



Commission for Rural Communities

Tackling rural disadvantage

Beyond digital divides?
The future for ICT in
rural areas

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The Commission for Rural Communities

As a result of Defra's Rural Strategy, published in July 2004, the Commission for Rural Communities was established as a division of the Countryside Agency from 1 April 2005.

The Commission provides well-informed, independent advice to government and ensures that policies reflect the real needs of people living and working in rural England, with a particular focus on tackling disadvantage.

The Commission has three main functions:

Rural advocate: the voice for rural people, businesses and communities.

Expert adviser: giving evidence-based, objective advice to government and others.

Independent watchdog: monitoring and reporting on the delivery of policies nationally, regionally and locally.

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Beyond digital divides? The future for ICT in rural areas

A report for the Commission for
Rural Communities from Demos

DEMOS

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Foreword

While the vast majority of the UK will soon have access to broadband, there is already the real prospect of a second generation of divides emerging. Policy-makers are used to viewing this challenge in terms of technological infrastructure, and these debates will persist in the years ahead. But it is no longer inevitable that the city must run ahead of the countryside in terms of connectivity and bandwidth. Already, community ISPs are enabling some rural areas to lead the way. In the longer term, a combination of ADSL, fibre and wireless networks offer rural areas the prospect of low-cost technologies combined with a high quality of life.

The cost of laying fibre suggests that areas with the highest demand will always come first. But the tantalising feature of wireless technology is that it offers the prospect of breaking these cycles – it is a genuine ‘leapfrog’ technology.

Yet competition between different platforms remains fierce and unpredictable. The days of gambling on a single solution are long gone. In this vein, it is to be hoped that the scenarios offered towards the end of this report can contribute to an ongoing process of horizon-scanning.

While a good understanding of technological possibilities and limits is as necessary as ever for policy-makers, it is far from sufficient. As broadband becomes increasingly embedded in rural lives, the divides that it creates, perpetuates or reconfigures will be less digital and more social.

As broadband becomes more tightly bound up with thorny questions of rural planning and development, agriculture and environment, it is important that policymakers avoid trying to impose online solutions on offline problems. Just as users are learning to integrate their online and offline activities, so policy-makers must learn to integrate online and offline policy.

How does broadband connect to rural economic and social processes? One answer is that it makes them happen faster. Electronic networks may be old news, but they continue to enable ever-more rapid changes, which threaten to undermine the capacity of rural workers to play vital roles, from custodians of the environment and tourist attractions, to producers of food.

This is likely to change expectations of government and regulation in the broadband arena. Whichever blend of platform technologies ultimately gains dominance, government should ensure the availability of simple, effective entry-level broadband products and environments both online and offline that can build people’s skills, confidence and literacy.



Two elements of the broadband future deserve particular attention. First, wireless technology is not only interesting for its ability to boost connectivity. It also places more influence and control in the hands of individuals and communities, who are then able to shape the infrastructure for themselves. Second, rural broadband is capable of sustaining and enhancing the vibrancy of local dialogue and discussion. The most exciting community ISPs are those which have simultaneously developed both the technical infrastructure and the democratic capacity of their local areas.

This leads to a broader point about the voices of ordinary broadband users. The perspective of the user is vital, even in the seemingly technical roll-out debate. By working with people to understand how broadband can work for them, policymakers will best understand the true scale of its potential.

Introduction

'Our country and its people prospering in the knowledge economy... Increasing by £1 billion the investment in science...and ending the digital divide by bringing broadband technology to every home in Britain that wants it by 2008.'

Tony Blair, Labour Party Conference speech, 28 September 2004

In April 2004, when BT pledged to extend broadband coverage to 99.6% of the population, it was tempting to proclaim the beginning of the end of the digital divide between urban and rural Britain. Yet as broadband technologies and platforms evolve, old divisions persist and new ones are created. As broadband becomes more of an essential and everyday part of daily life, this unevenness in its rollout and use needs to be tackled with fresh urgency.

Many rural communities are already using broadband to strengthen social networks, develop new kinds of organisation and access a far wider range of economic opportunities. But it may also bring threats. From online retail to an invasion of home-workers, broadband can become a factor in a set of wider social and economic changes in rural areas. Some of the key questions about the future of broadband are technological. Will fibre or wireless connections dominate? How much bandwidth will there be? What will people use it for? But just as importantly, we need to understand the relationship between broadband and wider aspects of rural life. What changes will broadband help and hinder within rural economies, societies and environments?

This report seeks to address these questions. It traces the rise of broadband before exploring the issues it raises today for rural areas. It then goes on to explore three possible scenarios for rural broadband in 2020, with the twin aims of dramatising a variety of future directions and helping rural stakeholders to think creatively about the more immediate responses these futures may require.

An overview of our findings, conclusions and the application of our insights into the broadband policy of today, are outlined in the foreword at the beginning of the report. This seeks to frame alternatives that embed broadband across rural thinking and are robust in the face of rapid technological change.

In chapter 1, we seek to understand the significance of the countryside, and note its growing interdependence with urban areas. We argue the terms 'rural' and 'urban' seem likely to lose their purchase in future. From the diversity of family forms to the end of 'job for life' careers, many key social and economic trends cut right across the rural/urban divide, requiring us to find new ways to describe the geography of the UK.

In chapter 2, we begin by examining what broadband brings to the countryside: fast, always-on, simultaneous transfer of voice and data. We then map broadband's rise, charting the optimism of the 1990s and the pessimism that followed the commercial slump in 2000, as well as the steadier underlying trends that lay behind the boom and bust. BT has

pledged that by the end of 2005, 99.6% of the UK's population will have access to broadband. Against such a rapidly changing backdrop, the need to keep refreshing our understanding about broadband's potential is clear.

In chapter 3, we explore the various technologies through which broadband can and will be accessed in future. We examine fibre alongside the growing number of wireless solutions, including Wi-Fi and 3G. We argue that wireless broadband, especially Wi-Fi's successor Wi-Max, can make a vital contribution both to rural development and to the way broadband is used.

In chapter 4, we explore the ways in which broadband can create social divides as well as social connections. While some people have been eager to take up the opportunities broadband affords others have not been, often for reasons based on existing patterns of social and economic inequality. The digital divide represents a twin challenge, of access and attitude, in which skills, training and the right forms of access may be just as important as ensuring that broadband infrastructure extends to every home.

The relationship between broadband and the rural areas in which it is being used is a complex one. In chapter 5, we argue that the best way to understand this relationship is along three dimensions: the local relationships broadband allows people to forge; the access to opportunities it helps to create; and the urban outshift it enables. We argue that while broadband is increasingly helping people to generate new structures of support and community, it also opens rural areas up to new cultural, economic and social challenges.

In chapter 6, we look in more detail at migration patterns to rural areas. From home-working to home entertainment, we argue that broadband may well strengthen this trend. Rural areas will need to capitalise on this inward investment in ways that avoid marginalising existing communities. Government may seek to play an active role in this process, by managing the disruptive shifts that broadband helps to make possible.

In chapter 7, we look ahead to 2020, and offer three scenarios for the future of rural broadband. These do not stand as predictions of what will happen, but are designed to dramatise and accentuate what could happen. Their purpose is in part to help people think about the future, but more importantly, to think about the present in new ways. What are our priorities? How can we future-proof broadband policy? How might different groups respond to the opportunities and threats that broadband brings?

Project methodology

The research for this report was carried out from August 2004 to January 2005, and included the following elements:

- Interviews with a range of experts, including technologists, policymakers, academics and representatives of rural communities;
- A one-day scenarios workshop, with around 20 of these experts;
- An ongoing process of desk-based research and analysis.

1

Rethinking the rural

Bloody clashes outside parliament, thousands on mass demos, and carcasses dumped outside party conferences – the British tradition of town versus country appears to be alive and well. But away from the skirmishes over foxhunting, a new orthodoxy has emerged among policy-makers, academics and NGOs. This emphasises urban and rural interdependence. Alun Michael, Minister for Rural Affairs, summarises this view well:

'We must avoid the trap of drawing false boundaries between urban and rural spaces. Nobody lives in isolation. Rural people rely on towns and cities for many key services, including specialised health care, further and higher education and leisure. Urban people rely on the countryside for food and non-food products, yes, but also people value the landscapes and the environment just as much as good quality food.'¹

Far from existing independently, the rural and the urban help to shape each other. The challenge is to understand better the relationship between the two. Rural and urban systems are less easy to separate than is often assumed. It is helpful to think of this in terms of the flows between them:

Rural to Urban

- Food
- Water
- Building materials
- Aesthetic value and well-being
- Visitors to cultural and entertainment attractions
- Shopping
- Commuters for jobs
- Skilled people

Urban to rural

- Visitors and tourists
- Air and water pollution
- Waste to landfill
- People to live: distance workers, entrepreneurs, down-shifters and retirees
- New products
- Businesses

Perhaps the strongest foundation for interdependence is the flow of people from urban to rural areas. Urban to rural migration is now the most significant form of internal migration in Britain, surpassing even the trend that has dominated the past fifty years – that of North to South migration. Between 1981 and 2002, the rural population of England grew by 1.7 million (a 13.7% increase), and in the last four years approximately 352,000 people more have moved to England's rural areas than have left them.² But there is also a strong two-way dynamic, with more young people migrating to urban areas. Within these demographic trends, policymakers have attempted to produce more detailed typologies of rural communities. For example, the Future Foundation identifies six distinct types: deep rural; retirement retreats; transient rural; dynamic rural; dynamic commuter; and settled commuter.³

Beyond interdependence

There is a strong logic to the idea of interdependence. But does it also miss some important dimensions? Many social and economic trends defy categorization as either 'urban' or 'rural'. To give a few examples:

Changing family/household forms

- More diversity of family forms;
- Extended adolescence: younger people living with their parents after university, putting off marriage, family and mortgages;
- More people living alone, particularly older people;
- Communal living / the 'Friends Generation': 20-somethings living together;
- Couples spending more time apart because of work or a desire to retain independence;
- 'Paranoid parenting': parents placing tighter restrictions on their children's activities;
- Greater use of nannies, cleaners and other domestic labour.

Changing consumer trends

- The rise of the individualised consumer: people creating their identities through consumption choices;
- The growth of the 'experience economy', as part of a shift away from manufacturing to a service economy;
- Increased consumption of hobbies, leisure and entertainment activities.

Changing workplace and organisation trends

- Time poverty, especially in households with single parents or where both parents work;
- Home-working and technology-enabled flexible working;
- The end of 'company man'/ the rise of 'portfolio woman' – instead of a job for life, people are switching careers and organisations more frequently.

As well as obscuring some of these trends, notions of rural/urban interdependence can imply that urban centres are the lead partners, with the countryside playing catch up. But in some important respects, rural areas appear to be ahead of the curve.

1.7m

The rural population of England increased 1.7 million between 1981 and 2002.

The new old

The whole of the UK is ageing. The 2001 census revealed that people over 60 now outnumber those under 16 for the first time. Proportionally, more people over 45 live in rural areas than in urban areas. The baby boomers, defined as those born between 1945 and 1965, have a preference for country living. Yet it remains to be seen whether they will settle for the quiet retirement of their parents. At every stage of their lives, the baby boomers have been at the forefront of radical social, economic and political change: within the family, education system, popular culture and the labour market. It is not presumptuous to predict that they will want something very different from their later years than previous generations. Given that they will be far more numerous in smaller settlements, these changes could be faster and more pronounced in rural areas.

415 / 10,000

There appears to be a more vibrant enterprise culture in rural areas, with 415 business per 10,000 population in rural districts, compared to 379 business per 10,000 population in urban districts.

The knowledge economy

The knowledge economy is part of a long wave of change affecting every sector of the economy, in which competitiveness and wealth are increasingly determined by the capacity for innovation and creativity. We have moved from an age of mass reproduction, where you could have any colour as long as it's black, to an age of mass personalisation and mass customisation. This new pattern of production and growth increasingly depends upon an open-ended process of collaboration between different players, with tight feedback loops between firms, organisations, suppliers, customers, marketers, and the broader environment. Urban areas have a structural advantage in that proximity makes this kind of cooperation easier. However, it is not all bad news for rural areas. There appears to be a more vibrant enterprise culture in rural areas, with 415 businesses per 10,000 population in rural districts compared to 379 businesses per 10,000 in urban districts.⁴

Within this report, our starting point for exploring the rural dimensions of broadband will be Defra's definition of rural. This is based around two 'axes of rurality': density of population, and distance from urban centres. Within this definition, the notion of interdependence between urban and rural areas is clearly important. However, with a range of economic and social trends common to all areas of the UK, and the balance of power between urban and rural increasingly disrupted, there is growing cause to question to what extent the distinction between the two is useful.

2

The birth of Broadband Britain

Defining rural areas in terms of their distance from cities immediately highlights how central information and communications technologies (ICTs) must be to the question of their future. ICTs enable the transportation and exchange of voice, video and data at speeds that often make distance irrelevant. They support asynchronous communication that can be picked up by the recipient at a time of their choosing, enabling people with busy lives to access and share information more effectively. The internet is unprecedented in the flexibility of scale of communication that it can support. Previously, different patterns of communication – one to one, one to many and many to many – all had media that were particular to them – but today, the web can do it all, through websites, email, wikis and blogs.⁵

'Broadband' is a term in search of a clear definition. The word suggests that it is defined by bandwidth and speed. Yet these measures have been, and will almost certainly continue to be, subject to constant change. For example, the 56 Kbps (kilobits per second) speeds of the late 1990s made 128 Kbps seem like 'broadband' (indeed, this is still the baseline downstream speed in Ofcom's contemporary definition). Now, broadband is generally accepted to begin at 512 Kbps, but in some parts of Europe and the Far East, bandwidth of 1, 2 or even 10 Mbps (megabits per second) is seen as the norm.⁶

However, there are more stable characteristics of broadband. Ofcom identifies three characteristics which differentiate broadband from narrowband dial-up services:

- always-on service, i.e. users are not required to dial-up each time they wish to access it (this is now the case for almost 25% of internet connections);⁷
- simultaneous use of voice and data services;
- and faster download speeds than dial-up services.⁸

92%

Broadband users report satisfaction levels of over 92 per cent, against about 65 per cent for narrowband.¹¹

For the Broadband Stakeholder Group, broadband is 'always on access, at work, at home or on the move provided by a range of fixed line, wireless and satellite technologies to progressively higher bandwidths.'⁹ More simply, from the user's point of view, broadband is increasingly seen as 'internet that works.'¹⁰ As clunky dial-up services are replaced, broadband users report satisfaction levels of over 92 per cent, against about 65 per cent for narrowband.¹¹ This ease of usage is evident in the steady upward curve in the amount of time spent online in broadband homes relative to dial-up homes,¹² and in broadband users' increased use of the internet for banking, shopping, emailing, games and music downloads.¹³

The immediacy and always-on character of broadband helps users to integrate it into their daily social and professional routines. As the sociologist Frank Furedi points out '...insofar as broadband eliminates the phase of getting connected it helps weave the online experience into fabric of people's lives. When getting online is as straightforward as making a telephone call or turning on the television, it becomes a 'normal' activity that can be readily assimilated into social experience.'¹⁴

Three phases of the internet

Since the launch of Netscape's web browser in 1994, the fortunes of the internet have peaked, fallen and begun to rise again. Beneath this perceived cycle of boom, bust and recovery, the rate of connections to the internet has in fact risen steadily and continuously over the entire period. However, in terms of wider commercial, policy and social expectations surrounding the internet, it is possible to delineate three distinct phases since the mid-1990s.¹⁵

Phase 1: Great expectations (1994 – 2000)

The internet's arrival in the mainstream helped to create an optimism spanning commerce and politics based on the view that new technology would inevitably bring social benefits. In the 'new economy', it was argued, conventional models of production would become redundant. Inflated profit forecasts and massive venture capital investment followed. While many projections of the internet's impact proved exaggerated, the focus on the knowledge economy remained, culminating in the 2000 Lisbon agenda. Within this, the capacity to transmit data quickly, securely and relatively cheaply was central, and was considered vital to the UK and Europe's global competitiveness.

Phase 2: Deflation and delivery (2000 – 2004)

Following the commercial slump in the telecoms and IT sector the political and social fortunes of the internet took a similar fall. Politicians and policy-makers began to make more clinical assessments of the benefits and potential of the internet. Delivery and access became collective priorities, focussing attention on those the internet had yet to reach. In the UK, firm targets were set to ensure the internet delivered:

- making 100% of government services available electronically by 2005;¹⁶
- ensuring broadband access to all education and health services and across the criminal justice system by 2006;¹⁷
- ensuring everybody who wants it has access to the internet by 2005;¹⁸
- and making the UK the best and safest environment in the world for e-commerce, with the most extensive and competitive broadband market in the G7 by 2005.¹⁹

However, until very recently, broadband was still a largely urban phenomenon. As the Countryside Agency has observed, telecommunications is 'governed by...very large economies of scale.²⁰ Sparsely populated rural areas provide little incentive for investment in infrastructure, while urban areas seem to guarantee huge returns on such investment. As a result, in 2003, while 95% of urban centres had access to broadband, just 7% of rural villages and 1% of remote rural areas had access.²¹

£30m

The government's £30m Broadband Fund focusses on sponsoring demand-side solutions through RDAs.

Until last year, BT's commitment to provide ADSL access extended to only 80% of the population²², so the question of what to do about the remaining 20% dominated the rural broadband debate. The government's response was to create a £30m Broadband Fund within the DTI, which focussed on sponsoring demand-side solutions through Regional Development Agencies.

Additional investment came from a different source. Rural broadband groups increasingly began to take affairs into their own hands, with considerable success.²³ Community campaigns across the UK took two forms. Many sought to secure the trigger level of demand set by BT, by signing up potential customers in the local area. However, some went further, bypassing BT altogether and setting up their own community ISPs.²⁴ The success of these local initiatives demonstrated both the depth and strength of rural broadband demand.

Between the demand-side investment of government and these local initiatives, significant progress was made. Total internet connections in the UK grew from 11m to 15m between 2001 and 2004. Broadband overtook the dial-up market, with nearly 5m people subscribing by the end of 2004.²⁵

99.6%

BT have pledged to extend broadband access to 99.6% of the UK population by the end of 2005.

Phase 3: Beyond the divide (2005 –)

Now that the rollout of broadband is well underway, the cloud of e-pessimism has begun to lift. In April 2004, BT declared its intention to extend broadband access to 99.6% of the UK population by the end of 2005.²⁶ This was made possible by a technological breakthrough enabling BT to take broadband 10km from exchanges rather than 4km. But equally significant was the growing political pressure on BT from Ofcom to improve access and end its stranglehold on the 'local loop' – the last stretch of wire connecting homes and offices to the local telephone exchange.²⁷

In recent months, broadband subscriber numbers have continued to grow at an astonishing rate. New subscribers are continuing to sign up at a rate of 60,000 each week, and the total number has now exceeded the six million mark, and is expected to hit eight million by the end of 2005.²⁸ Broadband now accounts for 38% of all Internet connections. This reflects a wider trend throughout OECD countries. Standing at 82m connections in December 2003, up from 3m at the end of 1999, broadband represents 'the fastest take-up of any new communication service experienced in the OECD... More than twice the speed of mobile take up.'²⁹ Britain was recently named the most wired nation in the G7; second only to Denmark globally.³⁰

However, as one divide closes, others threaten to open. New dimensions of the digital divide are emerging, most obviously in terms of bandwidth. In London, customers are able to access 2 Mbps from BT or 4 Mbps from Bulldog. But for many rural dwellers, 128Kbps is the current limit. There is a widely held perception that despite the astonishing advances made using DSL technology, it is now reaching the end of its useful lifespan.³¹ 'Everyone in the industry knows that DSL is yesterday's technology,' says Malcolm Corbett of the Community Broadband Network, 'but because of their Telco contracts, some can't say it too loudly, or too publicly. If we are not to get left behind, the UK really needs to put more effort into lighting fibre and supporting innovative wireless technologies.'³²

Managing the trickle down of technology from urban hubs to other areas will be an ongoing challenge. Just as importantly, the notion that the UK as a whole may find itself on the wrong side of an international digital divide is a growing concern. The majority of the UK population may soon have access to between 0.5 and 1Mbps, but in Japan, South Korea, Scandinavia, Italy and California, bandwidths of 10 to 100 Mbps are already becoming commonplace. By comparison, our DSL nation is 'going sideways, with the breaks on, at a snails pace.'³³

In the face of these emerging challenges, it is right to test broadband policy against the full range of possible scenarios for the future. 'Our assumptions have been constantly playing catch up with reality,' confesses Nigel Heriz-Smith, head of the DTI / Defra Rural Broadband Unit. 'This space is moving faster than we think.'³⁴

3

Bandwidth unlimited?

'Liquid bandwidth; all you can eat; always on. No contention.'
*Lord Currie, Chairman, Ofcom*³⁵

So what might the future bring? Are rural areas destined to play an endless game of catch up with urban areas? We need to look first at the technological possibilities.

Fibre

DSL technology uses telephone wires laid in the last century. Switching to new networks of fibre optic cables is widely viewed as the most appropriate broadband infrastructure for the future. Fibre would enable what Lord Currie, Chairman of Ofcom, has described as liquid bandwidth: virtually unlimited data speeds, and freedom from vulnerability to contention ratios. This is the technology behind Fastweb's 10Mbps provision in Milan, 100Mbps Ethernets in Swedish apartment blocks³⁶, and the 'Gigabit or Bust' project, which aims to reach every Californian home with 1 Gigabit broadband access by 2010.³⁷

So why don't we have it here?

Twenty years ago, a young British PhD student wrote a sparkingly original thesis that concluded that the future of telecommunications lay in the unlimited bandwidth offered by fibre optic cable. Landing on the desk of the then BT chairman, this prospect led BT into a frenzy of fibre deployment, laying under UK soil the greatest density of fibre per capita in the world.

Half way through this operation, however, the regulator spotted a competition problem and called BT's operations sternly to a halt. Peter Cochrane, who wrote the thesis, describes this as 'a travesty... we would have been ahead of everybody else in the world.' To this day, thousands of miles of fibre optic cable lie silent and dark beneath our feet. According to Cochrane, these reach to within 2km of 85% of buildings in the UK.³⁸

The real story is not that so much fibre exists, which others acknowledge, but that we do not know how much or where. According to BT's head of broadband strategy Paul Blacker, 'there is a significant amount of fibre in our core network'.³⁹

In addition, a fibre superhighway connects the UK to Europe and the US. Much of this lies deep in Cornish soil, where fibre runs past people's doors, but no move has ever been made to connect it to local homes and businesses. According to Tim Dwelly of LiveWorkNet, 'It's like living next to a motorway and not having a slip road.'⁴⁰ However, Paul Blacker argues that the cost of this 'motorway' is insignificant compared to the cost of the last mile, and sometimes even thousands of times smaller. While there is interest in 'dark fibre', therefore, there is disagreement about its significance.

Fibre deployment is a costly business. No-one knows the precise figures, but Ofcom estimate that to extend fibre to within half a mile of every user would cost £3bn. Fibre to the street cabinet, with the final journey to the home being carried by wireless or VDSL might cost £10bn⁴¹. And to take fibre to the door of almost every home in Britain might cost in the order of £18bn.⁴² 80% of that cost is simply digging the holes in the ground.⁴³ In the absence of a Universal Service Obligation, fibre rollout would almost certainly follow the urban-first deployment patterns that we have seen with ADSL.

Antony Walker, CEO of the Broadband Stakeholder Group, maintains that BT is the only player in the game with the capacity to make such an investment. BT has recently announced its '21st Century Networks' project, which involves modernising the 19th Century fixed line networks into next-generation, internet protocol networks, capable of massively enhanced transmission capacity. This is an ambitious project, which BT describes as comparable to 'changing most of the Boeing 747s whilst they're in flight.'⁴⁴ But to invest in fibre deployment would require even greater capital expenditure, which one company is unlikely to deliver on its own.

But is large and centralised investment the only model of fibre deployment? Norway has followed an alternative path. There, local ISPs give groups of neighbours a 50% discount on their fibre connection if they are prepared to dig their own holes.⁴⁵ 'What a fantastic idea!' said the head of the UK's Access to Broadband Campaign when he heard of the scheme. 'Can you imagine that in Kent?'⁴⁶

Ofcom is well aware that BT is not the only possible source of fibre deployment, and is looking for other sources of investment. But operators aren't falling over themselves to colonise the fibre market. They find it difficult to see where the returns will come from. One suggestion is through tighter content packages with entertainment providers – an extension of the 'walled garden' model of broadband service provision. Norway has overcome this financial barrier by separating the utility function of digging the holes and laying the fibre from the ISP element of the service.

However, fibre deployment may not be necessary if fibre can be used effectively in conjunction with wireless technologies. If the biggest obstacle to broadband expansion is concrete and soil, the alternative approach is to forget the ground and take to the sky.

Wi-Fi

Recent years have seen the rapid spread of wireless broadband using low cost wireless LAN cards for PCs that transmit and receive signals using the radio spectrum. The combination of low cost equipment, agreed technical standards and a relaxation of the rules governing unlicensed spectrum in the 2.4GHz range has led to the rapid growth in Wi-Fi hotspots in hotels, airports, cafes, on trains and in other public places. It has also enabled the growth of community-run wireless broadband networks.

£18bn

The predicted cost to take fibre to the door of almost every home in Britain might cost in the order of £18 billion.

3G

Although the advertising and media presentation of 3G tends to focus on mobile phones, it can also be used to make broadband internet connections.

Most people are only dimly aware that radio spectrum is licensed. However, together with the technology that exploits it, the licensing regime is increasingly important to the shape of our broadband infrastructure. The licensing regime first came to public prominence when the 3G mobile phone spectrum was auctioned for £22bn by the government in 2000. Since then the new licencees have been building their 3G networks, and several of these have been launched in the past year.

Although the advertising and media presentation of 3G tends to focus on mobile phones, it can also be used to make mobile broadband connections to the internet. At present there are limitations to 3G broadband; coverage is limited, upstream and downstream speeds are relatively slow and usage costs for data are comparatively high (around 50p per megabyte). So in the short term at least, 3G is likely to be less useful for rural communities and more about providing nomadic connectivity to highly mobile, urban professionals.

Licence-exempt spectrum is potentially much more significant for rural communities. The 802.11b Wi-Fi standard currently promises speeds of up to 11Mbps symmetrically, although depending on the distance from a hot spot this can fall to somewhere between 512Kbps and 5Mbps.⁴⁷ The more recent 802.11a standard offers symmetrical speeds of up to 54Mbps.

For community networks, the choke point is the cost of connection back to the internet – the backhaul. Here, the problem can be sheer distance, as wireless data transmissions must be in line of sight and will only travel for around 500m before signal strength is lost. To overcome this, people have started weaving together coverage from a number of nodes into mesh networks. These wireless mesh networks are increasingly being used to deliver broadband to rural and urban areas alike. The small British company LocustWorld has established mesh networks in 50 countries, including rural Texas, small Scottish villages and a university campus in Malaysia.

This has had a profoundly decentralising impact on broadband provision, and a host of community ISPs have sprung up around the country. Communities, in short, are doing it for themselves. With wireless nodes costing between £200 and £500 to cover between 300m and 500m radius, and the availability of free downloaded software, it is easier than ever before to become an ISP.

For example, community ISPs like Calder Connect Co-op or Barry Brook's community network in Austwick, Yorkshire, supply their customers and neighbours with Wi-Fi for £15 and £10 per month respectively. This out-competes commercial ISPs on the grounds of price and service, and also in terms of the relationship between the ISP and their users. Policy makers are beginning to wake up to this. 'The most vigorous challenges to traditional telecommunication paradigms are being made by relatively small WISPs' says one DTI official.⁴⁸

Reinforcing this trend towards open community networks, many Wi-Fi users are choosing to configure their hotspots so that anybody nearby can share their internet connection. The consume.net site, which advocates free networks, has over 3,000 nodes registered, and programmes such as Netstumbler.com provide roaming Wi-Fi hunters with information on hotspots in their local area.

As an alternative to universal service obligations being imposed on commercial providers from above, these new constellations of community networking raise the prospect of universal provision growing up from below. A growing challenge for policy is to integrate these two processes.

Yet community wireless internet provision is no panacea. Three problems stand out. First, a problem of credibility. Providers face major constraints from backhaul limitations, narrow spectrum availability, and uncertainties about the sustainability of the business model. Brian Condon of the Access to Broadband Campaign, admits there is a chasm between community ISPs and organisations like BT. Community ISPs are seen as 'a bunch of yoghurt knitters knitting their own networks – they don't look like proper business partners.⁴⁹ Second, wireless operators are constrained by the narrow areas of spectrum within which they can operate, although this should change when Ofcom introduces spectrum trading, and increases the proportion of deregulated spectrum.⁵⁰ Finally, community ISPs need start up funding and business support to make them economically sustainable over the long-term.

Wi-Max: Wi-Fi's big brother

Wi-Max is a next generation wireless technology that is so powerful it can transmit as much as 50Mbps over distances of 30 miles. It is expected to arrive in the UK by the end of 2005, and the first trials are now being held in Kent.⁵¹ The exciting prospect here for rural areas is that Wi-Max's contention ratios are stable, meaning that one transmitter can serve a fixed number of people for a fixed price.

Wi-Max could have very significant implications for broadband in rural areas. But it would be wrong to place too great a burden of expectation on it, until more testing and piloting has taken place.

50Mbps

The next generation technology, Wi-Max, is so powerful it can transmit up to 50Mbps over distances of 30 miles.

4

Divides old and new

'The digital divide is not digital: it's the social and economic divide which is reinforced by technologies that exacerbate the potential to exclude people.' Kate Oakley, Director, Local Futures⁵²

For some users, broadband is becoming embedded in the fabric of their lives. According to a recent Demos/MORI poll, many now log on before breakfast (57%) or get up in the middle of the night to use it (20%). 46% of broadband households have moved their PC into their daily living space, with 28% saying they access broadband from their living room.⁵³

But viewing broadband access purely in terms of the potential to connect misses a significant part of the picture: while over 95% of the population can currently access broadband, over 6 million consumers are actually wired up to these faster services. A recent report from BT warned that 40% of the population could still be without home access by 2025, creating significant exclusion from key services.⁵⁴

We are undergoing a transition in which many of our activities are, at least partially, entwining with ICT to produce a state of techno-dependency. Those who struggle with the transition are people on lower incomes, people with disabilities and people with literacy problems. These obstacles have a particular resonance in rural areas, as incomes tend to be lower, and public access points fewer and farther between.

Research from the Joseph Rowntree Foundation finds that people with disabilities are far less likely to have a home internet connection than the general population. The obstacles are manifold: website design which rarely takes account of visual or motor impairments; the need for technical support that, if available, may be costly and augment the third obstacle, cost.⁵⁵

45%

In 2002, 45% of adults in the general population surveyed by the Office of National Statistics reported they had never used the internet.

In 2002, 45% of adults in the general population surveyed by the Office of National Statistics reported that they had never used the internet. The main reason given was not affordability – indeed, only 7% of non-users cited cost as a reason for their voluntary digital exclusion. Rather, people simply weren't interested (44%), had no need (23%), or no desire (11%) to surf the web.⁵⁶ Later on in the same year and partly as a result of these findings, a report from the e-Envoy declared that the greatest barrier to Internet access was not affordability but a lack of understanding of the benefits of using ICT.⁵⁷

These statistics must be interpreted with care. Culture can quickly make a virtue of necessity, too often obscuring the root causes of exclusion. This may be why we still see graphs like Figure 1 on page 21.⁵⁸

However, the extent to which resistant attitudes to technology prevent people from even trying broadband should not be dismissed. Resistance is often due in part to unfamiliarity. The requisite skills to use the internet are fairly basic – reading, typing, manual dexterity and some hand-eye coordination. Yet the novelty of the interface to people who have not used the internet at work or at school can create a strong feeling that it's 'not for me'. This tendency, particularly prevalent amongst retired people, goes part of the way to explaining Figure 2 (opposite). And it is also important to remember that up to 20% of the UK population are functionally illiterate, which makes the text-based web an alienating terrain.⁵⁹

The costs of exclusion

'The arrival of new technologies tends to exacerbate already existing divides.'

*Robin Mansell, Professor of Media & Communications, LSE*⁶¹

Over time, the costs of exclusion from broadband are likely to rise. If you need ICT to get an education, a job, book a doctor's appointment, or fill in a housing benefit form then not having useable internet access becomes an obstacle to productive engagement in the world. As communities make greater use of the internet to share information, the inability to access such information could create barriers to community participation. Unwired individuals have greater challenges in maintaining and, perhaps, establishing connections to wider social networks – which are themselves a form of social advantage.

The government recognises the financial barriers to access for those on low incomes, and as a result has announced its intention to support the lowest income families in obtaining broadband access, beginning with those claiming the highest level of tax credit – about 3 million families.⁶² However, questions remain about whether this support is adequate, and about where more targeted support is needed for groups such as disabled people, for whom the digital barriers are very different.

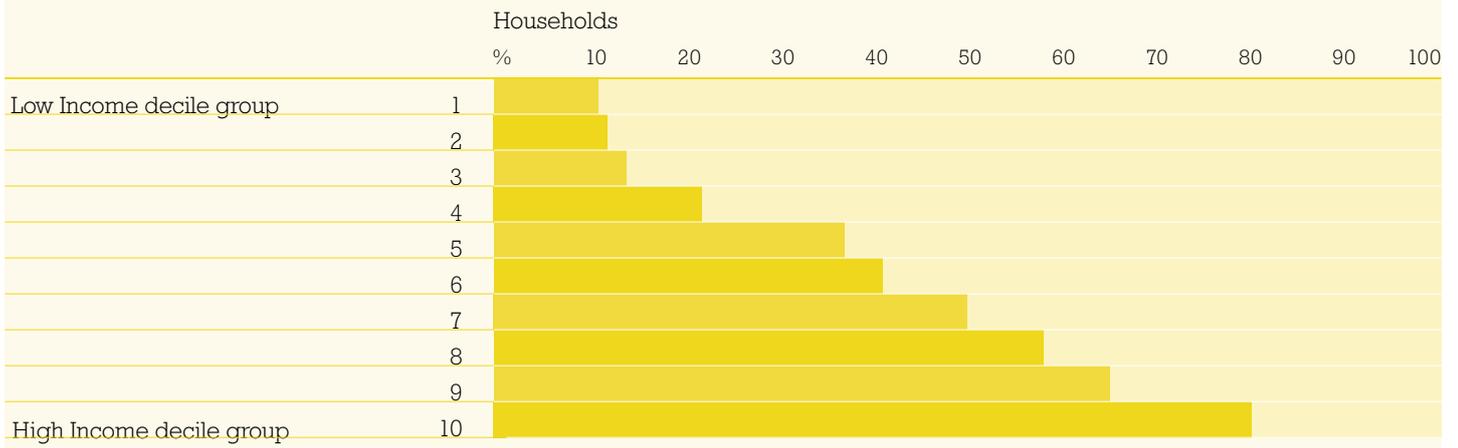
Closing the digital divide requires far more than simply reaching a wire to each household. In particular, the perspective of the user has too often been absent in debates about access. We need a much stronger focus on what people will use the internet for. Supporting the creation of three or four 'killer applications' could make a huge difference to people who are excluded from our online world – because it would help to make it meaningful in the context of their lives.

We may also need to think differently about how people access the internet and how they pay for it. For example, home access may not always be the ideal solution. Well-trained staff in public access centres can provide a human interface that can boost skills and confidence in the early stages of transition. As of 2003 there were 598 UK Online centres in rural areas, some of them mobile or run from accessible locations like the local pub.⁶³

598

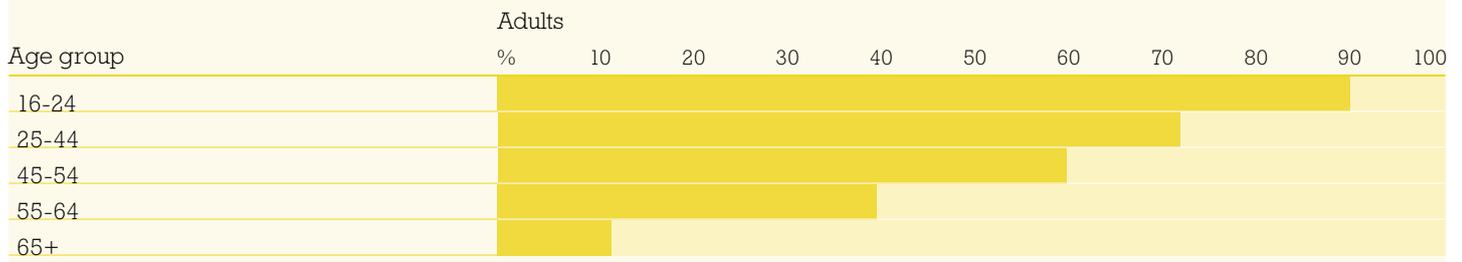
The number of UK Online centres in rural areas as of 2003. Some of these were mobile or run from locations like the local pub.

Figure 1 Internet access by income decile group, 2001–2002



Source: ONS, July 2002

Figure 2⁶⁰ Internet access by age, 2001–2002



Source: ONS, July 2002

5

The networked countryside

Policymakers are fond of analysing the relationships between places and things – for example, between rural areas and the rise of broadband. Most often, we ask ‘what will the impact be?’ The risk in such approaches is that places become passive objects, acted on by external agents.

This is often the case in analyses of rural Britain, which too often set the rural apart as a special case. And few forces are treated as so magical and uncontrollable as advances in technology. In truth, just as rural and urban areas blur into one another, so the relationship between places and the features within them is highly complex – each helps to shape the other.

In this dynamic situation, observing the ways in which different factors interact is more important than observing how they behave in isolation. While it is possible to look at the effects broadband might have in neat compartments, on economic activity, social life and so on, this will leave us no wiser as to what effects are most likely, and how we should respond to them.

The best way to understand broadband in rural areas is to acknowledge the messiness of the current situation. Too often, the idea that a situation is complex is seen as the end of the line, implying that we cannot do, know or solve something. In this case, however, the notion of complexity can help us to think differently about our analysis of broadband and rural areas.

Density and connectedness: the parting of ways

The function of communication and transport networks has always been to enable us to expand the circles through which we can exchange resources. Traditionally, communication required face-to-face presence, so that the greater the density of settlements in an area, the greater its connectedness. But for centuries, communications technology has been breaking down this relationship, and broadband has taken this process one stage further. For example, with sufficient fibre and some enormous servers, Google – the centre of the virtual world – could be run from John O’Groats.

The shift of sparsely populated areas towards greater levels of connectedness can be thought of in terms of three inter-related processes:

- Rural areas are increasingly using broadband to create supportive local relationships and to build social cohesion;
- Rural areas are accessing new resources and opportunities through broadband, changing the relationship between centres and peripheries;
- People and resources are moving out from urban centres towards the most connected rural areas.

We shall now explore each of these processes in turn, and consider how they may play out over the next ten to fifteen years.

The 'Netville effect'

Many rural areas are rightly proud of the resilience of local social, economic and organisational systems. From shops to social clubs, many local networks have been maintained over decades. In this context, it is easy to see broadband as a threat to local relationships. Many fear that accessing services online, from the home, will remove the social cohesion that is generated by friendly interactions at social and economic centres such as the post office.

However, in 1997, a housing developer in a Toronto suburb offered free broadband with every home in a new development, which was soon dubbed 'Netville'. In the end, only 50% of the new homeowners took up the offer, which provided anthropologist Keith Hampton a chance to study the role that broadband played in social behaviour. His findings were unambiguous: 'wired residents knew three times as many neighbours, talked with twice as many and visited 50% more of their neighbours compared to non-wired residents.'⁶⁴

Rather than eroding local social networks, therefore, online contact can reinforce them. Email is often used to extend face-to-face conversation, to add an afterthought or to arrange to meet up again. Using the web in these 'in-between spaces' becomes much easier with the 'always on' element of broadband.⁶⁵ In this way, online and offline communication can overlap and become mutually reinforcing. Recent polling in the UK found that a quarter of broadband users organise get-togethers online. While most of these are informal and social, a significant number are political, community or sporting events. In Netville, '...neighbours were organising face-to-face meetings via the internet and planning online campaigns at face-to-face meetings.'⁶⁶

31,500

UKVillages.co.uk was launched in April 2000 and covers 31,500 communities across the UK. In August alone it received 35 million hits.

This 'Netville effect' is evident in rural Britain, both in initiatives that have drawn people together to secure broadband and in those seeking to exploit existing connections. The benefits go beyond the social, helping rural people to work with one another to create economic and organisational capital. Calder Connect Co-op began in 2003 with 50 people meeting in a room in Hebden Bridge, West Yorkshire – an area not even assigned a demand trigger level for broadband. Today, they offer Wi-Fi broadband access for just £15 per month.⁶⁷ The co-op's organisers – mostly local entrepreneurs from micro businesses and SMEs – can see the wider benefits they bring to the area. 'We're doing something worthwhile and pioneering,' says their Chair, Anne Hadley. 'We wanted to do something for the community, but didn't want to be yet another charity shop; we wanted something new and exciting to do. Now we get to have meetings in pubs and put connectors in strange places like the top of church buildings. We're doing it because we think broadband is fantastic.'⁶⁸

Online initiatives of this kind can draw together valuable and disparate sources of information. UKVillages.co.uk provides an online forum for villagers to exchange information and create local dialogue. Launched in April 2000, the site covers 31,500 communities across the UK and received 35 million hits in August 2004 alone. It enables people to upload information about local businesses, community groups and events.

Broadband can also improve the efficiency of local businesses and organisations. The Fish Society, based in Merseyside, has six employees, all using broadband to work from their homes. According to Alistair Blair – ‘King Prawn’ and CEO – ‘we are always exchanging files – really quite big ones – which would simply not be realistic on a dial up connection.’ The company now updates its website almost daily at a fraction of the time it would have taken on dial-up. This enables them to provide special offers locally, tailored to their changing supplies.⁶⁹

However, such local benefits are not an inevitable consequence of broadband technology. To extract value from the technology, rural communities and those that serve them have to learn to align online networks with offline structures that may have remained unchanged for decades.

One phenomenon that is becoming more common in rural areas is the second office. According to Tim Dwelly of LiveWorkNet, while broadband makes it technically possible for users to work from anywhere, they face problems of loneliness, lack of technical support and isolation from new ideas and opportunities. New forms of office provision and other such hubs can be vitally important. Defra, for example, is in the early stages of designing a ‘new social and country programme’, ‘involving co-location and co-delivery of services in rural areas.’⁷⁰ Broadband makes it possible not simply to centralise services but to re-configure networks of public provision.

For example, Hudson House in Reeth, Swaledale, was set up by entrepreneurial local people after their bank and single local store both closed. Hudson House now provides business support, broadband access and accommodation for the Police and district council, both of whom had previously withdrawn from the area. An ICT training centre and a community transport project also run from the building.⁷¹ Local authorities are learning to work with these kinds of social enterprises. Soon we may see the rich information created at a local centre like Hudson House flowing through broadband into existing council services.

New kinds of community

Broadband is changing the ways organisations function. For example, the Charities Network is a consortium of 60 charitable projects that connect through a Virtual Private Network (VPN). Their head offices are in London, Wales and Sheffield and they share a common client information database in Nottingham. Some employees are given a VPN connection enabling them to work from home. Such relatively low-cost provision of company infrastructure is a powerful boost to the success of small organisations, which derive strength from their capacity to work together.⁷² Overcoming distance in this way provides enormous opportunities for organisations in rural areas to connect and collaborate in ways that were previously unthinkable.

These shifts also have social and cultural dimensions. Currently, less than 1% of rural dwellers and rural visitors are from ethnic minorities.⁷³ This has produced what Trevor Phillips of the Commission for Racial Equality has called the 'passive apartheid' between urban and rural areas. Can online activities affect this picture? Potentially, they could alter some of the forces that shape the social and ethnic mix of rural areas.

For example, in Cybermoor, researchers found that 25% of lone parents use the internet to work from home, while half of disabled respondents in employment use their broadband connection to work from home. A local resident, Monty Peach, paralysed after an accident, now uses the internet to participate in the reading panel of a number of publishing houses.⁷⁴

Broadband could also help to revive and strengthen rural economies in accessing new resources, ideas and customers. Vivian Olds, a 100-year-old Cornish family butchers, still runs from its original premises in Penzance. Having installed a Wi-Fi broadband connection, and linked up with a local web designer and transport company, they now sell boxes of their organic meat to customers across the UK.⁷⁵

Threats from the hubs

Low population densities in some rural areas have made them no-go areas for organisations that rely on economies of scale, such as supermarkets. However, as a greater number of social and economic transactions take place online, this is beginning to change. In turn, this will have a significant effect on the character and in some cases the sustainability of local rural systems.

Relatively marginal interventions into fragile local economies can have serious consequences. Each closure of a shop or public service makes the next more likely.⁷⁶ A recent report from New Economics Foundation describes what is required for more sustainable local economies: 'Suppose you painted a pound coin blue and watched where it went. Every time it changed hands within a community, it meant income for a local person. If the blue paint were to come off onto people's fingertips, how many people would have blue fingers before the money finally left the community? The more times it changes hands, the better for that community.'⁷⁷

30,000

The number of local economic outlets lost from 1995 to 2000.

The New Economics Foundation argues that we are witnessing a quiet drift towards 'Clone Town Britain,' with big businesses driving local businesses out and lining the main streets of towns around the country with an identical range of shops. 'If you combine the decline in the number of banks, post offices, pubs, food retailers and general non-specialised stores (usually corner shops), what emerges is a cumulative loss of over 30,000 local economic outlets in the five years to the year 2000 alone.'⁷⁸ Smaller outlets of larger franchises are replacing local stores. For example, there are currently over 100 Tesco Express stores, and the company plans to open a further 1000 such outlets over the next five years.⁷⁹ Already, of every £7 of retail spending in the UK, £1 is spent in Tesco.⁸⁰

These trends are driven by a number of factors. Policies on planning and taxation have favoured large-scale business over smaller retailers.⁸¹ Independent shop owners face difficulties in matching the economies of scale afforded to large supermarkets – for example, investments in large industrial ovens or new labour-saving technologies. And large organisations have greater capacity to adopt and exploit ICT.

12%

Up to 12% of people interviewed use the internet for shopping, banking, etc.

Yet something less tangible than financial capital is also at stake from business franchises – namely, local character, diversity and autonomy. When a supermarket's arrival brings the closure of local shops, local people become uniformed workers in uniform shops like Tesco, Woolworths and Boots. Even the aesthetic appearance of town centres becomes created by design decisions made in distant, urban, corporate headquarters, rather than by local people.⁸²

A recent report from Newcastle University argued that market towns face a major threat to their economic future from the internet and out-of-town shopping. Up to 12% of people interviewed used the internet for shopping, banking and so on instead of visiting the nearest market town, for reasons of ease and convenience.⁸³

The challenge is to strike the right balance between the expansion of rural and urban networks. For example, support for SMEs may be vital. 'The notion of using ICT would be great as a supplement if we actually promoted local businesses in real life,' argues Kate Oakley of Local Futures. 'Britain has an undiverse and non-local consumer culture. We can do more to give local SMEs access to real high streets and real customers. . . In this context, getting online is fine, but so what? Trying to bring back the dead online is plain cockeyed.'⁸⁴

6

The urban outshift

After a period in the city, ever larger numbers of professionals are seeking a higher quality of life in rural areas. These 'inward migrants' tend to be wealthier and better educated than indigenous populations, creating both opportunities for economic development, but also threats of rising house prices and social divisions. But migrants can also be entrepreneurs, bringing vital new businesses and investment into local communities.

For centuries, the city has maintained a powerful gravitational pull on people and resources. Yet while 75% of the population live in urban and suburban areas, 54% say that they would rather live in the countryside or a village, and 72% think that they would be happier anywhere but a city, according to a Gallup survey.⁸⁵

Migration trends throughout the last century were characterised by rural-to-urban and north-to-south people flows. Yet for the past thirty years, the exodus of people moving from cities into rural areas has gathered pace. Rural in-migration in the UK is now outstripping North to South migration at a rate of 4:1.⁸⁶ The lure is clear: people want a better quality of life than can be found in cities.⁸⁷

4:1

Rural in-migration in the UK is now outstripping North to South migration at a rate of 4:1.

An Aberdeen University study of in-migration in five rural areas across the UK found that 48% of in-migrants were under 40.⁸⁸ A similar study in 2002 found that nearly 50% of those migrating to rural areas were aged 25-44.⁸⁹ They are also comparatively wealthy. The Aberdeen research found that 41% of incomers earned over £25,000 a year, with just 13% of locals in this bracket.⁹⁰ 70% of incomers were economically active. 'These are all high value-added knowledge workers who begin with a considerable stock of social capital,' says IPPR's Will Davies.⁹¹ Tony Champion of Newcastle University agrees: 'People often move out to commute in to their City job, then wind the job down but turn themselves into consultants and work from home.'⁹²

Why now? The dream of tranquil country living has not suddenly emerged. The Economist reports that in 1939, 61% of people wanted to move to rural areas – yet at that time, national migration flows ran the other way.⁹³ There are strong correlations between the characteristics of in-migrants and those of ICT enabled mobile workers, suggesting that changes in working culture, partly enabled by ICT, are driving the urban outshift.

Yo-yos, pendulums and nomads

'Employees want more human organisations with greater autonomy and flexibility... In short, they want organisations to 'disorganise.'⁹⁴

Organisational cultures are shifting. The bureaucratic, hierarchical structures of old, in which management would impose control over not only what workers do but how, when and where, are beginning to dissolve. Networked organisational structures are growing up in their place, with increasingly flexible relationships between employers and employees

hinged by mutual trust. One product of this shift is that more employees are exercising greater autonomy over where they work – and in many cases it is broadband that enables them to seize this freedom. Between 1997 and 2001, the proportion of people teleworking shot up by over 65%, to 2.2m people.⁹⁵

65%

The proportion of people teleworking increased by over 65% between 1997 and 2001 to 2.2m people.

Such freedoms are still a privilege rather than the norm, and tend to be enjoyed by graduate and professional knowledge workers.⁹⁶ In the US, where teleworkers' mean income is 66% higher than the national average, 12.5% of the workforce telework. 40% say they would like to but don't think that their employers would allow it.⁹⁷ Researchers have identified five types of mobile workers, including Yo-yos who occasionally work away from a fixed work location; Pendulums who work alternately at two locations – say, the rural home and the urban office; and Nomads who work at changing locations.⁹⁸

What does this mean for rural areas?

'What does broadband mean for local areas? Money. Holding onto the people who commute 2 days out of 5.'

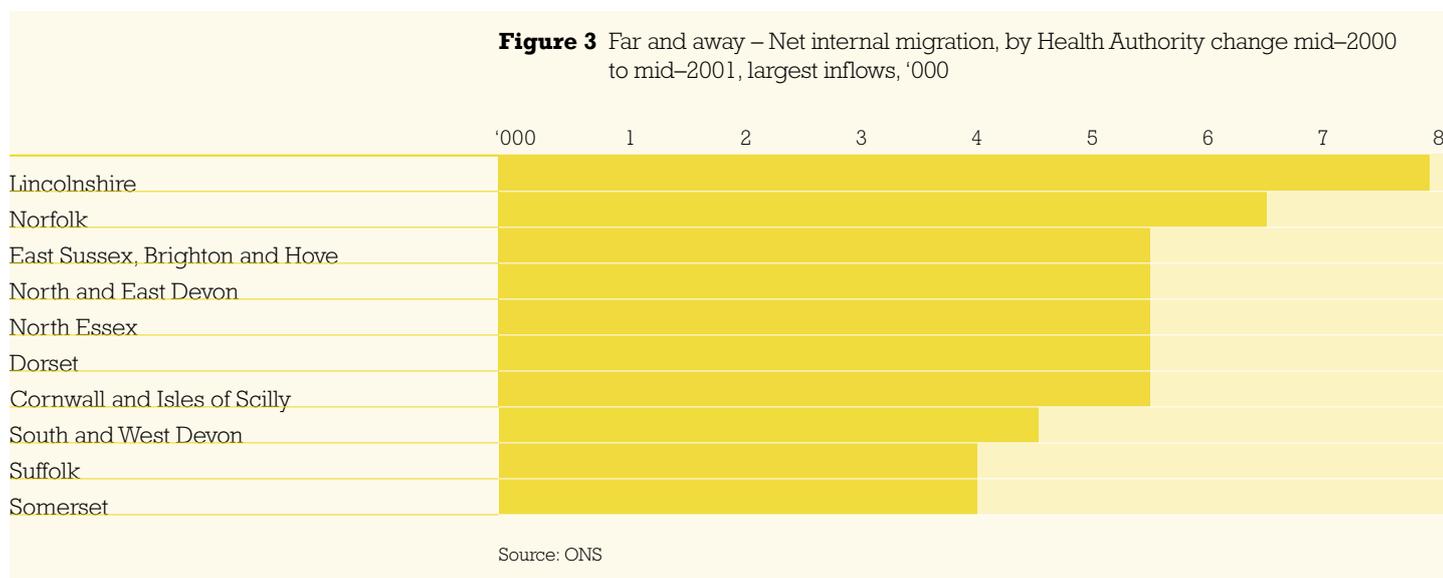
*Nigel Heriz-Smith, Head of DTI/Defra Rural Broadband Unit*⁹⁹

In-migrants to rural areas can boost local prosperity. They can bring new social connections and cultural influences in their wake. By boosting populations in sparse areas, they can help to create a more sustainable demand for local services and local employment. But migrants' multiple community and consumer loyalties may mean that they do not spend their money locally.

Furthermore, the employment that migrants do create may only be in basic services. In the areas studied by the Aberdeen University team, part-time job creation could be linked directly to in-migrants, but 45% of those jobs were cleaners and domestic help.¹⁰⁰ Where affluent knowledge workers arrive from the city and simply employ local people to look after their houses, gardens and children, social divisions are likely to be exacerbated.

Such problems are not new: in-migration has long generated negative perceptions. Yet these impacts depend on the particular type of migrant that arrives. The Aberdeen research found that 15 – 25% of migrants were self employed microworkers or entrepreneurs who set up SMEs locally. They created an average of 2.4 local full-time jobs each, with 12% employing up to four employees and 7% employing five or more employees. In-comers who set up businesses locally develop greater interdependence with their new homes, in the wider sense of the word, and as such are likely to invest more in the vitality of the local community. These are the migrants that rural areas should be working harder to attract.

The London commuter belt is largely saturated: property in Surrey, Hampshire, Berkshire and Buckinghamshire is just as expensive as in London, and councils are reluctant to let developers build.¹⁰¹ As a result, migrants are going further afield, as Figure 3 illustrates.



Self-employed migrants tend to have greater freedom to go beyond established commuter belts. Lifestyle migrants will go first to areas which are attractive, which have good services, leisure and entertainment facilities and, crucially, which are well connected by transport and broadband infrastructure. There is a widespread hope that incomers will contribute to the demographic and economic revival of depopulated rural areas – and as we have seen, there is strong evidence to support this optimism.¹⁰² Yet the rural areas most in need of regeneration may not attract the migrants they need.

Manuel Castells argues that ICT will drive economic growth 'by selectively linking valuable segments and discarding used up or irrelevant locality and peoples.'¹⁰³ We can see this happening in contemporary migration patterns within the UK. In the Aberdeen study, for example, the job creation potential of migrants differed significantly between areas. The place in most need of job expansion, the former industrial area of the Wear Valley, 'attracted the fewest self-employed migrants and accordingly was associated with the fewest new jobs.'¹⁰⁴

Limits to the urban outshift

There is some evidence that the urban outshift is made up of organisations as well as individuals. The Scottish Highlands, for example, are experiencing an economic regeneration not only from urban professionals, but also from companies enjoying the combination of ICT connectivity, lower overheads and higher staff loyalty.¹⁰⁵ However, there

are strong reasons why we should not expect to see a wholesale dismantling of settlement patterns. Knowledge-based and creative organisations generate strong forces of gravity between them that broadband is unlikely to weaken.

This clustering force finds its substance in the importance of intra-sector and inter-sector networks. Organisations need to be close to a healthy supply of skills and related organisations, not to mention good transport infrastructure. To take a well-known example, research has noted the importance of the lawyers, venture capitalists and marketing firms that have grown up to support the core firms of Silicon Valley.

More importantly, however, is the role of trust in professional networks. Gaining contracts requires trusting relationships, and for this, face-to-face contact is vital.¹⁰⁶ Ideas flow in the trusted connections between people that have been carved out by face-to-face contact. 'People and ideas move in similar directions...' argue network theorists John Seeley Brown and Paul Duguid. 'Ideas cling very closely to people and travel along rails built by practice.'¹⁰⁷ It is for this reason that, after an initial period of work in the city, professionals are able to move with their families, their CVs and their contacts book into pleasant rural areas for the next stage of their lives. Using ICT to maintain these channels of trust that they have carved out in person, at work or at parties in the city. The organisations they continue to work for as employees or consultants, however, are likely to remain huddled together in cities.

The importance of this urban outshift, and its potential for good and bad effects, may mean that we need to think differently about the UK's infrastructure. Broadband may add to the pressures on government to do more to improve housing supply, service provision and support for entrepreneurship.

For example, many northern settlements of Canada simply wouldn't exist without government subsidy and periodic huge investments in transport infrastructure. This is a site of big debate every election, but no government has been able to remove that investment. According to Professor Robin Mansell, this infrastructure is 'a necessity of the Canadian way of life: without it, we'd all have to live on a narrow strip along the North American border.' Mansell thinks that Britain as an island nation faces similar issues that remain unaddressed, yet which leave the majority of us huddled, rather reluctantly, in crowded clusters.¹⁰⁸

The question is whether broadband will accelerate the dissolution of these clusters. How will it affect a thirty-year-old process of rural residents being pushed out by new commuters and second-home buyers? The dilemma is clear, according to Moira Constable of the Rural Housing Trust. 'If we don't build affordable housing in the villages, everybody will migrate. They will have to.'¹⁰⁹

7

Three scenarios for 2020

Scenario 1: Internet-anywhere countryside

Rapid adoption of mobile internet equipment obliterates traditional distinctions between urban and rural, creating many different kinds of countryside. Town and country boundaries are replaced by a new digital patchwork, in which some rural areas prosper, rapidly attracting entrepreneurship and investment, while others witness a hastening of their decline.

Background

In 2009, a small firm based in rural England made a breakthrough that would have a lasting effect on the way people across the world accessed the internet. They created a mobile device able to roam seamlessly from one internet access platform to the next, from Wi-Max, to Wi-Fi to 4G. As a result, mobile hardware finally took off. The realisation of flexible working changed the countryside forever.

With wireless connections now ubiquitous, the great commercial gamble on Wi-Max pays off. Having been on the brink of bankruptcy following the failure of 3G, mobile operators wagered everything on Wi-Max, despite uncertainty about its ability to deliver. The UK's resulting head start bumped great swathes of the UK into the premier league of global bandwidth. Wi-Max did what it had always promised, ending the digital inequalities between rural and urban areas.

The Wi-Max platform swept other infrastructure before it, with digital TV eventually superseded by broadband TV. As a result, the next generation of PCs finally displaced the television at the heart of people's homes. Most domestic PCs now served as home servers, entertainment centres and wireless hubs.

The Government claimed vindication for its policies. It had stuck to a strictly demand-side approach to broadband, allied to investment in innovation. It had also supported community broadband initiatives across rural areas, to help individuals aggregate demand and function as local ISPs. Trumpeting the ability of national politics to deliver locally, the e-Minister posed with a group of Highlanders 'digging for bandwidth' as they built the foundations for the final Wi-Max base station.

However, in a world of 'internet anywhere', there was a striking irony. Just as technology meant that people could live, work and socialise wherever they liked, so the social significance of where they did so grew. Place remained as significant as ever, and divisions of wealth and status were increasingly mirrored by settlement patterns. While bandwidth could go anywhere, demand varied heavily from place to place, trapping some communities in spirals of low use and high prices. These areas tended to be suburban rings around city centres, which lacked both urban cool and rural exclusivity.

Technology

A new generation of devices capitalise on the ability to roam across the radio spectrum. 'Open hardware' engages people in the practice of wireless internet, rapidly creating a market for ubiquitous computing. Broadband-enabled 'smart cars' revolutionise not only the experience of travelling but also the public services around them, logging onto council servers whenever they hit traffic congestion or a pothole. Car-share schemes, drawing on sophisticated open databases, complement public transport.

As voice-over-IP became the norm, the term 'tri-band' is resurrected for the Wi-Max/Wi-Fi/4G generation of mobile device. With call costs tumbling, the British love affair with the mobile phone continues, but they now come in all shapes and sizes, with hundreds of different uses. With the dominance of mobile technology, RFID chips are everywhere. From pets and cattle to school children's shoes, the idea that we can find things online is now second nature.

Economics

The growth of the knowledge economy starts to meet the more optimistic predictions of the late-1990s. Unlimited bandwidth creates a nation of proactive 'netizens'. A large independent industry of software and web production grows up, based on hundreds of thousands of open source contributions from professionals and amateurs alike.

Abundant and mobile bandwidth has brought much of the educated, creative class to the countryside, attracted by the environment and quality of life. These entrepreneurs and investors breathe new life into rural economies around the most beautiful parts of the UK's countryside.

In some areas, retail experiences a renaissance, as social software enabled viral marketing to grow exponentially. In more exclusive rural areas, the role of shops diminishes, as consumers pool their purchasing power. Broadband fridges that use RFID chips to monitor their contents, and co-ordinate purchasing and delivery are commonplace.

Government and public services

Government plays a demand-side role in the broadband market, providing 'broadband vouchers' for people on low incomes, in order to boost uptake. Meanwhile, citizens' media outstrips all expectations. Local residents now video-conference with staff, patients with doctors and parents with their childrens' teachers.

However, while some councils ride this wave of innovation, others lose legitimacy at its hands. This adds to the diversity and divergence within rural Britain. With an ageing population, rural public services become over-loaded, as there is increasing polarisation between areas of affluence and disadvantage. Among those still unaffected by the 'digital renaissance', are many thousands of the poorest elderly people, provision for whom is under most strain. Meanwhile, in areas with a legacy of community self-help, co-production drives service quality. As farm watch schemes create peer-to-peer 999 services and networks of out-of-school hours childcare, better services and the social capital they rely on grows hand-in-hand.

Society, culture and politics

With the growth in the use of RFID chips and tracking technology, there are accusations in the press of a 'panopticon society'. But as the surveillance culture blends with a growing awareness that an area's prosperity can erode as quickly as it builds, so an informal social pressure to 'live right' and contribute to local communities grows. Nimbyism becomes an even more powerful force, making governance around issues such as the environment extremely difficult.

However, this activism has another side, re-engaging citizens in a new, 'conversational' democracy. Broadband users' hands have moved from the mouse to the keyboard, creating a key shift in UK democracy.

Scenario 2: Villages of Bits

Liquid bandwidth drenches the countryside. Universal coverage allows e-government to grow rapidly. But services are automated rather than transformed, as commerce-driven hardware encourages broadband use focussed on individual consumption. Populated by growing numbers of commuters and home workers, the countryside increasingly resembles a nature reserve.

Background

Following a series of technical failures that shocked investors, it took until 2018 for Wi-Max to finally prove itself as a platform for rural broadband access. Its ability to provide very high bandwidth across thirty miles was a relief to policy-makers, who had shied away from interim solutions in lieu of the technology. Now they proclaimed that they had delivered on their promise of high bandwidth for all who wanted it.

However, much had happened in the meantime. The success of 3G had drawn critical mass away from Wi-Fi, so that community broadband provision tailed off by 2010. With wealthier rural dwellers happy to pay for expensive but convenient mobile data cards for their laptops, the common interest needed for local initiatives dissipated.

As people from the cities moved out to the countryside, their demands for high-speed broadband were muted by their satisfaction with interactive television. By 2010, the record-breaking rise of the DVD player had been eclipsed by that of High Definition TVs (HDTV). Analysts were astounded by the amount of money those on low incomes were willing to spend on these next generation televisions. This reinforced the universality of the platform, so that for tax returns and prescriptions, viewers needed only to 'press the red button'.

When Wi-Max arrived, therefore, users were already financially and emotionally committed to interactive television. Commercial providers realised that only by integrating its use into the HDTV platform could they recoup their investment. Televisions, like mobiles before them, became people's gateway to the internet. 'Triple play' – purchasing and accessing voice, video and data through one channel – had arrived, reducing costs.

But the combination of clumsy interfaces and consumer inertia meant that the new level of commercial competition it promised never materialised.

With the average commute longer than ever, work-life balance became a powerful political issue. Invented to close a digital divide that had long ago disappeared, Wi-Max became little more than a tool for faster movie downloads.

Technology

After decades of buying PCs, the public turn their back on them. The laptop remains a symbol of professional work, used by a minority of rural home-workers. In contrast, the British love affair with the mobile phone continues. RFID tags enable phones to function as credit cards and passports, placing them even closer to the heart of consumers' personal identities. Smart phones learn users' routines and those of their friends, helping people to socialise and share interests with like-minded people. While online communities are mocked as kitsch science fiction, invisible social software is everywhere. As a result, household Wi-Fi servers are strictly for the enthusiasts, as mobile-based 'lifeblogs' begin to organise people's lives.

Broadband-enabled devices range from internet radios to washing machines that call a plumber when they break down. However, like the electric motor before it, broadband's ubiquity is hidden – users understand no more about bandwidth than they do about electricity. The sheer diversity of access devices balkanises the online world.

Economy

Without a large enough domestic market for innovative digital applications, the UK has fallen behind in the global knowledge economy. Caught in a vicious circle of relatively low bandwidth demand and a lack of high-quality home-grown applications, levels of innovation slow down. All the centres of digital production are elsewhere, making the online world less engaging to UK citizens.

New entrepreneurship in rural Britain is limited, and SMEs struggle. The countryside is increasingly a preserve for those who live and holiday within it. While supermarket deliveries have brought convenience, dormitory villages struggle to generate their own wealth and employment.

On the positive side, Britain remains one of the world's most popular tourist destinations. Squeezed from the high street into market towns, Britain's fashion and cultural scenes begin to draw people into the countryside rather than away, causing the domestic tourism sector to flourish. However, development aimed at the tourist and residential markets creates its own economic tensions. Cycles of 'slash and burn development' cause aesthetic and environmental damage to parts of the countryside.

Most spectrum remains licensed. As prices continue to rise, spectrum becomes more structurally important to government finance. This complicates policy-making, as government and mobile operators'

fortunes become further entwined. The lasting importance of closed mobile infrastructure ensures electronic networks are primarily a site for commerce.

The nature of this shopping has stayed much the same. Providers have been unable to create business models for digital services, so that online shopping continues to be simply about purchasing products. The resulting focus on the price of goods leaves large conglomerates free to dominate the mass market, with specialist and niche local suppliers filling the few gaps that they leave.

Government

The government's 'access first' policy on broadband has ensured that few people are without broadband access. Electronic services are used by the vast majority of the population, improving both efficiency and levels of public satisfaction. With the growth in m-democracy, mobile operators have become key deliverers of public services. From ID cards to public information to health checks, operators are key to the design and delivery of services.

However, government remains transactional rather than conversational. Regular 'text vote' plebiscites measure citizen responses, but activist community initiative declines. People appreciate the personal feel and convenience of the MyGov channel on their televisions, but distrust of politics and politicians continues to grow.

Society, culture and politics

The success of m-democracy preserves the political status quo. Political parties remain and a compromise over the House of Lords' composition is quickly taken for granted. As authority ebbs away from politicians, celebrities play a stronger role in elections and political debate. This further strengthens the centralism of the UK's political culture, reducing the voice of rural areas.

Away from politics, and rarely with any geographic basis, online clubs and societies remain very strong. The 'schools reunited generation' is constantly plugged in to a wide range of friends, and are far more aware of the social networks that they develop over the course of their lifetime.

While for many this is a sign of social cohesion, weak and distant ties can easily be lost. As the significance of place declines, old patterns of checking on elderly neighbours are replaced by telephone and email. Problems of hidden rural deprivation remain, putting considerable strain on public services despite continuing investment.

Government investment in fibre infrastructure has brought high bandwidth to both the city and countryside. However, despite universal access, inequalities in the use of the internet have grown. As a result, the digital divide has been superseded by a growing social divide between rural and urban areas.

Scenario 3: FiWi World

Background

In 2010, the UK Government refused to make sufficient spectrum available for Wi-Max. Instead, they pressured BT to speed up fibre roll-out. BT was divided into two companies, with infrastructure separated from the rest of its business, but the resulting chaos within the sector saw development slow. As a result, rural broadband was increasingly starved of investment.

Against this background, rural digital exclusion went from being a minor policy headache to a major political issue. As the 'right to fibre' campaign gained political momentum, the Government agreed to invest billions in a state-backed fibre roll-out.

Billed as a water-shed in the history of rural Britain, this investment was justified to taxpayers on the grounds that it would ease pressure on housing, transport networks and the environment by promoting tele-working and clusters of rural enterprises. Rural areas braced themselves for an influx of ambitious entrepreneurs.

Technology

Government and industry worked together to exploit existing 'dark fibre', and to lay thousands of miles of new fibre, and FiWi broadband became the norm. With the vast majority of the UK population now living within 500 metres of fibre, and the rest covered by improved 'meshing' technology, problems of rural access were solved.

Local-loop unbundling saw super-fast broadband hit urban centres first. After 2010, it had quickly become apparent that the South Korean experiment had paid off – the social benefits of high bandwidth far outweighed the costs. And thanks to state investment in fibre, Britain's urban centres were increasingly able to play catch-up.

By 2015, the vast majority of homes have multiple computers, with knowledge about how to configure them having spread rapidly. Home Wi-Fi systems are commonplace, with servers acting as the household nerve centre, connected to heating and security systems.

However, the rise of the 'searchable city' brings new challenges for rural areas. Cities have become unrecognisable. Signposts, for example, are increasingly rarely seen, as layers of location-based virtual information replace them. Such developments require thousands of people in close proximity. Yet it is these economies of scale that rural areas lack. As a result, as a new generation of city-specific online applications hit the market, a new digital divide opens up, based not on cities' comparative density and wealth, but on the richness of their social and economic networks.

Economics

The economic divide between urban and rural intensifies. In cities, investment in fibre has paid off. There are thriving communities of knowledge workers, commanding top salaries. However, barriers to entry are extremely high – competition is fierce and opportunities are few. The era of 'open source everything' has failed to materialise. Only professionals can keep pace with technology, and this intensifies the brain drain from the countryside to the town.

Because so much of the fibre infrastructure has been paid for by government money, local authorities are able to open up municipal Wi-Fi. For them, the primary objective is to connect public servants, making them more efficient. However, this also boosts the private sector, helping cities to attract investment over their rural neighbours.

The 2012 Second Kyoto Protocol has created a fresh wave of tough environmental targets. Subsidies to local, organic food production are reinvigorating British agriculture, increasing the amount of land considered 'working countryside'. This trend is boosted further by national and local road charging, which sees the cost of transporting goods rise rapidly.

Government

Ubiquitous bandwidth enables the transformation of public services. Rural schools become wireless ISPs, and increasingly draw together services on one site, and a network of second offices have sprung up next to schools, enabling workers to benefit from high bandwidth and, for many, proximity to their children. From these hubs, people can access online consultations with doctors, social workers and employment advisors. With many older people in the countryside, these school-offices have also developed provision for the elderly. School children and working people alike have become used to socialising with or caring for elderly people as part of their daily routines.

Government uses a universal service obligation on ISPs to create a range of pay-as-you go payment options and to connect even the cheapest form of access to essential online services. They work with the IT sector to develop 'value PCs' to ensure that PCs are available for all.

Society, culture and politics

Climate change had become the most important political issue by 2012, with huge consequences for the countryside. Today, the primary crop is energy, as the UK strives to meet its new 40% target for emissions reduction. For many farmers, this enabled something of a renaissance.

However, while demand for 'green travel' has boosted the rural economy, the price of commuting to work in cities trebled. Faced between committing to home-working or remaining within the city, most chose the latter, and the urban outshift stutters to a halt. As a result of this geographic polarisation, social and political divisions between urban and rural areas grow.

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