much as £41 per month. BT also offers a 2Mbps package for businesses. Bulldog and Easynet offer wholesale ADSL services that are much faster than BT's, but generally these are available only in major towns and cities.

Cable

NTL and Telewest both offer broadband services to subscribers of their cable networks, which together cover 45 per cent of the UK population. Telewest's 3Mbps product, which costs £50 per month, is the fastest on the market. NTL has around 1.3 million broadband users, and Telewest has roughly 500,000.

Broadband fixed wireless access

Technologies such as 802.11b (also known as Wi-Fi) have the potential to bring broadband to less-populated areas where it doesn't make economic sense to roll out a fixed-line network. Around 50 wireless internet service providers are being set up or are already in operation around the country, often targeting places where ADSL and cable aren't available. These services require a wireless modem, but are often priced competitively compared to other connections.

Satellite

Satellite broadband works anywhere in Britain, but a two-way connection is more expensive than other broadband services, on top of which the equipment can cost more than £1,000. Some Regional Development Agencies do provide subsidies to cushion the blow. One-way satellite connections that give only a fast downstream link from the internet are more affordable, but also require a dedicated phone line to send data upstream.

online community, and a recent report claimed that the project generates around £300,000 each year.

A second Cumbria project, Edenfaster, is bringing high-speed wireless connectivity to more than 10,000 homes and 500 businesses in the Vale of Eden. Edenfaster has inspired many other local communities to investigate setting up their own broadband networks, as it has proved that committed individuals are able to create a commercially viable broadband service where telecoms firms wouldn't take the risk. Another pioneering project is under way in Buckfastleigh, Devon, where the Department for Trade and Industry has funded the creation of a broadband town (see box).

When community networks such as Alston Cybermoor, Edenfaster and Buckfastleigh Broadband began, the people driving them had few places to turn for help as they tried to work out the best way of getting broadband to their area. Today, the situation is much better. A number of groups have been formed to provide help for community schemes and to push the rural agenda, such as the Access to Broadband Campaign and the Community Broadband Network.

However, with BT predicting that almost the whole nation will have access to broadband by the end of 2005, is there a future for all these local projects and community activists? BT is at pains to point out that making broadband available to all is by no means the end of the story. "We now want to nurture the demand side of broadband through partnerships," explains Trish Jones, BT's general manager for regional broadband partnerships. Her fear is that some local councils and agencies may relax their broadband efforts because they know that ADSL will be almost universally available by next year. "They should look at what regions with a partnership agenda are doing to extend the economic and social benefits of broadband," she said. In the case of Actnow, for example, BT partnered six other organisations including the South-West Regional Development Agency and Cornwall Enterprise, which worked with local firms to boost broadband awareness and interest.

And we have almost certainly not heard the last from the local activists. John Wilson, one of the founders of the Access to Broadband Campaign, insists that community networks will continue to be crucial for Broadband Britain. "The community network model is not just about access to technology," he says. "It's about community ownership, co-operative endeavour, new forms of social enterprise and, above all, the development of content and services both by and for the community."

Andrew Ferguson of ADSLGuide.org.uk, a website that has given valuable support to those seeking access to broadband, envisages wider repercussions. "Many campaigners will melt away, but some areas have definitely tasted people power, and you can see local community forums starting where other local issues are debated and campaigns organised," he says. Ferguson also warns that for at least one part of the UK, broadband coverage is still a major issue. "Scotland is the real battleground now," he says. Because the cost of bringing ADSL to certain areas is too high for the number of potential users, BT is investigating

how to use wireless technologies to reach these people instead.

Until everyone in the country has access to affordable high-speed internet access, Broadband Britain will not be fully formed. But thanks to local activism, government and regional assistance, and around £1bn of BT money, we're not far off that goal now.

Graeme Wearden is senior reporter at ZDNet UK, the technology news website

Monk e-business in Buckfastleigh

The Labour government has only once wavered from its firm stance against subsidising broadband roll-out in the UK, when it pledged £30m to fund a series of projects around the country in 2001. At that time, the residents of Buckfastleigh in Devon couldn't get affordable high-speed internet access. BT, NTL and Telewest had all taken the view that it didn't make economic sense for them to offer broadband to the town's 3,600 residents.

Faced with this problem, two local residents – Gordon Adgey and Kathryn Hughes – managed to secure around £500,000 of government funding. Their ambition was to create a community-driven rural broadband network in Buckfastleigh that would be a test-bed for thousands of other areas where broadband wasn't seen as commercially viable.

The first challenge for the Buckfastleigh Broadband team was how to bring broadband into the area. The solution was a mixture of ADSL and wireless connections. They linked the local primary school to the South-West Grid for Learning, which gave them a dedicated 2Mbps connection to the internet. They then ran a link to a new internet café called Wave in the town centre, where visitors could enjoy high-speed surfing, create digital videos or learn IT skills. It quickly became the social hub of the project.

A wireless network was set up to spread the broadband bandwidth around the area, and now links the local business centre and sports club to the Buckfastleigh network. A number of public wireless hot spots have been created, some in local pubs, which can be used by those with suitably equipped laptops. Wireless was also used to reach two neighbouring villages, and a fixed-line link was run from the primary school to Buckfast Abbey, giving the town's famous monks the chance to join the broadband revolution.

Buckfastleigh's broadband network has been used to support various educational, business and health-related schemes since its creation. But since the government money ran out in the spring of this year, the challenge has been to prove that the network can be economically viable in the long term. A company called 1st Broadband began selling wireless broadband services to local homes and businesses in Buckfastleigh last year. The signs so far are that the company will be able to run commercially viable services in the town. If so, this would be a powerful message that public subsidy, used wisely, can play an important role in closing the broadband divide.



Connecting with the future

by **PAUL REYNOLDS**, chief executive, BT Wholesale



The more a technology captures the public imagination, the easier it is for an investment bubble to form. A huge speculative bubble formed around the start of the convergence of the digital industries and, when it went pop, investors suffered. But investment bubbles don't kill off industries.

A radio industry bubble inflated in the USA in the late

1920s. Who remembers it now, as they flick between hundreds of channels? From time to time there's been an airline bubble, but it's hardly visible from the seat of a low-cost flight around Europe. Similarly, despite our bubble bursting, the information and communications technology (ICT) industries remain in surprisingly good shape.

In the UK and worldwide, more people are making more calls, enjoying more broadband, doing more productive work and having more fun using telecoms services than ever before. In 1995 in the UK, a 20-minute long-distance call cost £1. Today it costs 6p. Five years ago, UK consumers were lucky if they could find flat-rate dial-up internet access for £50 a month.

More people are making more calls,
enjoying more broadband, being
more productive and having more fun

Now they pay less than £20 for a broadband connection that runs at ten times the speed. The value they receive has improved significantly. While the spin undid investors, the substance benefited consumers.

Today's industry is emerging from the post-bubble recovery ward. Central to the industry today lies the challenge of building something new. This is the source of real potential for those who believe, as I do, that telecoms should not retreat to the strategic low ground of a utility business.

The promise of digital technology to deliver a step change in society is undimmed by what has happened in the markets, but the industry is undergoing a transformation where technologies, customer behaviour and business models are not as clear as we would like. No one knows today which

combinations of companies will be most successful in the converged digital world of the future.

Convergence was once seen as a kind of marriage between TV and PC, but that is not what we now see. As commentator David Hewson recently wrote: "TV is about couch-potato, look-and-listen, one-way entertainment, to be enjoyed by several people simultaneously; the net is about an individual. Trying to get both out of the same screen is like hoping to breed a chicken that can double as a pocket calculator."

What is happening is a different kind of convergence – the flowering of many types of non-traditional relationships – within and between the media and the ICT industry. With a multitude of connections and a proliferation of networked services, we are creating a world of infinite possibilities. Of course, this new future of choice and flexibility requires an infrastructure capable of supporting it, together with the new services and business models required to enable it. BT recognises this, and it is this commitment that is driving our 21st-Century Network (21CN) initiative.

BT's 21CN is a programme of business and infrastructure transformation supported by a multibillion-pound investment designed to deliver the future. It's about a next-generation infrastructure, but it's also about the next generation of converged, personalised and flexible communications services. Implementation of 21CN has already begun, and our ambitions and investments will put the UK at the cutting edge of the new world, leading where others will follow. 21CN is also designed to support new communications services that have not yet been developed.

Developing new services is one thing. However, the role of deciding which services will be a hit, and which are a miss, will be performed by the people who use them. It wasn't market research that identified text messaging and sold it to the public. SMS was a technological feature that lay largely dormant in mobile phones for years before people discovered it for themselves.

File sharing of music wasn't planned by the music industry – it happened because music customers and enthusiasts wanted to make it happen. The order of the converged digital world cannot be imposed by the will of the few who seek to control supply. It will emerge from the decisions of the many who choose to buy.

There is a growing demand from consumers for services that are delivered to them as individuals – rather than to their fixed and mobile phones, PDAs, computers and TVs. This is a fundamental shift – the development of services for the person rather than for the device.

"Mobility" as a concept will rapidly become understood as far more than having a cellular phone or wireless PDA. The



BT's network management centre at Oswestry

key concept will be user mobility – the delivery of a common set of information-based services to a user based on his or her individual identity and location, regardless of the access technology.

The only safe prediction about the commercial and industrial opportunities that flow from digital convergence is that we do not yet know what the biggest and best will be, but that we stand on the threshold of extraordinary innovation in the market.

The value of the connections that we provide will reside in the content that our customers put into them. This is an arena in which our industry can shine, not simply moving data from A to B, but building new frameworks in which people can find new ways of interacting that they find valuable, no matter how idiosyncratic they might seem.

Some truly brilliant new ways of communicating and interacting came to light as a result of the dot-com boom, and have become embedded in the everyday lives of millions. Ebay is perhaps the world's biggest, most diverse place for people to buy and sell anything. Friends Reunited has formed social webs that cross time and distance.

New media are often portrayed as potential killers of their

predecessors – but history tells us they usually live alongside them quite happily. Radio and cinema both survived television. Video games have not destroyed TV. The internet, rather than killing books, has done more for the publishing industry than anyone imagined.

The rapid adoption of broadband need not threaten the livelihoods of the artists who make popular music, films and other works of entertainment that have moved from the analogue to the digital world. The business model will change, but the value of intellectual property will survive.

BT embraces the future and is investing so that it can deliver new ways for everyone to work and play. In doing this, we are changing the business model and enabling change. We are also transforming the economics.

The economics of convergence will be based on what real people will pay real money for, not on academic theory. In seeing what customers want and what they choose to do, we must not become obsessed with what we might lose – such is the underlying demand for people to share, trade and talk, see and hear, that the converging digital industries have a bright long-term future.

‘Technology is producing less white heat than white noise, but broadband is like the jet engine’

Just as some people fly to Nepal and the majority go to Ibiza, so some will use bigger bandwidth to research bilingualism in Patagonia and most will order their groceries. The impact it has will be up to us, writes **RICHARD REEVES**

Almost a century ago, Marcel Proust wrote that a certain technology was “a supernatural instrument, before whose miracle we used to stand amazed, and which we now employ without giving it a thought, to summon our tailor or order our ice cream”. The instrument in question was the telephone. But the same progress from amazement to absorption into everyday life characterises our relationship with mobile phones, microwaves, e-mail, the internet – and now broadband, too. The first experience of downloading a document using broadband, for someone used to watching the slowly filling bar across the bottom of their computer screen using a dial-up connection, is inescapably thrilling. By the 100th time, the speed barely registers. We employ 512Kbps without giving it a thought.

For evangelical commentators, broadband none the less has near-miraculous qualities: it will boost productivity, enlarge leisure, revolutionise the media industry and put the internet at the centre of our lives. Broadband Britain must be the country of all our futures. Technology is producing less white heat than white noise. The trouble is, we have heard all this before. The new economy was going to sweep away the old rules, institutions, economic principles and politics. In the aftermath of the dot bomb, messages of a coming revolution driven by technology are treated with justifiable scepticism.

Yet the current scepticism may prove as mistaken as the earlier enthusiasm. For hiding behind the hype, there are some profound possible implications of wider broadband use. In particular, the dramatic lowering of the barriers to the acquisition of information could have significant consequences, in the long run, for the way we think, the media we consume, the social contacts we make and the pattern of our working life.

These trends are likely to be incremental rather than immediate, because broadband is a technology that makes other, already existing technologies – especially the internet and computers –

work better, rather than representing a wholly new direction. It is not the width of your band but what you do with it that counts.

The Royal Institution recently devoted a day to the cultural impact of electricity – we are unlikely ever to see a similar event for broadband, which is more like the jet engine. Without jets we would still have aeroplanes, but they would be slow and expensive to run. There would be no cheap flights to Rome, no package holidays to Florida. Easyprop would not have been a commercial success. For good and ill, jet engines made air travel the norm in affluent societies. The Wright brothers may have invented the plane, but Frank Whittle is the father of mass air travel.

Broadband gives the internet similar mass appeal. The combination of speed and being “always on” simply makes the already existing stuff – e-mail, search engines, instant messaging, online video and audio – much more accessible, and therefore useful. And just as some people fly to Nepal to complete the Annapurna trail and the majority go to Ibiza, so some people will use broadband to research the history of bilingualism in Patagonia and most will order their groceries.

There are four areas to watch, starting with the acquisition and development of knowledge. In the short run, it may be that the ability to download vast quantities of information quickly will make for some lazy thinking, unoriginal journalism and wholesale plagiarism. And there are fears that the very speed of broadband will reduce the time given to reflection and thought.





The writer and theologian Karen Armstrong worries that instant access to information will further reduce the “patient waiting for truth” that often characterises creative advance. She has pointed out the “need to train children to wait for long, apparently unproductive periods before achieving insight . . . what Wordsworth called ‘wise passiveness’”.

The virulently anti-IT Kurt Vonnegut suggests that luddite families such as his own, eschewing the advantages of the internet and e-mail, will raise “more interesting children” and that “computers are cheating people out of their sociability and also out of their relationships with other people – out of something as exciting as food or sex. People are becoming uninteresting to themselves.”

There is certainly a danger of an instant-access, cut-and-paste culture. But it will hopefully be short-lived. The brighter prospect is of a world in which the mere collection and collation of information ceases to be admirable, simply because anyone can do it. Although broadband is seen as a central plank in building a “knowledge economy”, once it is the norm for computer users – which is a matter of when, not if – the value of information could in fact decrease. There is little value or kudos attached to knowing that Whittle invented the jet engine, for example, if you can discover that fact for yourself in 0.012 seconds.

In a narrowband world, success can flow from collecting information. As Theodore Zeldin parodies academia in *Happiness*, “the only safe way to keep the esteem of colleagues was to be no more than a glorified clerk, classifying information in different ways, sticking new labels on old ideas, and above all copying. Most scholars [are] copyists, with or without quotation marks.” The same is true of “experts” in many fields. All too often, their only distinguishing feature is the possession of information that has hitherto been inconvenient and time-consuming to acquire. To know about a particular disease required hours spent scouring journals in a members-only medical school library. Now you can google it and know more than most doctors within 30 minutes.

Montaigne once complained that “there are more books on books than any other subject: all we do is gloss each other. All is a-swarm with commentaries: of authors there is a dearth.” But as information becomes ubiquitous, the value of accumulating and commenting on information should lessen. The real kudos will begin to attach to the ability to process, synthesise and – most of all – add to the stock of knowledge in society. To authorship, rather than commentary. It is even possible that broadband will signal the return of some reverence for wisdom.

The second area of impact is likely to be in the consumption of media. With the instant availability of online information sources, current forms of media – especially newspapers, magazines, DVDs and CDs – will face a less certain future. The competition between picking up your morning paper and dialling up to slowly download it was never an equal one – but broadband could change that. Newspapers beat narrowband, but downloading your personalised morning paper on to your laptop could become standard. At the same time, video and audio can operate through broadband in ways that have the entertainment industries justifiably terrified. A test of governments’ commitment to wider access will be their willingness to stand up to the pressure for regulation.

As well as personalised consumption of media, the less anticipated growth of personalised forms of production – weblogs, or “blogs”, in particular – will be given a huge boost by broadband. Most of these are awful. As someone once said, if

There are fears that the very speed of broadband will reduce the time given to reflection and thought

everyone has a book in them, in most cases that is precisely where it should stay. But blogging resonates with the shift to a confessional, let-it-all-hang-out culture in which everyone tells all their stories; broadband Britain meets biographical Britain.

The third area of potential impact is on the way we work. One of the great promises of technology has been that it will untether work from the workplace, that we will shortly all be working from flower-clad cottages in the country as the cities empty. It hasn’t happened, not least because the futurologists forgot that people mostly like being with other people. Yet telecommuting is at last ►

What has broadband done for you?

Ann Widdecombe The other day I was trying to remember a poem I had learnt at school. It would have taken hours to go to the library and look it up, but with broadband I found it on the internet in less than a minute. Information is now just a tap of a keyboard away. The greatest benefit of broadband has been to make me more decisive. If you cannot immediately make up your mind how to respond to a letter, the temptation is to leave it for a while, but e-mail demands more immediacy. So I know more and I react faster.

Stephen Bayley I am no technophobe. Far from it. But computers do not engage my imagination. Knowing how a computer works is no more interesting than knowing the chemical composition of ink if you are a fountain pen user. I am very glad that there are people who understand and maintain London's sewage system, for instance, but I do not want to share their secret knowledge. I am a big believer in the pleasures and efficiencies of the division of labour. However, yes. Someone did come along and, with the sickly glow of a religious maniac, offer to make both my office and my home accessible to broadband – whatever that means. The only difference I have noticed is that internet connections and e-mails now take longer. I have also thrown away my £600 PDA and returned to a period Filofax.



Bamber Gascoigne I am grateful in two ways for the magic of broadband. The first is as the creator of an interactive website, www.historyworld.net (winner in 2002 of the *New Statesman* New Media Award for education), which benefits greatly from the increase in speed. And the second is for the joy of being permanently connected to

the internet. Nowadays, if my wife or I need a telephone number, or the title of somebody's latest book, or the closing date of an exhibition, we automatically pop over to the computer and Google it – something we rarely did in the bad old days of "Connect Now".

Alun Michael Last year the danger seemed to be that broadband might not reach rural areas. Now the question is how quickly rural businesses can adapt and seize the opportunity. The DTI/Defra rural task force, aggregation, BT's roll-out of ADSL, new technologies, local community and co-operative initiatives – talk about a dynamic market! The danger is that we settle back into the typical rural response of pretending that everything is awful. It isn't. Broadband can transform transactions for government and farmers, open up new possibilities for the village shop and post office, as well as the school and the surgery, and give marketers and manufacturers new opportunities. The issue now isn't broadband access – it's entrepreneurship, vision, teamwork, leadership and partnership, as "local" goes worldwide.

▶ taking off – not among people without an office, but among those who find it's sometimes more convenient not to go to it. Data from the Labour Force Survey shows that, in 2001, 2.2 million people (7.4 per cent of the employed population) were "teleworkers", an increase of 65 per cent on the 1997 figure. Just when the breathless prophecies of a revolution in working lives were being consigned to the bin, some real change seems to be taking place.

There is no question that information and communications technologies are behind the increase. Of the 2.2 million, 1.8 million say they need both a telephone and a computer to work at home. Broadband, not least because it makes previously hilarious innovations such as teleconferencing and videophones a feasible option, is the development that might allow technology finally to deliver on its promise of killing the nine to five, along with the increasingly absurd notion of rush hour.

The most controversial influence of broadband – as with information and communications technologies in general – is on the depth and extent of social interaction. There is good evidence that people with broadband access spend more time online – grist to the mill of those who believe that people are being lured into spending hours in front of their PC screens rather than hanging out with friends and neighbours or organising church fêtes. This reaction is wrong-headed. The people who have adopted

It looks as if users spend a higher proportion of their online time on various forms of social interaction

broadband first are unlikely to be representative of the population as a whole – by definition, they are the geeks in our midst. And it also looks as if broadband users spend a higher proportion of their online time on communication, community-building and other forms of social interaction. A now-famous study in Toronto found that a wired community had much higher levels of social interaction and community spirit than a similar, non-wired neighbourhood. The lower barriers to use mean that people are more likely to use the internet and e-mail to form and sustain community groups.

The sociologist Frank Furedi argues that the technology naysayers, by overemphasising social pathologies that may be expressed via computers but almost always pre-date them, miss the potential social upsides of greater connectivity. "The real risk," he says, "is that this pessimistic reaction can discourage people using the broadband infrastructure to expand and strengthen the quality of their social relations."

Broadband, then, has the potential to devalue knowledge, atomise society, undermine the creative arts and fuel workaholism. At the same time, it offers the hope of promoting more original thought, catalysing media creativity, connecting communities and liberating work. As always, it won't be the technology that decides. That bit is up to us.

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Ducking and diving

Broadband is a pervasive feature of some people's lives. So how exactly are they using it? By **SIMON ROBERTS**

Picture these Broadband Britons. Mr Locke of Manchester pops home in his lunch break to attend to an auction on eBay. He cannot access the site at work but needs to feed his "addiction": he is currently bidding on a garden bench. In Sidcup, Mrs Russell logs into her daughter's e-mail account from work to purge it of spam, offers of Viagra and other unsuitable messages. Returning from work, Mr Jones switches on his computer and launches his e-mail and internet browser as instinctively as others might flick on the television after a long day at the office. He checks his e-mail and finishes some internet research he failed to complete earlier.

For these three individuals and many others, broadband use is moving beyond the desktop to become a pervasive feature of their lives. For so long, the language of broadband was technical and practical. Above all, it was about provision and availability. Finally, as these various everyday users illustrate, we can talk of a broadband sensibility. For them, broadband is not just always on, but always there. Rather than hiding the computer away in a cupboard like a scary monster, households are welcoming them downstairs and into their lives. Broadband is central to this process of domestication.

So how exactly are families such as the Lockes, Russells and Joneses using broadband? The simple answer is quite instinctively and, most of the time, with little of the fuss that was presaged in the BT "dinosaurs in pipes" advertisements. Research has found that broadband supports well-developed uses of the web and, in time, encourages a whole series of additional uses and experiences. First it changes how people use their PC and the internet. Later it begins to change their behaviours, online and offline. This shift from uses to behaviours is a journey from a narrowband to broadband mentality.

The journey is not fast or straightforward. In fits and starts, broadband users add uses to their repertoire. The impact is

not immediate. The advertising, with its focus on speed, leads some users to expect something dramatic: "It's quicker, but it's not instant. I thought it would be instant." Broadband helps people do many of the mundane tasks of life such as finding a plumber more smoothly, perhaps even pleasurable, than narrowband did.

Look hard at the use of broadband and it can start to appear pretty unremarkable. There is little that many do that is impossible without broadband. But broadband is the oil that makes the internet a better experience. Younger family members download music and compile discs for their friends. Mr Locke's wife collects teapots and china dolls that are displayed in the kitchen as trophies of her internet use; eBay is nudging aside car boot sales as

There is no logging
on and logging off.
It encourages a more
fluid type of use

their main second-hand market. The grandparents come over to dabble, too. Three generations unite around the broadband-enabled computer.

Initially, broadband replaces unwieldy telephone directories or Ceefax, or the wet and cold of a boot sale, but then it encourages users to do new things. The Spencer family, for example, already took digital photographs. Now they are easier to share, and their friends, now broadband-enabled, have stopped complaining about the wait for large images. Broadband use begets broadband use for families and their social networks.

Broadband makes using the internet in part quicker, in part more enjoyable. It encourages use and, in time, use changes the way the technology is incorporated into family life. Perhaps the ultimate

expression of this is a son asking his mother to bank online for him: "Alan has not got a computer in his flat and is too lazy, so he rings me up to look at his balance on the net and then transfer money over from one account to the other."

An evening at the Spencers can best be described as "tag-team computing". Family members dart between their bedrooms and other living spaces to "snack" on the internet. Their teenage son Peter refers to this as "ducking and diving". There is no logging on and logging off. Broadband encourages a more fluid type of use. As Peter explains: "Sometimes I like to check the *Autotrader* site because I'm well into my cars and can quickly compare prices of cars and spare parts, but the other day I found myself quickly going upstairs to check on a mini disc I was recording in my room, downstairs to check the TV for the Arsenal score, then back to the website."

For families like the Spencers, high levels of use have encouraged an "always there" mentality. Google is the oracle in the corner to be probed at any time. Sending an image to a friend here, a little instant messaging there, checking film times while on the phone to a friend with an eye on *Eastenders* in the other corner of the room: broadband use is about multitasking.

Many broadband households are journeying to the ducking and diving, snacking behaviours of the Spencers. Yet there are some whose computer use is quite unaffected by the acquisition of broadband. For them, broadband is like the luxurious off-roader that barely does more than mount the pavement. But they have it and they are venturing, at different speeds, towards a different outlook and set of behaviours.

Slowly the technology becomes taken for granted and the question of use begins to appear odd. There was probably a time when asking how people used the telephone or electricity was interesting and important. That time, for many, has past. For some, but certainly not the majority of broadband households, the question of use has become irrelevant. For them, broadband has become invisible, a utility they could not be without.

Simon Roberts is an anthropologist and founder of Ideas Bazaar (www.ideasbazaar.com)

CASE STUDIES

Bickleigh school

Rural education



Bickleigh on Exe Church of England Primary School is based in rural Devon, with 150 children on its roll. The school is in a small village at the centre of a large catchment area with an eight-mile radius that includes the local farming community.

"We have a distributed population in this part of rural Devon, and 50% of the children come in by school bus, so we don't have regular direct contact with all parents," explains David Goode, the headteacher at Bickleigh.

The school installed broadband in April 2002 using the South West Grid for Learning (SWGfL). SWGfL is a consortium of 16 local education authorities (LEAs) working collaboratively.

The speed and interactivity of the broadband connection immediately opened up new opportunities for research, online learning and sourcing curriculum support materials.

"The whole school community uses broadband to access information to support learning. Broadband delivers a vastly improved level of access to an ocean of fabulous curriculum resources," explains Goode.

For a small school, it is critical that a high-performance service like broadband does not require high-cost maintenance and support.

Despite its size, Bickleigh on Exe Church of England Primary School has developed a comprehensive website. The site includes a range of important school documents, including Office for Standards in Education (Ofsted) inspection reports, annual governors' reports and the school prospectus.

"The school website is an excellent window into the school that helps to project us out into a widely distributed community – and helps get the community involved in the school's development. Broadband has enabled us to establish and maintain contact with a much wider range of the community, which is important when 99.5% of our children travel to school from outside the village," says the headteacher.

In this rural area, where many farming households include extended families, the school finds relatives and friends using the website to catch up on news of their family members at the school.

"People such as grandparents are often living on the same farms as

the children at school. They like to stay in touch, look at photos and other news on the website. For the school, this is a useful contact with the community that we would otherwise not have," says Goode.

The web presence has also helped to make new and useful contacts for the school. These include links with a teacher training college in the USA that brought students to the school to look at literacy and a link with a French college that brings teachers and teaching students to the school as part of their training.

"The website has led to contacts with people we didn't know existed," says Goode. "The children have had the chance to try their French out with the French staff, and a range of other benefits have helped broaden their experience. I am pleased to say that we are still in touch with France and the USA – and they have offered me a return trip!"

www.bickleigh.ik.org

Democratic Dialogue

Belfast-based think-tank



Democratic Dialogue is a Belfast-based think-tank focused on the continuing challenge of political accommodation in Ireland and the social and economic issues neglected during the Troubles. The organisation undertakes projects that encourage dialogue across communities. These are often published as part of a wider project to generate concrete policy outcomes for the political process in Northern Ireland.

"Democratic Dialogue is trying to encourage frank and honest dialogue in Northern Ireland. We have lived for many years with an environment where the argument of force has been more important than the force of argument, so we do not have an easy task," explains Robin Wilson, director of Democratic Dialogue since its foundation in 1995.

In fulfilling its role as a facilitator of openness, Democratic Dialogue often finds itself in the middle of fraught discussions. Sometimes – as in the case of round tables hosted for victims of violence – life and death issues are at stake.

Democratic Dialogue is a relatively small organisation with just four full-time staff, yet it is able to generate real impact through the quality of its work and the ability to make its output available via a comprehensive website.

"The success or otherwise of what we do is not determined by up-to-date communications – but by deeper emotional issues.

However, broadband and our website do help to widen the audience for our output and are a great way for people to get access to our ideas and material on a global basis."

Democratic Dialogue has used broadband since an office move and upgrade of computer facilities three years ago. All staff benefit from the immediacy of broadband communication – and the cost-saving element that it is on all the time at no extra charge.

For the future, Democratic Dialogue is keen to extend the functionality of its website and is considering the addition of an interactive facility to allow online discussions.

"Our view is that being on the side of the angels is no excuse for being inefficient or ineffective. Our work is important. We want to use technology as best we can to help us achieve our aims," says Wilson.

www.democraticdialogue.org

Signpost

Streaming media that is changing the lives of the UK's 70,000 deaf people



The Newcastle upon Tyne headquarters of Tyne Tees Television, hosts a unique service that streams British Sign Language (BSL) translations of television programmes over the internet. The service is called Signpost and allows deaf people to receive regional news, information and entertainment.

"New media is an important part of the future for TV companies – especially as new platforms such as the internet emerge. Signpost is very much at the centre of that new media future, as we deliver two things – sign language translations for TV companies and streaming sign language translations into deaf people's homes," explains Malcolm Wright of Tyne Tees Television.

The Signpost service was not technically feasible before broadband.

"Sign language is a visual language, so we need fast-streaming media to make it accessible. We are only able to stream sign language because of broadband. Before the fast upload and download speeds of broadband, we could not have put out moving pictures in a meaningful way," says Wright.

Signpost claims it is the only fully bilingual British Sign Language site in the world and Britain's largest supplier of BSL services for television, video, CD-Rom, DVD, film and the internet.

"Broadband has allowed us to break into the internet market and move beyond using digital terrestrial TV to offer BSL access," says Wright. "Broadband also allows us to offer a genuinely bilingual website in English and BSL – and the growth in our service means that we are creating employment for deaf people."

As well as streaming sign language translations, the Signpost website publishes a list of UK TV programmes that are broadcast with BSL language access and delivers a "Sign a Day" feature to promote and support learning of sign language.

"We are still in the toddler stages of understanding what broadband can deliver," concludes Wright. "Already, broadband has empowered deaf people by allowing them to communicate in their own language without the need for interpreters. For the future, we are looking at creating a dedicated deaf channel – not on TV, but on the internet."

www.signpostbsl.com

Health

Hi-tech future for health and telecare

Telecare and telemedicine services are seen as aids to solving society's most pressing healthcare issues: long-term care of the elderly, the chronically ill or vulnerable people.

Broadband has great potential in the healthcare sector; it can control and enrich people's lives by letting individuals live independently through newly developing applications. Commercially, broadband also has huge potential for healthcare companies.

iMetrikus, a California-based healthcare technology company, is looking at using broadband connections between those with chronic conditions and health professionals. The company's MediCompass can monitor diabetes, asthma, pulmonary disease, hypertension, cardiovascular disease and HIV/AIDS. MediCompass system employs the highest standards for healthcare-related websites as accredited by URAC (Utilization Review Accreditation Commission) and for privacy and security as accredited by HON (Health on the Net Foundation).

Matt Sanders, chief executive of iMetrikus Inc., said: "Combining our expertise in patient and care-giver connectivity and remote patient monitoring to look after people remotely, we believe provides a unique approach to address the chronic-care challenge.

"We deploy state-of-the-art technology aimed at supporting and improving the quality of life for chronically ill individuals. But what we don't want is for them to feel under attack from technology. Our systems are aimed at providing peace of mind."

With the wider adoption of broadband, there is more chance of solving a number of problems resulting from poor health and an ageing society. In the future, there will be hundreds of devices around our homes and other environments that are able to sense things, or carry out computational processing, and also communicate with other devices. This will have a huge impact on health issues and independent living.

You, too, can change your life

New technology can turn work into a pleasure, get the cooker fixed quickly and even help people walk again. By **ANTHONY CAPSTICK**

I've been eulogising about what technology can do for individuals and businesses ever since I can remember. Yet only recently, with the roll-out of broadband, have I thought that things could get really exciting. You will have read that sort of thing before, during the dotcom boom – but the bust might never have happened if broadband had been big back then.

In those early years, using the internet was a frustrating experience. It was agonising to wait while the web page you wanted to look at inched its way across the screen. Using secure connections – to bank online, for example – was enough to drive you mad. But combined with broadband, the net is a very different proposition. All of a sudden it becomes usable. With broadband, you have a permanent connection to the internet for a fixed charge. It allows you to send and receive large amounts of content. Many different types of technology can be pushed over it, including the telephone, radio, TV, games and office networks, and what makes it really useful is its interactivity.

The past three years have been awful for technology companies, but great for consumers, as the cost of both equipment and internet services has fallen. Take domain names: it is now possible to buy one for less than £5 a year. So instead of having business cards printed, just quote your website – it's a lot cheaper.

Broadband is changing the way we work, rest and play. It certainly encourages us to be more mobile. With the new type of 3G mobile phones becoming widely available this year, broadband will be available in as many different ways as you want it.

The railway company GNER is making it available on a number of trains running on the east coast line from London's Kings Cross. This will enable anyone with a wireless laptop (standard for recent models or available as a £50 gismo) to be connected to their office network as though they were sitting at their desks. As commuting is turned into work time, the effects will be far-reaching. People will be prepared to travel greater distances to work, which will have a knock-on effect on all sorts of things, from house prices to demand for school places. Before long, the same technology will be available while flying, sitting on a bus or travelling in a car. For anyone out on the road, whether for work or transporting noisy children, broadband will transform how the journey is used.

On the other hand, this technology can be used to avoid travel altogether, with obvious benefits for the environment.

Videoconferencing is central to this. In the past, the pictures were jerky because there was simply not enough capacity on the line to transmit the pictures clearly. But broadband changes all that. At www.broadbandlaboratory.co.uk, a publicly funded initiative to encourage businesses to adopt broadband, the most popular demonstration to date has been videoconferencing, with many visitors expressing the desire to adopt the technology to improve communication between the home and the office.

There are many other possibilities. Virtual Private Networking (VPN) is a method of setting up in effect free leased lines over an existing broadband connection. The appeal of this is that there is no charge each time a virtual line is created connecting two points together – usually a person to their office network, so they can send and receive e-mails as if they were in the office. There is therefore no need to have home and office e-mail addresses, just

The use of this technology to avoid travel has obvious benefits for the environment

a personal and a business one. It is also possible to route telephone calls over the same connection using a technology called Voice over Internet Protocol (VoIP), which can significantly reduce costs. Phones that can use this method of calling are already available in shops for around £30.

The exciting thing about virtual private networks is that, once the link is set up, it is very easy to add other functions. A great trick is to connect a telephone at home so that it rings when the phones ring in the office. Add a plasma screen and speakers, and you can do almost everything at home that you could do in the office. All this technology could make real the government rhetoric about home, flexible and part-time working and the work/life balance. The danger is that the always-on technology makes us always there, and we never really get away from work. But you can always use the off button.

Access to this technology is arguably most important, but also most difficult, for those who live in remote areas. One answer is satellite broadband, which can be deployed almost anywhere. My

Skye's the limit: Anthony Capstick has brought broadband to his remote croft via satellite



family's croft on the Isle of Skye was recently fitted out with satellite broadband and is now being used as a retreat for writers and photographers, who can work in peace and quiet but still send their work within seconds to London or New York.

An always-on connection to the internet at home allows for all sorts of interesting developments, not just for our working life. In the same way that modern cars are plugged into the garage computer when taken in for a service, it will be possible for household appliances to be inspected remotely. Plug your cooker into the broadband connection and an engineer will be able to identify the faulty part. You will also be able to switch on the central heating by phone on the way back from the office, or give your apartment in Spain an airing.

But perhaps the most engaging use of broadband is for family and friends, allowing them to pop in and out of each other's lives without turning up on the doorstep. With Windows Messenger, for example, each time someone signs in to the service, a window pops up, possibly with live video of the person. Now people on opposite sides of the world can see and hear each other every day, if they wish, for the cost of a simple home connection. Webcams and broadband were made for each other.

Last year, I met a man who had a particularly inspiring broadband story to tell. He'd been involved in a very serious road accident and the surgeons had done all they could for him. He was unable to walk and was told that the best he could hope for was a 50:50 chance of his leg being saved. Not prepared to give up, he went on the internet and sought out some physiotherapy sites that offered interactive exercises to train the muscles in his damaged leg.

His existing internet connection was too slow, so he upgraded to broadband. With the faster connection, he was able to access all the best physiotherapy sites around the world and to take part in the interactive training. The result was that he walked again. His story is a striking example of the way in which broadband can change your life.

Anthony Capstick (www.anthonycapstick.com) is a broadcaster and author of How to Change Your Life with Technology. He runs the family business, www.instant-search.com, from rural Lancashire

What has broadband done for you?

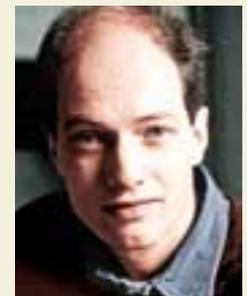


Ellen MacArthur High-speed internet connection has revolutionised offshore racing in two ways. The sea is one of the most remote places on earth – but thanks to modern technology, we are able to take the action of offshore racing live into people's homes all over the world. From TV-quality footage and webcams to e-mail and photos. From a tactical and security

point of view, we are able to obtain up-to-date, high-quality weather images, and are able to plan our routes more accurately and safely. In short, the performance of projects both media-wise and speed-wise has taken a big step forward due to high-speed connections.

Frank Furedi Because it allows people speedy access to the internet, the principal impact of broadband is to help normalise the online experience. This means that cyberspace can become an extension of normal life and vice versa. From my experience, the more the two are interconnected, the greater the positive impact of broadband on the quality of life. What I particularly like about broadband is that it makes location a less relevant factor. In a highly mobile world, where friends, family members and colleagues can live at great distances, broadband internet has considerable potential for creating effective interpersonal connectivity. That alone has significantly enhanced the quality of my life.

Alain de Botton The problem with the internet is that it can make life too good for us: everything is made so easy and accessible, it can prevent the arduous lonely process of thinking from which the greatest ideas emerge. And the problem with broadband is that it makes things even easier and even more accessible. Progress always invites a certain regress . . .



Patricia Hewitt For most businesses, there are big economic benefits of adopting and absorbing broadband into the way they operate. Many companies are already making huge cost-savings through staff working remotely and flexibly, and through improved communications within the firm. Broadband also lets companies talk to suppliers, customers and others in much more sophisticated ways, which means they share their knowledge and skills better, and are more able to do business on a global level. Broadband is also really vital to my department and others in thinking about how we deliver services to the public. The NHS Direct website is one very successful example.

A helping hand from the state

Broadband Britain is emerging thanks to some Nordic-style nurturing of networks to serve schools, hospitals and local authorities, writes **MICHAEL CROSS**

Britain was the only non-Nordic country among the top five in a recent “e-readiness” survey, a whisker behind Denmark in first place, and a big reason for the high ranking was the UK’s competitive broadband market. But the telecoms industry did not achieve this on its own. Britain’s Nordic class of broadband network is taking shape thanks to some Nordic-style state nurturing of networks to serve schools, hospitals and local authorities.

National plans for a broadband infrastructure led by the public sector date from November 2002, when Tony Blair, in a speech at the London “e-summit”, announced targets of connecting schools and hospitals as well as unspecified government agencies to broadband by 2006. But several local authorities were already pioneering the concept, in most cases driven by the lack of interest by telecommunications companies. In fact, several parts of the UK would have no broadband if it weren’t for initiatives by their councils.

One pioneer was DurhamNet, which grew out of a scheme by Derwentside District Council. It began as a network to connect council offices, schools and libraries, then spread to community centres and local businesses. An NHS trust uses the network to send huge images from MRI scanners around its different sites. “We had massive market failure,” says Alan Hodgson, Durham’s director of e-government services. “The telcos weren’t interested; they were looking for instant return on investment. We had to do it.”

Even in Cambridgeshire, with its booming “Silicon Fen”, the local authority is playing a vital role. The Cambridgeshire Community Network, described as the UK’s most inclusive broadband community network, will link more than 400 council buildings, including schools and libraries, with community access points ranging from post offices to pubs.

Councils can afford to get into such ventures by combining budgets for educational IT with central funding for e-government. (Derwentside also picked up regeneration funding and showed an entrepreneurial flair in selling network capacity to other organisations.) Also, new networking technology such as Voice over Internet Protocol (VoIP) telephony can help councils cut phone bills between their different buildings.

However, the main reason such networks bring broadband to areas that would not normally be economically viable is that they aggregate demand. For telecoms firms, a county council is worth doing business with, even if its schools and libraries are scattered through areas that wouldn’t otherwise be attractive to them.

Aggregation is now the cornerstone of central government’s broadband policy. The e-envoy, Andrew Pinder, has long been urging government departments and agencies to pool their needs for networking, rather than procuring stand-alone systems. Last

summer, the government responded by creating “aggregation bodies” in each of the nine English regions. These would buy capacity for education, the NHS and the Department for Environment, Food and Rural Affairs. Few people outside the regional offices took much notice.

In March this year, however, the project moved up a gear, when Stephen Timms, e-commerce minister at the Department for Trade and Industry, awarded 17 telecoms firms “framework contracts” to supply broadband services. Aggregation bodies, now named Adits, would be able to order capacity from the 17 firms on behalf of public sector organisations in their areas. The idea is that they aggregate demand from all public sector agencies, including local authorities and post offices, and take the requirement to the framework suppliers and order “bundles” of services by a reverse auction (a procurement method rapidly coming into

Connectivity is crucial to the £6bn programme to modernise IT in the National Health Service

vogue for commodity purchases of IT). Businesses and householders would then be able to piggy-back on the investment by taking advantage of broadband-equipped exchanges.

Timms said that the contracts would be “a powerful mechanism for competitive interest” and “a vital contribution to reaching our target of having the most extensive and competitive broadband market in the G7 and for having 100 per cent availability by the end of 2005”.

Although the framework contracts cover all parts of the public sector, throughout the UK the pace of procurement has been driven by one “anchor tenant”, the NHS in England. Broadband connectivity is crucial to the £6bn programme to modernise IT in the health service, being pushed forward by a central team led by Britain’s highest-paid civil servant, Richard Granger. The first fruits of the new system – e-booking of hospital appointments from GP surgeries – are due this summer.

The system depends on a secure, reliable, national IT network capable of handling X-ray images and other bandwidth-hungry parts of multimedia electronic medical records. The “spine”, being developed by BT, will make these available to every NHS desktop – and patients themselves via the internet – by 2010. Duncan McNeil, director of the national IT programme’s design and technology office, says that the spine will have an availability

of better than 99.8 per cent and a maximum response time of 0.2 seconds within the system itself, though some transactions, such as electronic booking, will take several seconds.

To give the project a chance of success, the NHS had to replace a previous network, NHSnet. This was created under contracts signed in the mid-1990s with BT and Cable & Wireless, which notionally provided a dedicated network used mainly for administrative data. (Originally, NHSnet was very much a child of the “internal market” created by the Major government’s reforms of the health service.)

The spine will run on a new NHS broadband network, known as N3. It, too, is being assembled by BT under a contract signed early this year for £530m. Unlike with its predecessor, which was an end-to-end BT affair, the contractor is

required to buy capacity from cables and exchanges installed by firms picked through the aggregation programme. In a first for joined-up government, the NHS programme abandoned the health service’s cherished administrative boundaries to set up IT boundaries that coincide with the English regions. If any of the regions drag their feet in ordering aggregated capacity, a national Adit can step in.

Although the NHS contract suggests that regional aggregation will take off, there are still question marks over how it will work in practice. One uncertainty concerns integration with existing networks, especially at the county level, which most authorities see as the logical unit for connecting libraries and schools.

County-led broadband initiatives are still very much alive. Last month, for example, the Hertfordshire Grid for Learning, one of the first in England, contracted its existing supplier, NTL, to connect 567 schools and other establishments to a managed broadband network in a contract worth £22.6m over five years. The new contract involves putting 313 primary and nursery schools on 2Mbps networks by March 2005 and upgrading the county’s 85 secondary schools to 10Mbps by March 2006. NTL says that the extra bandwidth will allow remote teaching by videoconference and multimedia presentations at school assemblies. The contract includes software to protect students from unsavoury websites; teachers can monitor all internet use.

John Warwick, a deputy head at a Hertfordshire school, says that high-speed internet access is “transforming the way we teach. We have already implemented videoconferencing, enabling pupils to communicate with other schools in Hertfordshire and across the country as well as organisations such as museums and



Getting better all the time: broadband is being used in a variety of ways to improve the health service

art galleries in London. We are currently looking at a range of new projects, such as online broadcasting, which simply wouldn’t be possible without broadband.”

While state-led broadband investment is certainly taking off in Britain, there are two big dangers ahead. First, not everyone is joining the broadband aggregation party. Noticeable wallflowers include criminal justice agencies, which have their own national network supplied by Cable & Wireless. Many local authorities with modern “intranets” see no advantage in sharing their infrastructure, especially shire counties that are sceptical of the whole regional agenda. The same goes for central government bodies such as the Department for Work and Pensions, which have access to the Government Secure Intranet supplied by Energis.

Second, there is a temptation to see broadband as an end in itself. In January, the third annual report of the Broadband Stakeholder Group, set up by the government to advise on broadband strategy, warned that public agencies must take a greater lead in promoting not just broadband connectivity but broadband use. It warns that the £1bn committed by the Prime Minister to connecting education and health services will not by itself transform services. Many public services do not have an embedded culture of IT use – for instance, the health service still relies heavily on paper-based processes. The report stresses that users must be involved: “Employees need to be motivated to use and exploit the technology once it is put in place.”

The overall message is that even the most sophisticated broadband network is just a conduit. The important thing is not the hardware, not even the electronic data that comes across it, but the way that can be used to improve public services. Easy to say, not so easy to do.



CASE STUDY

HI Arts

HI-Arts is an arts development agency based in Inverness, working with a disparate arts community in the Highlands and Islands of Scotland. Innovative use of broadband has helped HI-Arts to create online community networks and deliver service to a region with few population centres.

Founded in 1991, HI-Arts has a charter to promote and develop the arts in the Highlands and Islands of Scotland. The organisation is funded by the Scottish Arts Council and the development agency for the north of Scotland, Highlands and Islands Enterprise. As well as supporting individual artists and groups, HI-Arts promotes their artistic output both in the region and beyond.

"One of the biggest challenges we face is the geography of the Highlands and Islands region," says Marcus Wilson, Audience Development Co-ordinator at HI-Arts. "HI-Arts is working in an area with one of the lowest population densities in the EU."

According to HI-Arts, there is a vibrant cultural and arts scene in the Highlands and Islands region. As well as the already established local artists and groups, many musicians, poets and visual artists move to the area and are inspired by the landscape to create new work. The region boasts more than 150 art galleries, 70 arts festivals each year and 12 arts centres, but the only significant population centre is Inverness.

Promotion of these assets to tourists who have arts and culture as a priority for their holiday is an important priority for HI-Arts. To serve and promote this disparate arts community, HI-Arts looked to its online presence and website as a possible platform to help create virtual networks.

Reaching out beyond the Highlands and Islands was also important in ensuring that the arts and cultural dimensions to the Highlands and Islands get exposure. This was important for the arts themselves and also for tourism, so HI-Arts created an innovative website to publicise the arts in the region.

"For various reasons, the arts in Highlands and Islands don't get the coverage they deserve," explains Wilson. "The arts press is predominantly in London, with the Scottish papers in Edinburgh and Glasgow. The distances involved mean that they cannot generally visit us. We saw the web as an international platform to talk directly to those interested in the arts."

Broadband also enables the HI-Arts team in Inverness to more effectively administer and populate the core site with other information sources using xml feeds.

"We used to have to collate material on events as a quarterly arts supplement for the region," explains Wilson. "It was out of date as soon as we had published it. We now make the events listings available online and they can be searched by category – making it much easier to use."

HI-Arts also publishes a comprehensive online magazine. The content of the Highlands and Islands Arts Journal includes event listings, features on local artists, writers and musicians – along with samples of their work in formats such as MP3. Managing



and delivering this range of content has been made possible by broadband.

"The Arts Journal is a good example of how broadband has helped us to reach out to arts audiences throughout our region, in Scotland – and across the globe. It is the business-to-consumer dimension of what we deliver," says Wilson.

He also sees HI-Arts using broadband to help deliver business-to-business services within the arts sector.

"We want to raise the profile of groups working in the area and help them be more effective through providing training and opportunities for sharing information. Broadband helps us deliver online tip sheets and bulletin boards that help people in different arts groups talk to each other and share ideas. This online presence has also cut down on the time we spend handling repetitive information requests and enabled us to focus on new and ambitious projects instead," he says.

In addition to making information available, there is also an interactive dimension to the way HI-Arts has deployed its broadband web presence. For example, theatre groups, musicians and individual artists in the region can apply for developmental grants online.

HI-Arts also actively promotes online publishing. An online publishing collaboration in March and April this year saw Stornoway-based poet Ian Stephen travel by boat around the north and east coasts of Scotland from his home on the Isle of Lewis en route to the Stanza Poetry Festival at St Andrews. He wrote a daily log of the journey, including poems, that was sent in to HI-Arts from a satellite phone and published in real time on the site.

The impressive use of broadband by HI-Arts has made it an example of best practice in the arts and not-for-profit sectors. The HI-Arts online service was a winner in the 2003 Broadband Britain Challenge, and the Scottish Arts Council is so impressed with HI-Arts's expertise that it engaged the team to develop the regional pilot for a national crafts website for Scotland. The new site, www.craftscotland.org, is now live – and will be expanded as a national portal for Scotland's crafts.

Back to school

E-learning has much to offer children, adults and the government alike, writes **KATHRYN CORRICK**

When the word “learning” was first prefixed with an “e” and a hyphen in the 1990s, few people understood what possibilities lay ahead. E-learning – education through the use of electronic technology – has its roots in the 19th century, when the phonographer Isaac Pitman taught shorthand courses via correspondence in the UK. Since then universities – the Open University being a prime example – have used mail, radio and television to provide students of all ages and from all backgrounds with a flexible and varied learning experience. This was enhanced by the introduction of the internet and e-mail.

Companies were quick to see online learning as a cheap, easy way to educate their employees. Why pay expensive tuition fees to a real teacher for “face time” (as Microsoft coined it) when you could simply place your staff in front of a screen attached to an internet course anywhere in the world at any time? No more need for your employees to take time off to go on a course.

Education establishments, on the other hand, saw e-learning as a great means to earn additional income in an increasingly competitive market. They could place vast amounts of information on to the internet and have any number of students studying at the same time. In the US, for example, the California Virtual University, a consortium of nearly 100 colleges and universities, opened in 1997 with more than 1,500 online courses. And in 1998, NYU Online was founded. Yet with the majority of people still relying on poor dial-up connections, many of these market-driven enterprises failed at the first hurdle, not helped by the bursting of the internet bubble and the overenthusiastic expectations of investors. NYU Online struggled on until 2001 before closing.

Recently, however, there has been new interest in e-learning. Last year, the UK government published a consultation document, *Towards a Unified e-Learning*

Strategy, which highlighted the major contribution that e-learning could make. As well as flexible study, the Department for Education and Skills listed personalised support, individualised learning and collaborative learning as some of e-learning’s benefits.

So why is e-learning firmly back on the agenda? Given that most jobs today require people to be able to use a computer, the government believes that learning via the use of electronic media throughout the education system makes economic sense, helping to produce people with highly employable skills. But another part of the answer has to be broadband, which the government has pledged to make available to every primary and secondary school in the country by 2006.

E-learning is not only about courses designed for use online, but also about using all kinds of electronic media as additional classroom resources. With broadband, e-learning can mean so much more than just pages of information on the internet.

Having access in classrooms in Wales has already made a real difference to teachers. It enables them to have the internet constantly on without the worry of expense, loss of connection or having to wait for ever for a page to load. They can now begin to explore some of the games and websites designed specifically for their key-stage group. E-learning is as much an addition to the classroom (be it in a primary school or further education college) as BBC Schools, 4Learning and Open University programmes.

Broadband also makes learning from home much more productive. This is a particular advantage for students in full-time work, but also for children’s homework. And parents previously unfamiliar with computers can learn essential skills alongside their offspring.



Broadening horizons: children learning from technology

Learners can benefit not only from the communication tools of e-mail and instant messaging, but also from more sophisticated applications such as video-conferencing and live tutorials via webcams. Tutors can now give lectures from the comfort of their own living rooms to students in Japan and Australia. At the same time, students can have one-on-ones with their tutor without the fear of looking stupid in front of a whole class.

The days of the World Wide Wait are pretty much over, as broadband enables instant communication in most mediums to large numbers of people. But there is one proviso in all this: that the technology must be seen as a tool and a resource rather than an end in itself. However amazing the technology is, the content needs to be high-quality, too.

The challenges facing the government in getting its e-learning strategy right are great. Much relies upon education leaders, teachers, learners and commercial suppliers to share their skills. The UK is in a good position to excel in this area, especially now that broadband is more available in both homes and institutions. Britain has refined distance-learning practices, strong IT/education societies and commercial expertise. What the government has to do is enable these different bodies to work together.

Kathryn Corrick is the New Statesman’s online manager and co-ordinator of the Bright Sparks e-learning awards scheme (www.newstatesman.com/brightsparks)

ns interview kip meek

Can the man from Ofcom get more competition without confusing the consumer?

by JAMES CRABTREE

Picture the regulator. More John Major than John Galiano, those who keep tabs on former monopoly industries are rarely noted for their flair. So you might not pick out Kip Meek in a regulator's line-up. A colourful shirt and tie, angular glasses and quick manner mark out Ofcom's senior partner of content and competition. He is a leading light of telecommunications regulation's new broom brigade, a cadre of self-assured über-wonks crusading for vigorous competition and the primacy of the "citizen-consumer" in broadband.

Meek left a job at Spectrum Strategy, a management consultancy he co-founded, to join the revamped regulator's top table. Under the businessman Stephen Carter, and alongside the former Downing Street technology adviser Ed Richards, they have a wide-ranging brief to rethink the rules governing British media. Much rests on their efforts.

Sitting in his commanding corner office with dramatic views of the Thames, Meek embodies the regulator's updated persona. It looks different. But is it? The shiny building and new faces at the top, sceptics suggest, disguise an organisation that hasn't yet changed its approach and harbours most of the same people as the previous regulator. Meek defends his predecessor and his new colleagues. Oftel "gets an undeservedly bad press", he says. "It was packed full of good people, many of whom now, of course, work here, too."

The difference of Ofcom, he claims, is "to be more strategic, not to take each decision on its merits, but to focus more clearly on the type of regulatory outcomes we want to achieve". This is difficult to argue with – who wants a less strategic policy? – if easy to take as a back-handed comment on the previous regime.

After only four months, it is difficult to tell if this "strategic focus" is resulting in wholly new directions for technology regulation. But Meek's thoughts on the subject are currently of great interest to those who trade in, and use, broadband. Ofcom began a top-to-bottom review of British telecommunications at the beginning of the year. The project team reports directly to Ofcom boss Carter, but Meek's remit across all competition policy gives him a powerful voice. His role as the director responsible for Ofcom's three main policy sections – strategy and market development, content and standards, and competition and markets – gives him a remarkably wide-ranging and influential brief.

This process, he says, will not duck the big issues: "The last review was in 1991, and even that wasn't a fundamental rethink. Since that time, a lot of water has flowed under the bridge." The

aim now is "to create sustainable competition in the broadband market as the best way to create innovation and investment". But to do so, they must tackle some taxing issues. The review, Meek suggests, asks all the questions that need to be asked, from "Does BT need to be broken up?" to "Should we forgo regulation altogether?"

The bottom line throughout is Ofcom's enthusiasm for more competition. "Broadband is one of those markets in which competition is hard to establish. There are very, very significant advantages to the incumbent player. In that environment, competition often doesn't get established, and the regulator has to jump through various hoops to help others get a toehold."

On the big questions, though, he will not be drawn. Can he envisage a situation in which the review recommends structural changes to British Telecom? "I can envisage it, but I'm not saying it is likely." Then is it likely? "It's much too early to tell. It would be a very difficult process."

A successful review, he suggests, must set a framework for competition in the broadband market that will work for the five years or more. This, again, is no easy task. Ofcom has two sometimes contradictory aims – to promote competition and look after the interests of consumers. "In the long term," Meek says, "what is good for competition is good for consumers, too. This is why we like competition." But he does admit that getting the right long-term policy can leave users perplexed. "It is confusing. But when you have new markets, an element of consumer confusion is inevitable. I would prefer to see lots of different products and confused consumers than for no such services to emerge."

It isn't just users who could end up scratching their heads. The previous regulator was frequently accused of being bamboozled by the minutiae of market intervention. And the new review must also get to grips with a set of fiendishly complicated broadband market pricing and structure issues. Meek's eloquent and often donnish explanation of Ofcom's broadband policy reflects this: he peppers his descriptions with talk of "end-to-end competition



across the value chain”, “multiple price points” and other difficult descriptions of difficult issues.

Take, for instance, Ofcom’s approach to wholesale broadband competition. This is where smaller internet service providers (ISPs) buy bandwidth on various parts of the telecommunications network from bigger companies, most notably BT. At the end of his tenure as boss of Oftel, David Edmonds said he didn’t think there was a need for the regulator to intervene. But for the past year, a number of companies have been crying foul, claiming that the way the renting options are priced stifles competition and keeps prices high. Ofcom has already taken a different approach, warning BT that it wants cheaper prices quickly. The future prosperity of a number of large broadband providers now rests on the intricacy of relative pricing options for “Datastream” and “IPstream” wholesale products.

The flip side of this discussion, also part of the review, is what to do about unbundling the local loop. A long-running bugbear of telecoms policy, this ought to allow companies other than BT to put their wires into “the last mile” between telecommunications exchanges and the home. The previous regime couldn’t crack this nut. Can Meek and his team do it first time?

He seems quietly optimistic. “I would say that we have done a third of the job. But only a third of it is to do with price; two-thirds is to do with process.” By this he means that any small broadband provider is unlikely to put its kit in an exchange, even at a good price, if it takes a year to get a move-in date. He admits that “delay is a feature of regulation, as problems turn out to be more complicated than they first appear”, but he claims Ofcom is “putting in a lot of effort to make sure that the right processes are in place”. The regulator plans an “independent telecoms adjudicator who can make decisions quickly”, Meek says, snapping his fingers enthusiastically to illustrate just how quick it will be.

Ultimately, is Meek a broadband enthusiast or a realist? The small bookshelf in the far corner of his office gives conflicting evidence. Nestling next to each other are two books: *Blown to Bits* and *Dot Bomb*. The authors of the first are consultants at the Boston Consulting Group, for whom Meek used to work. Their starry-eyed analysis prophesied that technology would fundamentally transform the way all businesses worked. The authors of the second book sifted the wreckage left behind by those who believed them.

Meek steers a careful line between the two positions. “I don’t know if you have seen these studies that claim broadband will have the same impact on GDP as electricity,” he says, referring to economic research produced last year by the Broadband Industry Group. “I’m not sure I believe all that. But I do think it has a potentially very significant economic impact in the long term.”

The right balance of regulation is vital for this impact to happen – and judging by past performance, it is extremely difficult to get right. A great deal rides on the telecommunications review establishing a framework that is adequate for the next decade of broadband development. Meek describes himself as “a completely middle-of-the-road broadband user, but an enthusiastic proponent of the industry”. If he and his colleagues turn out to be middle-of-the-road regulators, they will leave many people disappointed.

Time to think outside the box

You could watch a show you missed while on the train, and even shape dramas to your personal tastes. Does this spell the end of conventional broadcasting? By **DAVID COX**

These days, we grab our music from the net and listen to it while we’re jogging. We watch the films we want, when and where we want to, on DVD. If we’re wondering how the traffic is flowing on southern California’s freeways, an LA radio station will tell us at the click of a mouse. Yet the telly still expects us to hunker down on the couch and stare at “channels” of output assembled by aptly named “controllers”.

It is true that around 400 channels are now available to digital TV subscribers, and that they can time-shift their programmes with ever-cleverer recording devices such as Sky Plus and TiVo. Even so, taken together, these channels still provide only a fraction of what we might nowadays expect from the most versatile medium humanity has come up with. Why shouldn’t we be able to call up whatever audio-visual material we want? Why shouldn’t we be able to interact with it, cannibalise it or e-mail it to our mates? And why shouldn’t we be able to do any of these things whenever and wherever we want to?

Broadband transmission makes all these things technically possible. In the digital universe, television, as much as music, art or literature, is readily reducible to a string of numbers which can be sent anywhere in an instant. And television, with its commercial, civic and educational potential on top of its obvious entertainment possibilities, appears to have even more to gain from the broadband revolution than music or games. Yet, for the moment, a broadband connection will not bring you very much extra TV.

There are reasons why telly has tarried. Moving pictures require much more bandwidth than speech or music. This means that the slower of the broadband connections currently available cannot deliver full-blown TV in real time: you have to download it first and play it later. Programming is also expensive to make, yet cyber-revenue is notoriously hard to come by. Pickings for advertisers are slim, and the micro-payment systems that might make subscription easier are not yet in place. Rights issues are a serious problem, which the fear of piracy exacerbates.

Another difficulty is that the long-predicted “convergence” between computers and television sets has stubbornly failed to materialise. Broadband connections generally go to computers, but people want to be able to watch entertainment on their fancy plasma wide-screens, not just on a monitor in the study.

Still, this last problem is about to be cracked. Manufacturers are coming up with gadgets that will switch audio-visual material ►

► from our computers to our TVs or hi-fi systems at the click of a remote control. Other factors, too, are encouraging television companies to take broadband rather more seriously than before. Increasingly they fear that if they stay on the sidelines as take-up gathers pace, the public might discover a way of stealing their property, as happened to the music business. Even worse, they might see growth opportunities that ought to be theirs seized instead by rival producers.

Website owners, internet service providers such as Wanadoo, the people who own the wires such as BT and purpose-built new organisations are themselves starting to become programme suppliers. It is the music website Playloder, for example, that has become the “official webcaster” for the Glastonbury festival, not a broadcaster. In London, a service called “HomeChoice” enables its subscribers to summon films, music and time-shifted conventional programming direct to their TV sets down their telephone lines. The cable firm NTL now offers broadband customers 15 channels of its own music, games, learning materials and children’s programming.

Britain’s other cable company, Telewest, has experimented with more imaginative ideas, including a service called “Living Health”, which enabled Birmingham subscribers to check out symptoms through their TV. If there seemed cause for concern, they could then use their set to book an appointment with their GP. If they could not wait that long, they could scroll down to “Nurse-in-vision”, which would provide an on-screen expert with whom they could discuss their problem. This kind of thing has persuaded traditional broadcasters that they must at last take the plunge if they are not to be left hopelessly behind.

So far, it is Channel 4 that has made the biggest splash, with its 24-hour live streaming of life in the *Big Brother* house – still many people’s only actual experience of broadband television. The station has followed up with 4Broadband, which, for £4.95 a month, offers subscribers access to shows they may have missed. It is also asking its suppliers to consider making programmes specifically for broadband. Sky now offers a broadband channel called Sky Sports News, which provides not just hundreds of clips of sports highlights and sports news, but also general news, film trailers and comedy clips. ITV, too, has waded in, streaming highlights from *Pop Idol*.

The small financial rewards currently available still limit the horizons of commercial broadcasters. The BBC, on the other hand, considers that expanding provision may enhance its case for the maintenance of the licence fee. So the corporation intends to make as much as possible of its programme archive freely accessible to everyone.

This opens up all kinds of possibilities. For example, children might eventually be able to plunder old programmes for material to insert in video homework projects. The first 2,000 clips in the “Creative Archive”, available from this autumn, consist of material for which the BBC already owns all the rights, but negotiations are under way with other rights-holders to get the system extended.

The BBC will provide broadband coverage of Euro 2004 and the Athens Olympics over and above what is broadcast on conventional television, along with games, facts and statistics. It is also looking for ways in which broadband could extend the reach of conventionally broadcast output. Participants in a trial scheme will be enabled to download BBC programmes on to their computers, and thence on to hand-held devices. This will enable them to catch up with shows they may have missed while commuting on a bus or train the next day.

Are these the first, faltering steps towards a digital TV world in which broadband might even come to replace conventional broadcasting completely? Maybe. If so, what might that mean?

By maximising its opportunities to reach us, television might recover some of the grip on our lives it has lost in recent years to other leisure activities. It would, however, also face new difficulties. As viewers gained ever more control, they would become harder to reach with advertisements. The television licensing system might be imperilled, if the question of what constituted a TV set became debatable.

More significantly, television programming itself would probably change. Interactivity would be taken

for granted: if, for example, we turned out to want drama plots shaped to our personal tastes, alternative versions of the same story would be readily deliverable. Television would cease to be controlled by a small priesthood for narrowly defined purposes, but would become something that anyone could distribute to anyone. Doubtless businesses, public authorities, political parties and pressure groups would all pile in.

Individuals, too, would be likely to want their own piece of the action. Once, photography was the province of professionals; now, it has been democratised. Something similar might happen to television. Broadband might enable us to pass round to our friends not just our own home videos, but also bits of TV acquired from anywhere else, edited, reworked, commented on and absorbed into our own electronic scrapbooks. The webcam video diary might merge with the weblog, moby chatter and texting to turn each of our lives into our own personal soap opera. Who knows?

Television may currently be broadband’s laggard child. But it could yet turn out to be the most prodigious of the thick pipe’s mewling progeny.



Big Brother on broadband: couch potatoes in the house



Broadband in 2010: BT's perspective

by **ALISON RITCHIE**, chief broadband officer, BT



Broadband has had the fastest take-up of any mass-market technology in history, leaving the CD player, the video game and the mobile phone trailing in its dust. But at the end of the day, it's the benefits and services that matter far more than the technology – the true benefits come from what people do with technology, not from the technology itself.

But if we are going to mention technology, it's also true to say that beyond a certain stage in the evolution of any technology, it becomes futile to extrapolate from the past to the present. Just as airliners became "fast enough" 45 years ago, and the focus switched to seating capacity and low running costs, the future of broadband may take a different angle as it accelerates.

Our vision of 2010 therefore has less to do with profound technology evolution, as we believe this is inevitable. But what is not so obvious is the profound difference that high bandwidth connectivity between networks, people and devices will bring. The key difference between a broadband world and a narrowband world is that it is visual. It facilitates visual communications and video. It also enables multiple connections and multiple applications and services to be consumed simultaneously. So, it is inevitable that we will see a world developing of ubiquitous, always-on networks and ubiquitous, always-on computers and other hardware devices that will link a variety of wireless and fixed technologies seamlessly.

Services will be created that will connect not only people with each other but, people with machines, and machines with machines. In the foreseeable future, teleworkers could well be the norm for white-collar workers – or "no-collar workers", as they may well become. Children will do their homework on laptops at their friends' houses using WiFi to connect to their class portal, and discuss their homework using multiple videoconferencing, not instant

messaging, phone, text or chat. Patients will experience post-operative monitoring and analysis in their own homes via tele-medical applications.

Throughout the realm of public services, the emphasis will move from applications and web portals focused on the institution towards those focused on the individual consumer or citizen, or the family and household. Re-engineering public services around modern technologies will increasingly become a key weapon in global competitiveness. Reducing the public sector cost base for existing activities should free up significant money for desirable new public sector projects.

But, for this world to flourish, there will be a need for continued incentives for companies to invest. Network operators must invest in network and systems upgrades and in making those networks interoperate – both fixed and wireless. The race for local transmission technologies beyond the next few years is genuinely wide open. With the right business model and public policy foundations, fibre may move closer to the user. Wireless networks will

undoubtedly increase in capability and intelligence. Copper has already had three lives – telegraphy, telephony and DSL – who knows how many more it will have in the future? And service companies must also be encouraged to invest in services and application creation as, ultimately, it will be British consumers and citizens who will decide what services and applications they need and value (the technologies used are of little interest to them).

In successful and prosperous countries, public policy must recognise that for investment to be sustained, it must be rewarded. It should also be accepted that not all companies will succeed. Therefore a risk premium must be expected and allowed for by regulation, for all investing players across the whole of the value chain, from content to end user devices. Given such an environment, BT does fully intend to continue to invest strongly in UK broadband infrastructure. We also believe such an environment will help ensure that investment from other players will also be increased.

Regulation is always a surrogate for an effective competitive market. And, ultimately, an effective competitive market with minimal intrusive regulation has to be the surest way for a sustainable market to develop and grow. Regulation must therefore avoid being prescriptive or technology specific, simply balancing the regulatory environment so that higher risk investments have the opportunity for higher rewards, but with the selection of services and content left to the consumer or citizen making choices in the marketplace. Rules and boundaries based on yesterday's world – or even today's world – will distort investment decisions to the detriment of the development of a genuine broadband market in 2010.

There is a chance that the fresh new thinking that Ofcom brings to the regulatory landscape can have a material influence on the UK's competitiveness as a leading broadband nation. It is very timely.

In through the back door

A host of well-armed hackers are lining up to take advantage of your computer.

BILL THOMPSON describes the darker side of being “always on”

If the internet is a virtual city, then getting a home broadband connection is the equivalent of jumping into an unlicensed minicab and asking to be taken to the red light district. Once you're plugged into the network, you're a target for fraudsters, con artists, pornographers, hackers, phishers and zombies. Worms, viruses, Trojan horses, spyware, adware and all sorts of other “malware” – the generic term for programs that do bad things – will be knocking at your virtual door.

Some of the nasties will probably get in, leaving your computer open to hackers who want to turn it into a “zombie” and use it to attack a corporate website, or software pirates who want to store their illegally acquired “warez” on your hard drive. Start surfing and you'll come across websites with obscene pictures, unauthorised music or movies and dodgy businesses of every variety. You can gamble at implausible odds, buy shares in companies that don't exist and watch surprisingly athletic young people indulge in every describable form of sexual contact.

Join an online network such as Friendster or Orkut and you'll have a bunch of weirdos – the friends of friends of friends you never realised you knew – offering to sleep with you, sell you dodgy drugs or kill you and eat any selected part of your anatomy. And if you're foolish enough to install any of the popular file-sharing programs such as Kazaa or Morpheus, then child abusers will be hoarding their illegal images on your hard drive. Not knowing how they did it won't help you when you're up before the judge.

But is any of this the internet's fault? And does having a broadband connection contribute to the criminal use of the net, or would it happen anyway? After all, we had porn sites, e-mail scams and viruses back in the days when we drooled over far slower connections.

Broadband clearly makes a difference. While most of the criminal activity associated with a broadband connection could be carried out over a dial-up link, the whole thing would be neither as slick nor as straightforward. For once, the advertising campaigns have got it right: having a fast, always-on internet connection really does make life a lot simpler – for the online criminal.

Instead of having to wait for the few minutes in the evening when Auntie Maud logs on to AOL to pick up her e-mail, a worm or virus can sneak on to her hard drive during the hours her PC is turned on so she can listen to her favourite ballads on an online radio station. And the secret stash of hardcore porn that is being stored on her hard drive, visible only to the other users of the peer-to-peer network that has taken over her computer, can be downloaded in a matter of seconds rather than taking hours and slowing down her surfing.

Broadband users aren't defenceless. Anyone with a broadband connection will have a firewall and up-to-date anti-virus software

(and if you don't have both of these essentials then stop reading *now* and go get them – you never know what's been installing itself on your computer while you've been reading this). And few people are gullible enough to fall for a business proposition from Mr Achabe in Nigeria.

But broadband connections do more than expose innocent net users to the criminal world. Those same superfast links can provide the less scrupulous with an unparalleled opportunity for career development, and it is probably here that broadband is making a real difference to the amount of online crime.

Sending out a million spam e-mails using a dial-up connection is time-consuming and potentially expensive. Doing the same over broadband is easy, and a lot of the growth in spam can be traced back to thousands of amateur e-mailers sitting at the end of an AOL broadband connection. All those badly written offers to

A worm can sneak on to Auntie Maud's PC while she is listening to her favourite online radio station

get in at the ground floor of a multi-level marketing programme that is guaranteed to enhance your sexual pleasure are part of the hidden cost of broadband.

A low-grade fraudster might have little success skimming credit cards in a restaurant, but give them a web-authoring tool, a little time and a CD containing millions of e-mail addresses, and they'll be phishing like a pro in no time.

Earlier this year, a 21-year-old man from Lytham St Annes, in Lancashire, was arrested after he made a rather crude copy of the Smile bank website and tried to persuade customers to give him their account details. At the time of the arrest, Detective Chief Superintendent Les Hynds, head of Britain's National Hi-Tech Crime Unit, said: “The message is clear. Do not do this at home, we will find you.” But in fact the message was more “If you are stupid, we will find you”, and many other talented hackers and fraudsters may not be so easily caught.

There are some very useful tools out there to allow them to sit in the comfort of their own home and find thousands of computers to crack, some of which might have sensitive information or bank account details on them. It's all much nicer than heading out on a cold dark night with a jemmy.

Serious internet fraud is still relatively rare, but white-collar crime has moved online faster than a packet of new pens disappears from a stationery cupboard. Unlicensed music files are being snatched from the net, and broadband makes it possible.

And while Napster demonstrated to the world just how easy it was to copy music from a CD, load it on to your computer and share it with your ten million closest friends, faster connections allow today's downloaders to go for bigger fish: movies.

Simone lives in Cambridge, and recently bought herself a new computer and a stack of blank DVDs just so she could download the latest movies and make copies for her friends. Most of them are early versions of pre-release DVDs, stolen by someone in the supply chain and placed online for anyone to see. Occasionally there will be a new release movie, often filmed surreptitiously at a screening and of poorer quality.

Simone knows why she's doing this: "It's cheap, I can show off to my friends, and it's cool," she admits, quite happy to be a cybercriminal. But without broadband at home, she'd find it impossible, as downloading a movie would take days instead of a few hours.

It's easy to blame the net for society's ills, but there were no car thieves in 1804 for the good reason that the car hadn't been invented, just as there were no computer viruses in 1904. Each age must learn to live with the crimes that new technologies make possible. Sadly, we haven't quite got used to the sheer creativity of the online criminals who are at this very moment rummaging through our hard drives in search of online bank accounts to pilfer.

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GLOSSARY

The net is a strange place, full of words that don't mean what you think they do, or were invented to confuse ...

adware a program that puts adverts on your screen outside your control

cyberspace "the space behind the screen": sci-fi writer William Gibson's term for the whole network and all the data it contains

hacker originally a dedicated programmer, now usually a malicious computer expert who breaks into other people's systems

malware a general term for any program that does something bad or unwanted

phishing putting up a fake website or sending fake e-mails that pretend to be from a bank or online shop, with the goal of stealing card numbers or account details

spyware a program that sits on your computer monitoring your activity and reporting back

Trojan (Trojan horse) a program that appears to be doing something useful but is really malicious

warez stolen software ("wares"), usually with cracked activation keys, which can be downloaded over the net

worm a program that spreads from computer to computer over the net, usually doing something nasty at the same time

zombie an internet-connected computer secretly running a program that lets a hacker control it. Often used to mount attacks on other computers



Broadband across the G7

by **SAM PALTRIDGE** of the OECD

In 2001, the government set a goal to make the UK the most extensive and competitive broadband market in the G7 by 2005.

Extensiveness was defined as making broadband available to households throughout the country, including rural and remote areas. Competitiveness was defined as providing users with value for money and a wide variety of product choice.

At the time, the task looked formidable. The UK trailed all other G7 countries in the adoption of broadband, with less than one subscriber per 100 inhabitants. Only half the households in the UK could access the service and broadband availability was developing faster in other countries. In 2002, while the coverage of broadband had increased to just under two-thirds of households, all the other G7 countries had a wider availability of either DSL or cable modem service.

Forecasts for potential broadband availability in the rural areas of UK were even less promising. A significant proportion of exchanges were deemed uneconomic to upgrade for DSL, and cable networks were largely confined to urban areas. If market forces were not going to do the job, some suggested that the government should mandate this as part of BT's universal service obligation.

In 2004, the situation looks very different, with broadband access available to 90% of households. Moreover, the UK is not only expected to lead the G7 in terms of broadband availability by 2005, but also to provide service to virtually all rural and remote communities. Significantly, this has been achieved without the government mandating obligations on BT.

The greater availability of broadband and an increasingly competitive market have also acted to stimulate the take-up of the service. The UK has overtaken Italy and Germany, and vies with France for having the highest growth rate in Europe. International competitiveness, however, is a moving target, and further gains will be required to match the broadband services on offer in Canada, Japan and the United States. In these countries, the speed of connections available to residential users, for most platforms, tends to be higher than comparable offers in Europe. While the jury is still out on which country will have the most competitive market by 2005, it is likely that the UK government's goal of most extensive broadband availability in the G7 will be met. Moreover, many users in rural

areas are likely to have a choice of competitive service providers.

What happened to transform the outlook for Broadband Britain? One factor has been the rapid pace of technological development. The cost of equipping exchanges, for example, has fallen, making it more economic to upgrade smaller exchanges. But that factor should favour the UK no more than any other country. Technological development does, however, assist on several fronts. One of the past limitations of DSL has been the distance from the exchange that can be served. In most countries, telecommunications carriers will offer broadband services up to 6kms. In the UK, at Milton Keynes, BT is trialling service up to 10kms and beyond. When coupled with BT's plans to upgrade all but the smallest exchanges, this capability will enable around 99% of households to have the option of DSL.

Development is also proceeding apace with other technologies and this has helped to support the UK's emphasis on competition to expand broadband access. Perhaps the most promising is the development of fixed wireless broadband access using licensed and unlicensed parts of the radio spectrum. The amount of new entry by wireless internet service providers in rural areas is virtually unprecedented in countries such as Canada, the UK and the United States.

The same dynamism that characterised the early provision of telephony, where monopolies were absent, is now emerging in the provision of broadband access. In rural areas, the results are sometimes surprising. Indeed, the early experience indicates that some of the traditional paradigms for thinking about communications policy are being stood on their heads, in that prices and service offers are better in some rural areas than in the denser urban conglomerates. Recent work by the OECD* shows there is a rapidly increasing amount of new private sector entry occurring in the provision of broadband access in rural areas. Incumbent carriers, such as BT, are responding to these developments by expanding the availability of DSL, far beyond initial projections, and by adopting the same fixed wireless technologies as the new entrants.

For its part, the government established a broadband task force in November 2002, with a remit to work on extending affordable broadband access especially in rural areas. The task force

developed the broadband aggregation project, which aggregates public sector demand including in rural and remote areas.

The government has also financed trials of new technologies in rural areas. These and other initiatives by the public and private sector, such as BT's pre-registration scheme, have also played a part in expanding broadband availability.

*The OECD report, "The Development of Broadband Access in Rural and Remote Areas", is freely available at www.oecd.org/sti/telecom

DSL availability in the G7 (% of households with access to DSL broadband)						
	2000	2001	2002	2003	2004	2005
Canada	69	70	75	75.4		
France	32	66	71	79	90	95
Germany	60	70	80	85	90	
Italy	45	67.5	70	80		
Japan		73.5	80	90	90	
UK	50	60	64	85	95	99
United States	36	50	68	75		

Source: OECD

Big in South Korea

A nation still living in the shadow of its colonial past and civil war leads the world when it comes to broadband.

ANTHONY TOWNSEND on what we can learn from this success

Frustrated with the slowness of your dial-up internet connection? Dismayed at how your business or organisation has been prevented from improving productivity through online communications? Join the millions of frustrated Britons, Americans, Germans, and so on, whose broadband dreams (along with their retirement portfolios) were flushed down the drain with the telecoms bust of 2001-02. As G7 policy-makers debate, discuss and wrangle over the wreckage of the global telecommunications industry, it is tempting to believe that universal deployment of broadband infrastructure is just another utopian dream born in the 1990s and best left to die there.

But wait. What if I told you that it's not just a utopian dream? What if I told you that there is a nation – still living in the shadow of its colonial past, still reminded by its artificially abridged geography of its 50-year civil war (which is officially still not over) and with a per capita income closer to Greece or Portugal than the US or UK – that has managed to deploy broadband faster and more extensively than any other nation in the world? Would you believe it if I told you that nation is South Korea?

When it comes to broadband, South Korea not only leads the world, but has left the competition far behind. The latest reliable statistics published by the OECD rank Korea number one in the world, with 23 broadband lines per 100 households as of last June. This is almost twice as many as Canada, ranked second with just 13 lines per 100 households. The US – which created the internet in the first place – has only eight lines per 100 households. The EU? Fewer than five per 100 homes. Even Japan, with 85 per cent of the world's robots, barely pulls ahead of the US.

National statistics don't capture the astonishing and nearly universal use of broadband in South Korea's capital and largest city, Seoul. In a speech in October 2001, Korea Telecom's president, Lee Sang Chul, noted that in some apartment complexes, the residential penetration rate hovered over 75 per cent. Nothing like this exists anywhere in the west.

From a distance, Korea's broadband success is striking. On the ground in Seoul, it is breathtaking. Few aspects of Korean society have been untouched by the internet, and most have been utterly transformed by ubiquitous access to broadband. In the past six months, social network services such as Friendster have revived the English-speaking world's interest in new internet applications. By contrast, such services have thrived in Korea's clannish culture for years. Today, young Koreans construct their identity online in a way that few in the west could imagine.



Wired city: the capital, Seoul

If aliens had visited earth in 1999 or 2000, armed only with *Wired* magazine as a guide, they might have believed that Finland was the planet's technological powerhouse. The industry watched as Nokia pioneered a fundamental shift in the way information technology was developed – by designing devices that would appeal not just to geeks, but to everyday consumers. The world's business leaders learnt about this isolated, rather peculiar nation and the wireless society of the future it was supposedly birthing. But a few years later, Nokia is on the ropes and the futurists have stopped talking about Finland as a technological utopia.

Is it a flash in the pan, a technological shooting star like Finland seems to have turned out to be?

Already there are signs of a new kind of "Helsinki syndrome" among the technorati. For the first time since 1953, the flow of Koreans heading overseas to learn about the ways of the west is being matched by an equally eager cadre of corporate researchers and scholars heading east to have a look. Companies as varied as Intel and Lego are after the next big thing in South Korea. The British government even sent a high-profile fact-finding team in 2001 to study the nation's successful broadband policy.

Is Korea a flash in the pan, a technological shooting star like Finland seems to have turned out to be? And if it isn't, what lessons does its experience offer countries that are struggling to reduce gaps and delays in broadband deployment?

The good news is that there's an enormous amount to be learnt from South Korea. In his ground-breaking study of Korea's broadband policies, the Japanese telecommunications scholar Izumi Aizu summarised it this way: "In Korea, bottom-up, grass-roots entrepreneurship and aggressive netizenship ▶

Americans get a raw deal

High prices and poor technology are symptoms of a deeper malaise. By **MARK BEARN**

America, the joke goes, doesn't have broadband. At best, it has "middleband" – overpriced, sluggish internet connections, transmitting grainy video and tinny music over ageing technology. While 89 per cent of American households now have access to some kind of high-speed internet connection, either through their telephone with DSL technology or through the cable lines down which their television programming also runs, less than 20 per cent bother to subscribe. As a consequence, the US ranks behind countries such as Finland, Iceland and South Korea in its adoption rate. For a nation that prides itself on technological and economic primacy, this is an embarrassment, and indicates a huge policy failure.

A principal reason for the slow take-up is straightforward: consumers are unwilling to pay high prices for the inadequate service on offer. They certainly get a raw deal compared to the South Koreans, who enjoy connection speeds up to 20 times faster than are available in the US. And American consumers are charged between \$35 and \$50 a month, roughly the same as the Koreans pay for their superior service. To put it another way, while Koreans are surfing the web, making internet phone calls and watching the latest Hollywood blockbuster on their laptops, Americans are still struggling to make out Paris Hilton in her murky home video.

High prices and underdeveloped technology are symptoms of a deeper malaise. As the policy analyst and entrepreneur Charles Ferguson has put it, "the principal source of the problem is the monopolistic structure, entrenched management and political power" of the local telephone and cable companies that control access. He might also have added President Bush's dogged anti-regulatory policies that have done so much to protect them.

More than 95 per cent of US broadband connections are provided by local cable and phone companies, which control almost every neighbourhood under a rigid duopoly. The local telephone companies, the "Baby Bells", are notoriously poor innovators and delayed the onset of DSL for years in order to protect their existing ISDN technology. The typical Bell company invests almost nothing in capital spending – while burning hundreds of millions of dollars a year on lobbying and political

contributions. Unlike Korea, which opened up its national phone network to competition, the US has shown little interest in smashing these local monopolies. Tellingly, while prices for every other telecommunications product have plummeted, broadband prices have remained steady for years, and have only recently begun to fall.

These companies have found a powerful protector in the Bush administration and in the chairman of the Federal Communications Commission, Michael Powell (son of the Secretary of State, Colin Powell). Since 2001, the commission has sought aggressively to protect broadband companies from competition. In 2003, it tried to redefine them as "information services" rather than telecommunications providers, and thus exempt them from the legal obligation to open their lines to competitors at all. Courts rejected the move. The commission has scorned calls to foster competition, instead supporting industry demands for further deregulation without competitive pressure. Meanwhile, Bush has mixed campaign trail calls for access to broadband for all by 2007 with vague policies and a commitment to the *laissez-faire* status quo.

Activist government policy could make a huge difference to usage, as it did in fostering the growth of canals, railroads, motorways and airports in earlier periods, and as it has done in Korea and Japan. The Bells and the cable companies could be forced to let other firms sell services over their lines for a fair (that is, low) price – as the 1996 Telecommunications Act committed them to doing and which they have lobbied ferociously against ever since. Government subsidies could expand the reach of quality broadband services to 100 per cent of US households by helping to finance a fibre-optic "last mile" and building networks in rural areas where private companies cannot recoup their costs (in parts of Alaska, connecting one new DSL subscriber can cost \$9,000). State and federal government could help towns such as Burlington, Vermont, that in frustration have taken it upon themselves to build community-owned, advanced fibre-optic networks.

But in its slavish commitment to a free-market mythology, the Bush administration and its corporate backers have brought only delay, confusion and often chaos with misadvised policies. It's all horribly familiar.

► contributed the most to its rapid explosion of broadband, coupled with accidental excess of bandwidth supply, fierce market competition and freedom-hungry citizens' activities."

Going by this formula, there is certainly a lot for the UK to be optimistic about. The wireless internet service providers, both for-profit and co-operative, that have sprung up throughout the British Isles exemplify the population's newfound enthusiasm and ability to make broadband happen. But there's bad news for the UK, too. Competition is lacking in a major way. As Aizu's

colleague Adam Peake has written: "Broadband is growing where it is available, but affordable services are not available to around 33 per cent of the population, and realistic competition, a duopoly between DSL and cable, is a reality for only 40 per cent of the population. Broadband is provided by two cable companies whose networks do not overlap, and by resellers of a single wholesale provider of DSL service."

The role of cable television infrastructure as a competitive force for residential broadband should not be underestimated. In

this area, the UK's historical choice of satellite television as its primary alternative to terrestrial broadcasting places it at a severe disadvantage in the broadband race. While cable networks pass approximately 50 per cent of British homes, less than one-third of these are subscribers, and many networks lack the upgrades needed to provide broadband services. In the US, consumers are just now beginning to witness the opening salvos of a price war between DSL providers and cable companies that seems reminiscent of Korea circa 1998-99. This trend seems likely to generate an explosion in broadband subscriber rates in the US, in a similar fashion to what happened in Korea.

So much for policies aimed at broadband diffusion. What policy-makers really want to know is what the pay-off will be in terms of economic growth and social development.

On the economic front, there is certainly reason for excitement. Many credit the expansion of the telecommunications sector, driven by interest in broadband, as one factor in Korea's rapid recovery from the Asian financial crisis of 1997-98. Korean electronics firms are benefiting from the unique insight into new lifestyles and practices based on broadband, which gives them an edge in the global marketplace. And entrepreneurial Korean firms are pioneering a whole slew of new technological industries such as multiplayer online gaming and telemedicine.

But let's suppose the UK can get its broadband act together and achieve the government's goal of being number one in broadband among the G7 by 2005. Such success isn't likely to be of much help in solving the biggest challenge to the nation's economic development – the gap between south-east England and the rest of the nation.

In both economic and social terms, broadband has done nothing to divert Koreans' obsession with all things Seoul. Even as national leaders consider decentralising the capital, the city continues to grow more rapidly than the rest of the nation (and in a sprawling chaotic mess reminiscent of London). As urban planners and economists around the world have begun to recognise, the places that are most connected to begin with tend to get connected to new networks first. And by virtue of their bigness and their facilities for face-to-face interaction, they are able to turn technologies for communications such as broadband into economic development much more rapidly and effectively than outlying areas.

It is clear that Britain needs to do more to accelerate broadband use and catch up with Asia and America. Furthermore, the lack of effective competition, an area where good public policy can make a major difference, is the major force propping up prices and holding up development.

The government needs to follow the example of Korea and create an environment where communities and small firms can build broadband infrastructure from the ground up, where they need it and when they need it. It should not be left to the big telecoms providers alone to provide such a critical public infrastructure.

Anthony Townsend is adjunct professor of communications and urban planning at New York University. He has received a Fulbright scholarship to study how the broadband revolution is playing out on the streets of Seoul, and you can follow his adventure at <http://urban.blogs.com/seoul>

A new kind of republic

Experiences of connecting cities and their citizens are different around the world, but a common theme is emerging: the people are being given greater power.

By **SIMON WILLIS**

A new political and economic phenomenon is emerging in cities around the world as a result of their approaches to connectivity. Experiences of connecting cities and their citizens are very different, but a number of common themes suggest that we are on the brink of some very significant changes.

People construct the complex architectures of their cities over time – driven by their desire to be with each other, learn from each other, and grow economically, culturally and spiritually. To satisfy these desires, we have developed physical spaces such as the street, the marketplace or the coffee shop. In recent times, these have been supplemented by digital spaces. As the means for the instant exchange of digital information are built, a new dynamic emerges at the heart of what makes a city – information can flow towards people rather than people towards information.

In recent times, physical spaces such as the street or coffee shop have been supplemented by digital spaces

The consequences are subtle but profound. Looking at connected cities, three themes emerge. The first is the changing nature of work, as the boundaries of the working day and the workplace begin to blur, and more collaborative ways of working and decision-making emerge.

The second theme is the growing realisation that cities, in order to change in the way enterprises have changed, require the kind of information exchange environment that businesses now take for granted. In the process, they may have discovered the next pervasive social infrastructure to follow water, roads, power and telecoms.

The third theme is political – a new model becomes possible when new ways of working are combined with a new pervasive social infrastructure. These cities are collaboratively reconstructing themselves around the needs of their citizens.

In Milan, a unique set of circumstances allowed the service provider e-Biscom to take off in an impressive way. It ►

► benefited from the availability of venture capital in the late 1990s, the lack of pre-existing cable that might have slowed take-up of its services, and the density of housing. The driver in Milan was not the desire to put e-learning into schools or to do health consultations in people's living rooms. Rather, it was demand for video telephony and entertainment, as well as private communication applications. And Italian cities are only just beginning to look at the wider set of applications enabled by the technology infrastructure.

The Swedish capital lies at the other end of the spectrum. There was a very clear vision in Stockholm that the building of a knowledge economy, the attraction of inward investment and the provision of better public services would all be facilitated by a fibre-based communications infrastructure. And indeed, the

The Stockholm model reflects the Swedish belief in the public provision of fundamental infrastructure

benefits are clear. For example, as people in the city begin to telecommute one or two days a week, strain on the transport infrastructure is being reduced. High-speed or "real" broadband is expensive, but it's a great deal cheaper than roads and railways. This development is more or less at the forefront of what is happening in the modern city. There is already a different approach to work and the workplace in Stockholm, and there are plans to turn the city into a wireless hot spot. The Stockholm model reflects the more general Swedish belief in the public provision of fundamental infrastructure.

Then we have mixed models. These are often very complex and affected by the local political environment as well as legal and economic factors. One model is like a utility that is majority-owned by the city but has a lot of private sector money and investment. Wroclaw in Poland is a good example. When the city was damaged by flooding at the turn of the century, the repair work gave existing utilities an opportunity to wire the city, and its holes in the ground are now used as a public/private vehicle to develop the technology infrastructure.

Hamburg also offers a mixed model, where the private sector leads and the public sector encourages and invests. Here, the public sector will intervene as and when necessary, and will ensure that, through the services provided, Hamburg remains a growing and successful trading hub.

New York has made what appears to be a small step forward, but it is in fact a crucial one. The city has long been opaque to its citizens because there have been 25 or so different departments dealing with different things – if you want your garbage picked up you ring one department, if you want your water turned off it is another one, and if the people next door are noisy it is yet another. Now the city's networked information system allows New Yorkers to pick up a phone, dial 311 and be put through to the right person to solve their problem. This is a clear example of how the city has reorganised itself

around the needs of its citizens, not vice versa.

Several years ago, Barcelona rearranged its network around a portal that reflected the way people live their lives and the problems they have. This sounds very obvious, but public servants find it difficult to make the fundamental shift from "this is the way we are arranged" to "this is how your needs as a citizen are arranged". Clearly, they are not going to reorganise their departments around citizens' needs every week. People's needs are different; they are constantly changing; they overlap and contradict each other. However, once citizen and official are networked, they can collaborate. The official finds himself or herself working in a great virtual contact centre where inquiries can be routed to the appropriate destination. It is what the government of Ontario calls "No wrong door". And when information is networked, citizens see it is transparent and become ready to engage with authority, which they now see as offering them a service.

In this international and fast-changing environment, it may be useful to try to look at what is happening in more conceptual terms. This may allow us to develop a framework within which we can see what is common to these success stories.

The republic in political history was an idea that broke with the concepts of monarchy, oligarchy and timocracy and established the idea of rule by the "polis". It was in the small trading-hub cities of Greece in the sixth-century BC that the democratic project truly began.

The prospect of a "connected republic" now presents us with the opportunity of giving greater power to the people. A connected republic is an environment in which people reconnect with each other politically and at the same time rediscover the connection they have lost with their elected leaders. And the natural geographical confines of the connected republic are, as in ancient Greece, those of the city state rather than the nation states that dominated the past century.

All cities have to grapple with the issue of how to re-engage with people who are becoming disengaged. Governments have to

The natural geographical confines of the connected republic are those of the city state rather than the nation state

become transparent: citizens must be able to see what government is doing. Communications technologies unlock the possibility of reorganising and presenting information in a way that is digestible and appealing to citizens.

This is an extract from the book Connected Cities: essays from urban innovators edited by Simon Willis (£9.99). Cisco has made 150 copies available free to New Statesman readers, obtainable by calling Premium Publishing on 07974 176708

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