

Pushed to the Periphery?

ICT Futures Paper

Mid Wales Partnership

*The aim of **Mid Wales Partnership** is the promotion of economic regeneration within the Mid Wales region.*

This paper has been written to provide details on ICT (Information and Telecommunications) critical strategic issues affecting Mid Wales and the possible steps that can be taken to address them. It is intended for a wide readership. In particular it is for those who wish to consider what they can do to assist in addressing these issues through their work and other roles.

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Acknowledgements

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Pushed to the Periphery? Mid Wales Partnership: ICT Futures Paper:



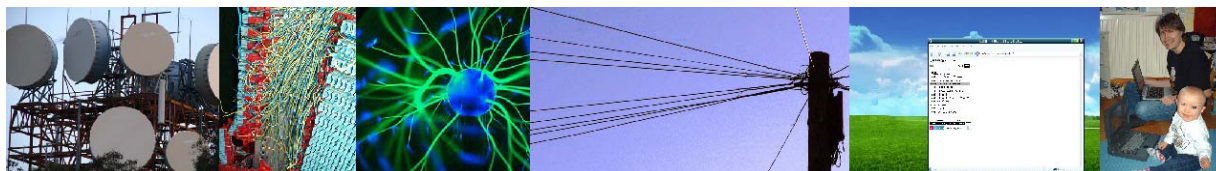
Executive Summary

"People lack many things: jobs, shelter, food, health care and drinkable water. Today, being cut off from basic telecommunications services is a hardship almost as acute as these other deprivations, and may indeed reduce the chances of finding remedies to them"

UN Secretary General, Kofi Annan.

- ◆ A High-Bandwidth affordable data communications infrastructure to businesses and homes is not available across the majority of mid Wales
- ◆ Information and communications technologies are converging e.g. telephony and digital TV broadcasting, a High-Bandwidth data communications infrastructure is required to deliver the convergent technologies to all
- ◆ Existing Broadband services are far from ubiquitous and are too slow to support the new convergence of technologies, content, services and applications that will be provided
- ◆ A High-Bandwidth data communications infrastructure is not seen as being as critical and as important as roads and other infrastructure services, yet can offer the greatest economic, social and environmental gains
- ◆ The newly developing Information Economy, and work and leisure interests, will require a High-Bandwidth data communications infrastructure to all parts of mid Wales if it is to compete in a national, international and global economy
- ◆ A High-Bandwidth data communications infrastructure development will assist significantly in bringing higher value added activities for the mid Wales area and will have a significant impact on economic growth
- ◆ Telecommunications data services will become a key ubiquitous utility service, giving a competitive economic and social advantage, similar to the birth of the electricity supply and will support many new businesses as economic activity is increasingly becoming location-independent
- ◆ Many applications, activities and services provided in everyday life will become increasingly reliant on High-Bandwidth communication networks such as e-Health applications
- ◆ There is clear market failure in the provision of affordable high bandwidth data services to all homes and businesses across Mid Wales

Without planning and investing now for a ubiquitous fit for purpose High-Bandwidth data communications infrastructure in mid Wales there is a very serious risk of a "digital divide" between urban and rural areas emerging – a gap between information rich and information poor – between services, content and applications being available to the "rich" and not the "poor", between mid Wales playing a central part in a national and global economy or being pushed to the periphery



Where we are now

Being in a rural area of mid Wales cut off from accepted affordable urban high speed broadband telecommunications will be a hardship as more and more services, information and support are delivered via high speed telecommunications.

Mid Wales requires appropriate infrastructures to ensure the success and prosperity of the region. This applies equally to technology infrastructures as it does to traditional services such as roads, water, waste, power and so on. People in mid Wales rightly expect to live in a modern society with the same opportunities and life choices as those living elsewhere. In all areas of infrastructure it is recognised that there need to be different solutions in rural areas, but this should not mean the lack of a service and consequently of the benefits it may bring. Technology is the one area where we do not yet have the appropriate and necessary infrastructure (and associated levels of utilisation and support), that we know and expect from other services. The road analogy is useful: whilst we do not have (or need) motorways in mid Wales (because of lower traffic density) the road network does allow for the passage of all necessary traffic in a reasonably timely and appropriate fashion, and is upgraded when necessary to meet new requirements (for example when lorry axis weight restrictions were raised in the EU, bridge strengthening/rebuilding was scheduled across Wales).

Nationally BT is celebrating breaking through the ten million broadband barrier, thus smashing the initial target of five million connections by the end of 2006. However, this news story does not recognise the inequality of provision between rural and urban areas, especially in terms of higher bandwidth provision.

This paper has been developed by the ICT Advisory Group of the Mid Wales Partnership in order to summarise the current context of ICT in Mid Wales and to look at opportunities and solutions. Following a 'Think-Tank' meeting in September 2006 this document has been extended and developed using on-line development tools within the Advisory Group, and the wider membership of Mid Wales Partnership. It is intended to inform future actions.

Telecommunication Infrastructure & Utilisation

Soon Wales will be at the point where all telephone exchanges in Mid Wales are enabled for first generation broadband, and there is work in hand to fill in the black spots (too far, inappropriate wiring etc.). This is covered by the Welsh Assembly Government RIBS project and it is to be hoped that the 'black-spot' solutions are simple and user friendly and so appropriate to the end user. Solutions involving the necessity of community group support and so on are not necessarily going to fill in all the necessary holes, nor provide the standards and

ease of service that customers require. However, this work does not then consider bandwidth beyond basic broadband designation, and sooner, rather than later, users will require this.



Larger businesses, by and large, now have the access they need to broadband services. Will the network be able to meet increased needs? Probably, yes because these companies can make the necessary payments for individualised provision. There is concern that smaller businesses and sole traders may be caught in the same traps as home users. Will we reach a position where certain bandwidth is only available at affordable prices in certain locations? Will businesses need to relocate out of very rural locations because of this? This is counter to the arguments that technology allows people to remain in their communities and be economically competitive.

Telecommunications have a role to play in rural areas that will always surpass that in urban areas. Access to information, communication systems, entertainment etc. etc. have traditionally been more difficult in rural areas because of remoteness, distance and volume – all can be overcome by telecommunication.

Topography creates its own problems. Wireless communications is an option in many areas but the topography might mean 5/6 wireless 'hops' to cover a distance that in Cambridge would be a single hop. Current licensing models would make the service 5/6 x more expensive in the Welsh scenario.

Similarly topography limits mobile phone reception, it also affects satellite television reception and digi-box reception. Given the fact that television is seen as a public service and should be accessible to all, how are the TV digital 'black-spots' in Wales going to be filled when the analogue signal is switched off in 2007. It is important to recognise that the ICT debate does not just involve terrestrial (or alternative) access to internet services, but equally is concerned with mobile phones, digital television and radio.

Many of the reports in Appendices 1 & 2 raise the very real concern that bandwidth (rather than broadband itself) will become an increasing problem. Home users will want to use greater bandwidth for entertainment, video-calling, gaming and so on, public bodies in rural area will want to use broadband to relay CCTV footage (from point of capture), video conference, provide public information in an accessible format, health services will require sophisticated end-user services at locations close to patients, businesses will need to be able to compete in an increasingly sophisticated market place, education will utilise distance learning in range of interesting and interactive formats.

In rural Wales economic, social and environmental issues are intertwined and





similarly the solutions. Cutting edge technology has the potential to strengthen local communities through better information networking and joint activities, to solve social difficulties created by remoteness, to reduce environmental impacts via remote working, remote reporting etc, and to enhance the economy. It should therefore be seen as a major priority.

How is it that a country such as Bhutan now has a more or less comprehensive telecommunication network (despite its rurality and topography) and Wales does not?

Although service provision is still a major issue, there is also much work to be done to ensure that maximum opportunity is made of services when they do exist.

The development of cutting edge infra-structure cannot be demand driven, it needs to be ahead and actually drive demand. If we look at the M4, it was built purely to increase transport/communication speed, but has generated new business areas, new housing etc. etc.

We need to ensure we have sufficient human expertise within the Region to support and capitalise on the opportunities, both within businesses and also in support businesses and consultancy.

Questions

- ◆ How will the remaining gaps in the broadband map of Wales going to be filled. What service will this provide, and will it already be out of date by the time it is delivered?
- ◆ Are there approaches to rolling out subsequent generations of broadband that will ensure that rural areas are not the last to receive each service, or level of bandwidth?
- ◆ What of the 'gaps' in the mobile phone network coverage?
- ◆ What of the difficulty in receiving satellite or digital TV in various rural locations, given the analogue switch off?
- ◆ What about the complete absence of certain services in rural areas – cable, 3G etc.?
- ◆ In a time of technology convergence, do some of the solutions lie in investment in technologies that can also supply services which in urban areas might be delivered in another way?
- ◆ How can we ensure appropriate, reliable ICT support for homes and

businesses?

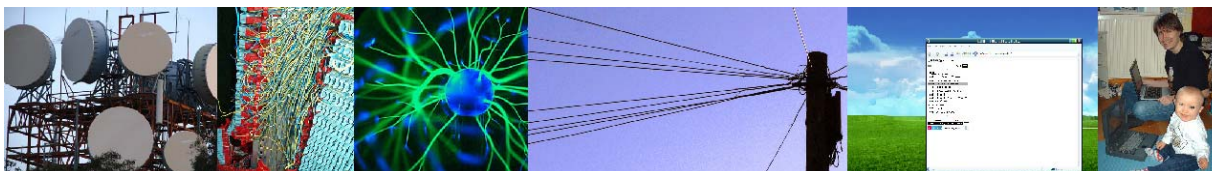
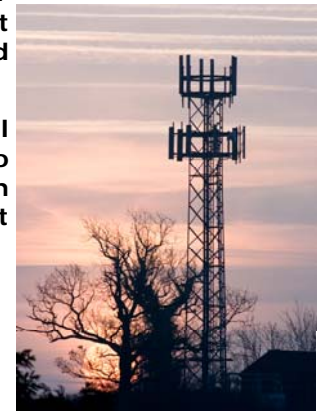
- ◆ Laying fibre to all homes in Wales might cost £10bn. This sounds like a lot, but is it when compared to the costs of roads, and ICT infrastructure could now be seen to be just as important. What is the best solution to provide the necessary infrastructure?
- ◆ How can the opportunities for voice-over-IP be maximised?
- ◆ What are the opportunities offered by using RFID chips?

Where we want to be

High speed Broadband available for all homes and businesses at competitive prices, not just at 2 megabit/second (current offering), more is needed. Filling black spots is part of this strategy.

Goals:

- **Explore establishing a consortium to bid for wireless spectrum to offer Wireless connectivity for all for the public good**
- **Ensure rural areas keep abreast/ahead of urban in relation to bandwidth provision**
- **Encourage changing pricing policies for open zone WIFI, pay as you go type systems**
- **Install ubiquitous WIFI clouds in major towns**
- **Increase ICT capacity of businesses, communities and individuals via training and awareness raising**
- **Create 'blue-sky' thinking environment for new applications – run a competition 'what could be done with a 100 megabit/second feed to Tregaron' (or similar)**
- **Ensure Government recognises that rural areas need different solutions and rules to enable progress at the same pace as urban areas and implements changes to support this.**



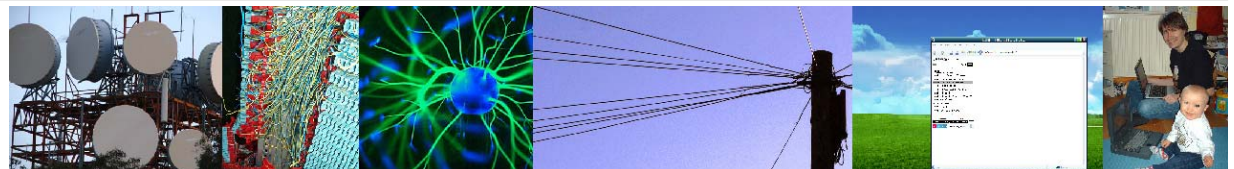
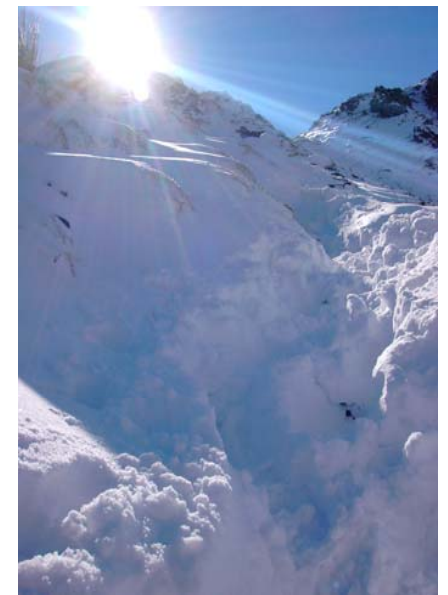
Appendix 1:

Statements from some recent publications. (Extracted from 'Blue Skies Literature Review, June 2006, Broadband Wales Observatory)

- ◆ Broadband will be conceived over the next five years as a fundamental utility which will drive applications in a number of areas such as business, health, education and the media.
- ◆ Between 2006 and 2010 there will be a '100Mbit/s wireless speed in office/home'.
- ◆ The demands of applications such as IPTV and video on demand will drive significant demand for increased bandwidth in the consumer sector (a minimum of 2-3 Mbps). If digital switchover accelerates demands for services such as movies-on-demand then 4-8 Mbps is likely to be the norm. The addition of audio-visual services such as HDTV could increase this requirement to 10-15 Mbps.
- ◆ Predict a second digital divide in Wales due to loop length limitations of ADSL, the availability of higher bandwidth services and the limited availability of cable broadband in Wales.³
- ◆ Predicts that by 2010 the internet will be a ubiquitous technology, as electricity was a century ago.
- ◆ In 2050 most homes are equipped with cinema-quality projection screens that are connected via wireless networks to the internet. These coupled with home virtual reality suites enable the coupling of shopping with the entertainment experience.
- ◆ Learning content will increasingly be pushed down onto an increasing range of devices such as iDTV and mobile phones¹
- ◆ Broadband (a minimum of 2 Mbps) as ubiquitous as hot water. It will become embedded in people's lives – more of a utility.
- ◆ Broadband technologies will increasingly promote the convergence of computers, communications, consumer devices, content and services.⁶
- ◆ Investment in a national fibre infrastructure needed to ensure sufficient and adequate supply of broadband as a utility⁶
- ◆ 30% of local loops will be all-optical by 2010⁶
- ◆ A gigabit to every home and business by 2010 should be the aim²
- ◆ We estimate that by 2010 around 50% of premises (in Wales) will not be able to receive services greater than 10Mbps and that around 25% of premises will be limited to services of less than 4Mbps. Higher speed services (18Mbps) will be limited to around 25% of premises³
- ◆ Today's broadband is tomorrow's narrowband. Rural areas are likely to continue to lag behind urban areas in developments in communication

infrastructure⁶

- ◆ Broadband will be available to more than 95% of the urban population of the EU by 2010. Coverage in rural areas will be much lower, achieving 75% by 2013 in the wealthier countries
- ◆ By 2008 the bandwidth demand for the most bandwidth intensive households could reach 18Mbps downstream and 3Mbps upstream. (2012, 23Mbps and 14Mbps)
- ◆ Every home in the UK will download at least one movie using their broadband connection by 2010¹
- ◆ By 2010 we expect to see much greater use of established applications: web browsing, email, music and video download/streaming in the consumer sector; IP VPNs, eCommerce, teleworking, mobile access in the business sector and the use of broadband in the health, education and government sectors³
- ◆ IPTV and video-on-demand will be the emerging applications that will drive significant bandwidth in the consumer sector, requiring a minimum of 2-3Mbps for adequate performance. If the digital switchover accelerates demand for subscription services, movies-on-demand and TV replays, and if the digital home requires multiple channels to satisfy parents and children then access speeds of 4-8 Mbps could be the norm by 2010. The addition of audio-visual services such as HDTV could increase this requirement to 10-15 Mbps per household.³
- ◆ Remote working will become the norm, particularly in rural areas. But increased remote working is likely to continue to drive up house prices in prime rural areas⁶
- ◆ In the broadband future small businesses will be given the opportunity to compete on the same basis as large enterprises, with access to the same tools as their global competitors¹
- ◆ Uptake of broadband services is likely to be in the range of 45%-50% in urban areas and 12%-13% in rural areas by 2008 amongst the regions of Europe having significant amounts of objective 1 assistance (by 2013, 75-81%, and 28-30%)
- ◆ The consequences of being digitally excluded in 2025 are likely to be more severe than currently as society increasingly expects engagement with new technologies in all walks of life¹
- ◆ Remote patient care will become a robust healthcare option⁶



- ◆ Broadband-delivered information will create a healthier and more informed population; a growing proportion of diagnosis and advice will be delivered via video technology easing the burden on GPs and waiting lists; elderly people and those with chronic illnesses will be able to live at home for longer due to broadband-enabled monitoring systems¹
- ◆ Community-based portals may act as new loci for rural communities⁶

1. *Broadband and the next five years; simulation the debate (2005) BT*
2. *Technology Timeline (2005) BT*
3. *Broadband in Wales in 2010 (2005) Ovum.*
4. *Smoke on the water: a fire in the sky (2000) Electronic Commerce Task Force.*
5. *The Future of Online Shopping, (2005) FutureFoundation*
6. *Thing – Visions for Broadband Britain in 2010 (2006) UK Broadband Stakeholders Group*
7. *Digital Divide Forum Report (2005) EU*
8. *Technical assistance with bridging the 'digital divide': A Cost Benefit Analysis of Broadband Connectivity in Europe (2004) PricewaterhouseCooper)*

Appendix 2: Background Information

'The UK Geography of the E-Society: A National Classification', has developed a nationwide household classification based on levels of awareness of different ICTs, levels of use of ICTs, and their perceived impacts upon human capital formation and the quality of life. This it is argued can be used to investigate regional and sub-regional policy issues. In rural Wales many communities have low scores – however, the issue is not about how we score now but what can be done to raise the scores and maximise the opportunities of ICT.

Australia now includes access to the internet within the national census. The reason being that as access to information is increasingly via the internet, the lack of access to a computer, or lack of knowledge of how to use it, is in itself a significant source of disadvantage.

The 'E-Society' report identified four sources of disadvantage arising from such inequality:

- Disadvantage from lack of understanding of or access to electronic technologies – via lack of access to information per se, or lack of

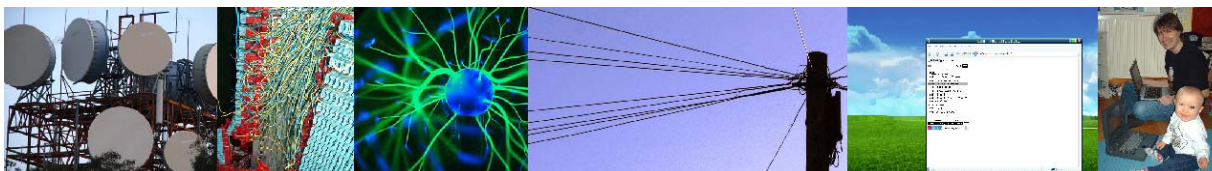


access to re-runs of radio or television information programmes, a person may find the general development of his or her skills and competencies undermined, and this may have implications for the formation of human capital.

- Handicap in terms of access to the labour market. Businesses will expect new employees to already have the relevant IT skills and experience.
- As consumers individuals are disadvantaged as they may have to pay higher prices for good such as airline tickets. They may also not have access to the most competitive interest rates on savings and borrowings. Increasingly consumers who are unable to access the Internet will find themselves denied access to key information enabling them to make the optimal decisions that informed consumers are expected to make.
- Social exclusion – school children who lack access to current ICT are at a disadvantage when wanting to participate in social networks and for peer group communication. Similarly for adults.

The Ofcom report “**The Communications Market: Nations and Regions: Wales**” provides some interesting findings. Many of these differences will be more extreme in rural areas, and can be linked to aspects of rurality.

- Levels of availability of communications services are generally lower in Wales than for the UK as a whole
- Take-up of three of the four key services – mobile phone, digital TV and internet is also lower than the UK average (35% overall compared to 43%), reflecting lower levels of availability and a higher proportion of C2DEs.
- Owing largely to its higher than average rural population, Wales has a lower than average coverage for 2G and 3G mobile phones.
- Wales has lower than UK average adult personal take-up of mobile phones but higher than average reliance of mobile phones as the households only method of telephony.
- Wales experiences lower than UK average broadband and internet take-up (49% compared to 57%) despite good broadband availability. The proportion of households with 5km of a broadband exchange is slightly less than the UK average (82% compared to 86%). PC take-up is lower (59% compared to 66%)

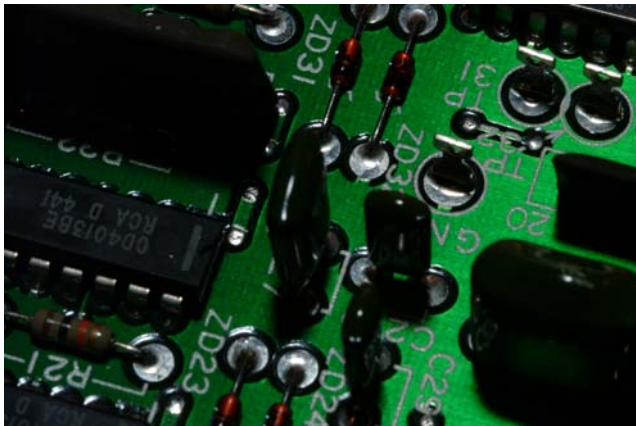


- Digital TV has been widely adopted in Wales (72% compared to 65%), largely driven by high satellite take-up (46% compared to 32%)
- Wales has lower levels of availability of DAB digital radio services
- People spend a lower absolute amount of their weekly income on communication services (£14.60 against £15.20), but this is higher as a proportion of average weekly disposable income (3.6% compared to 3.2%)

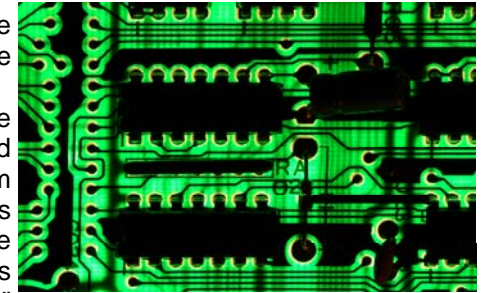
The e-Commerce in Welsh SMEs: the State of the Nation Report 2005/06 has much to say about utilisation by SMEs. From a regional perspective figures are presented that show that the proportion of businesses with an internet connection was lower in rural parts (and the south Wales valleys), with dial-up analogues services more prevalent in these areas. The Welsh Consumer Council in a December 2005 update of **'Internet Inequality in Wales'** shows that the level of home internet connections across Wales has remained stagnant during 2005 (at 41%), with 55% of these connections being broadband. Mid and West Wales have some of the lowest levels (34% with internet, and 39% of these via broadband). The report emphasises the growing digital divide.

A report in the **'Welsh Farmer' (FUW) (August 2006)** highlights the wide benefits to farmers of broadband; including practical issues such as being able to use telephone, fax and internet simultaneously, as well as the on-line services that can be utilised for better farm and live stock management, marketing and also tourism related activities.

A report in the **Guardian on July 20, 2006 (Danny Bradbury)** raised many of the rural user questions. The article focussed on the June 2003 auction of radio spectrum across the UK, with ultimately all the licences (for 15 areas) held by one organisation (UK Broadband, a subsidiary of the Asian phone company PCCW). To date a service has only be launched in two urban areas in SE England, and a lack of a contract clause (from the Radio Communications Authority – RCA) to stipulate support for rural



communities as part of the licence negotiation, means that services are unlikely to be offered in rural areas. "The UK could claim to be one of the most clean, transparent, market force-led economies in the world," says Tim Johnson, publisher at broadband analysis company Point Topic. However, in the US, urban telecommunications revenues are used to subsidise rural services"



Walker also foresees problems in rural areas become of distance from the local exchange generating background noise and dis-continuous signals. "The debate might not be about whether you can get broadband, but more about how much broadband you can have access to... if the average service in an urban area is 18 megabits per second, while in a rural area the best you can get is one or two mbps, then this could be a problem". Martin Cave, director of the centre for management under regulation at Warwick Business School says that "no one knows what wireless broadband costs will be in two years time. It's possible that new technologies will enable wireless to be delivered to remote locations using new technologies that are still being explored in the labs".

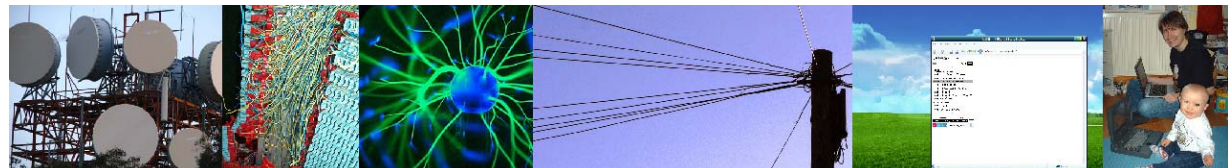
The conclusions of a **DEFRA survey (England, 2005) ICT in England's Rural Economies**, make interesting reading, are would appear to be similar to Wales:

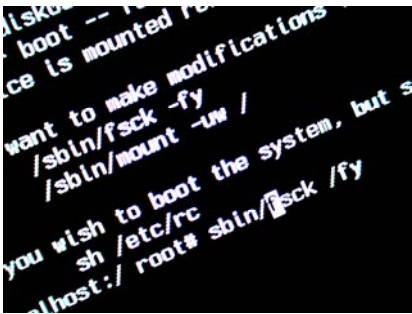
- In general rural businesses adopt significantly more slowly than their urban peers.
- This slower adoption is primarily attributable to a more limited range and intensity of 'influences' promoting the uses of ICT, rather than 'barriers to adoption'
- Micro-businesses are particularly disadvantaged
- There are few important differences across the various types of rurality
- Rural businesses are playing 'catch up' with broadband
- Our research supports the argument that ICT developments are having a positive impact on rural economies
- The most important productivity advantages of ICT only start to be realised when businesses go beyond 'basic' adoption levels

This research goes on to suggest the following key messages for consideration in rural ICT policy development:

- There is a case for intervention, to address an information-related demand-side market failure
- There is an argument for focusing such interventions on micro-businesses
- Existing mainstream, public sector initiatives are positive – but unlikely to

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close the rural-urban gap on their own

- Interventions should seek to exploit the web as an information channel, and should take advantage of the window of opportunity presented by the current boom in rural broadband take-up
- There is a prospect of a new digital divide emerging between rural and urban areas, with the advent of next generation broadband and 3G services. Policy makers will need to consider their responses to this.

This last suggestion is of particular importance.

Also in **2005 the Commission for Rural Communities, commissioned by the English Countryside Agency produced a report entitled 'Beyond digital divides? The Future for ICT in rural areas.** The significant interlinkage and interdependence of rural and urban is highlighted and the importance of ensuring comparable ICT infrastructures is highlighted. Again it recognises the emergence of a new digital divide in terms of the size of bandwidth available in different locations. A couple of quotations from this report are thought provoking –

“Everyone in the industry knows that DSL is yesterdays technology, 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”. Malcolm Corbett of the Community Broadband Network.

“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 divide is a growing concern. The majority of the UK population may soon have access to between 0.5 and 1 mbps, but in Japan, South Korea, Scandinavia, Italy and California, bandwidths of 10 to 100 mbps are already becoming common place. By comparison, our DSL nation is ‘going sideways, with the breaks on, at a snails pace” Malcolm Matson.



The report goes on to look at various infrastructure options, highlighting the possibility of fibre together with wifi solutions. It also raises the future opportunities through WiMax.

A survey in **2002** highlighted that the biggest barrier to internet access was not affordability but lack of understanding of the benefits of using ICT (**Pilling, Barrier & Floyd, 2004**).

This report also highlights the costs of exclusion – An obstacle to productive engagement in the world – to book a doctors appointment, fill in a housing benefit form, get a job etc.

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 may have greater challenges in maintaining and establishing connections to wider social networks

The report presents three technological scenarios for 2020 –

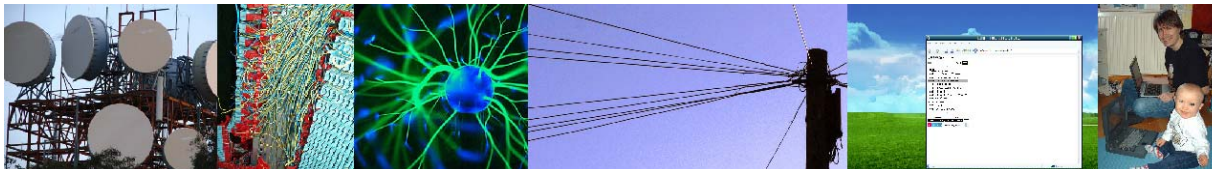
1. Internet-anywhere countryside. Based around mobile internet using WiMax to WIFI to 4G seamlessly. Complete flexibility. Broadband TV. Talks about a nation of proactive 'netizens'.

2. Village of Bits. Mixed technologies with gaps. UK fallen behind. E-government grows, services automated. Rural areas populated by commuters and home workers, with the countryside resembling a nature reserve.

3. WIFI World. Rural digital divide. Urban areas had local loop unbundling. Urban areas highly competitive in a global perspective.

The Equal Opportunities Commission (EOC) has published “Working Outside the Box: Changing work to meet the future” (2007). This is the interim report of the EOC's investigation into the Transformation of Work. The report recognises that the world of work is changing, much of this is due to technological advances. Quoting from the report *“The most forward looking employers have already seen the future. They are responding and the results are exciting. Innovation and technology provide the potential to re-define the way we work so that businesses can operate longer and achieve better results faster in more varied ways—and with a modern, flexible and productive workforce.*

New, better and faster technology relies on connectivity, the ability to connect devices to create flexibility for the employer and employee, wherever they be in the world—anywhere, anytime. High speed affordable connectivity is required.



Appendix 3: Scenarios

John Davies lives in rural Powys. He is 76 and suffers from arthritis and a heart problem. He still lives in the small hamlet where he was born. His son, and family, live in New Zealand.

Scenario 1A – John spends most of his time in and around the village in which he grew up and worked. The practice nurse comes in twice a week, can monitor his health and on several occasions has sought specialist medical advice via the telemedicine service by using John's high speed broadband computer – she has also arranged for his test results to be e-mailed to him as soon as they are ready. His monthly telecommunications bill is subsidised by the government which recognises the savings made in central costs by not bringing him into the hospital/surgery each week and by closely monitoring his health so that changes can be controlled before they become problems. John finds the flight to New Zealand too uncomfortable these days, and also not good for his health, but he talks to his family in New Zealand two or three times a week using his video link – and he can view videos and picture shows of all the families trips and events via the family web blog, and he's sure he knows more about his 16yr old granddaughters exploits via her blog than he ever would 'in the old days'. Although the village shop closed more than 20 years ago, he orders his shopping over the internet and this is delivered weekly. John uses his mobile phone to check with friends about the bowls match or to make sure an elderly friend has got home safely after a night in the pub – his 10 year old grandson can't believe how good granddad is at text messaging. When he catches the bus into town each week he can check the exact time it will arrive on his mobile phone and so can arrive at the bus stop at the right moment.



Scenario 1B –

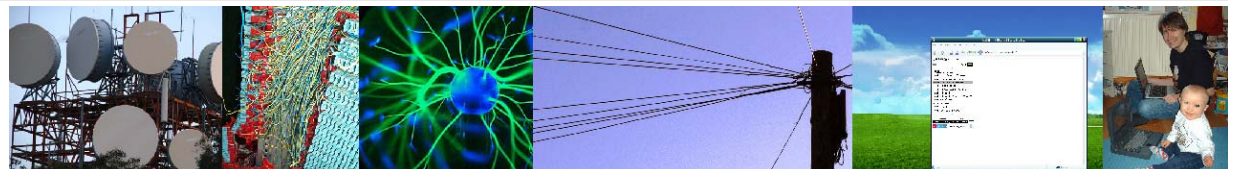
Twice a week John must go into town for a medical checkup. The bus doesn't always arrive on time and he finds it cold and painful to wait at the bus stop especially in winter; then he has to wait in the surgery with lots of other people and sniffing children. Carrying his shopping isn't easy and he never finds time to just sit in the pub for a pint with his friends as there's too much to fit into the afternoon and he can't face the journey more often. Letters come from his son and grandchildren about once a month, he tried to use the internet but his modem has blown three times because of power surges and he doesn't know anyone he trusts to sort it out. Sometimes he phones New Zealand but it costs so much, and his hearing isn't that good – he would love to see them all.

Dylan Evans is 11, he lives in a small village 5 miles from Aberystwyth. He goes to the village school

Scenario 2A -

He uses his laptop computer 'for everything': talking to his friends on MSN, gaming, downloading music and films, getting information for his home work. Dad is a farmer who buys and sells live stock via the electronic market where he can watch video footage, see validated health records and current market values. Mum runs a B&B, she does all the marketing and booking on-line through Visit Wales but with her own web site that provides tours of the farms and an interactive question and answer session.

Scenario 2B – He always seems to be trying to use his computer but it always causes trouble – either his Mum wants to use the internet, or his Dad's on the phone, or Mum is saying don't be too long someone might be phoning for B&B. When he can get on the internet it is just SO SLOW, it takes all evening to get one bit of information for his homework. Dad still takes him cows to market in town, but he knows other people get a much better price, for much less effort, using the on-line system but his dial-up services won't run the software. Mum is thinking of giving up the B&B and getting 'a real job' although she doesn't know what, because fewer and fewer people are coming to stay. They all want wireless laptop connection, they want to see the place before they arrive, they want to be able to book a meal at the local restaurant on-line and she can't offer any of this.



Sally James lives in an old farmhouse three miles from the English border. She runs a small businesses designing wedding stationery. She has three children at school in the nearby town.

Scenario 3A-

Sally works from home in her office, she can send designs to clients around the world and also works interactively on those designs with clients. She also liaises with suppliers, as well as being part of an active internet based world wide design community. This works much better than the so-called group of designers she met weekly when she lived in Sheffield. Quite often she meets friends for lunch in the local pub, and the local wireless network means she can take her lap-top if she needs to be available for a panicking customer. Her children often stay in town after school with friends, or to play sport or go shopping but they always text to say where they are, at the weekends they go out on their bikes but if necessary she can check were they are because of the electronic tags on the bikes (great to combat theft, but even better when your children get lost 20 miles from home without a map)

Scenario 3B-

Sally produces her designs on her computer but has to post them to clients because they need to see the very high quality of the output. This takes time and more and more customers are switching to more local companies. She feels lonely because she can't leave the house too much because of pressure of work, and twice when she has gone out things have been cancelled and she's not know, her internet connection was too slow for her to find out.

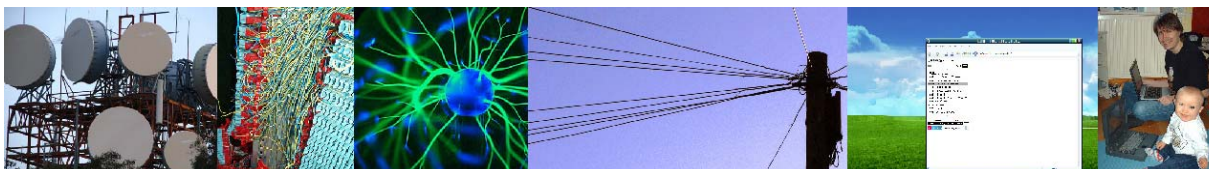
She never knows exactly where the children are unless she walks a mile up the track to get a mobile signal, and then they don't always text anyway because they know she doesn't always make the effort to get the messages. She can't get a digital television signal and so is beginning to worry about what they are all going to do when the analogue signal is switched off. She signs, perhaps they need to move again, and this seemed so idyllic, but then of course they will never sell the house because everyone wants broadband, mobiles, and TV. Back to the 'Good Life' then.

Michele Bleu is a French tourism in Mid Wales for the very first time. He want to make the most of his week.

Scenario 4A - So far Michele has booked every night of his accommodation one day ahead using his laptop connecting via WIFI (which seems to be available just about everywhere). This has meant he could be very flexible and he has also found some amazing very friendly well equipped places that are right off the 'main tourist route'. He has found a community concert to attend tonight because he registered by mobile updates about community events near to his current location during the whole of his stay, he's already been to a horticultural show. On Cader Idris he downloaded route instructions and information from the WIFI points to his PDA and he felt really safe and well informed, at the same time he'd logged himself onto the track system so that if he did go astray someone would know to look for him. He's been writing a blogg as he travels around, and already a friend has been so impressed by some of the video clips that he is joining Michele for the second part of the holiday.

Scenario 4B - Michele arrived three days ago. He's seen the places in the Guidebook but its all a bit too sterile and touristy. Someone said something about mountain biking, but in the village he is not staying in the TIC is only open between 11 and 1, and he'll be gone by then. If he hadn't booked his accommodation before he left France, he'd be sleeping in a field by now. He's missing his friends, and his mobile doesn't seem to work very often.

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