Date:	**30 January 2003**
Time:	**9.00am - 12.30pm**
Location:	**Committee Room 3, National Assembly for Wales, Cardiff Bay**
Title:	**Broadband in Wales**

Broadband in Wales

National Assembly for Wales Economic Development Committee

BT Submission

1.   Introduction

This briefing paper will emphasise the importance of broadband as a key enabler for economic development. It will use case studies, conducted on BT Wales' behalf by the electronic Commerce Innovation Centre to show the tangible and intangible benefits that broadband has conferred on Welsh users before exploring current and future availability, as part of BT's passion to deliver broadband throughout Wales. The paper will finally explore where, in BT's opinion as a company with the widest geographical experience of deploying and marketing broadband, the National Assembly for Wales could helpfully be addressing any shortfalls, even in enabled areas, in the demand for the services that broadband brings. It is vital to remember throughout that Wales remains near the bottom of the league for take up of broadband services even where they are currently available in the UK as measured by households taking up broadband.

BT believes so strongly that Broadband is the future of telecommunications, that it has made it a central focus of its corporate strategy.

2.   What is Broadband?

Figure 1.   Bandwidth
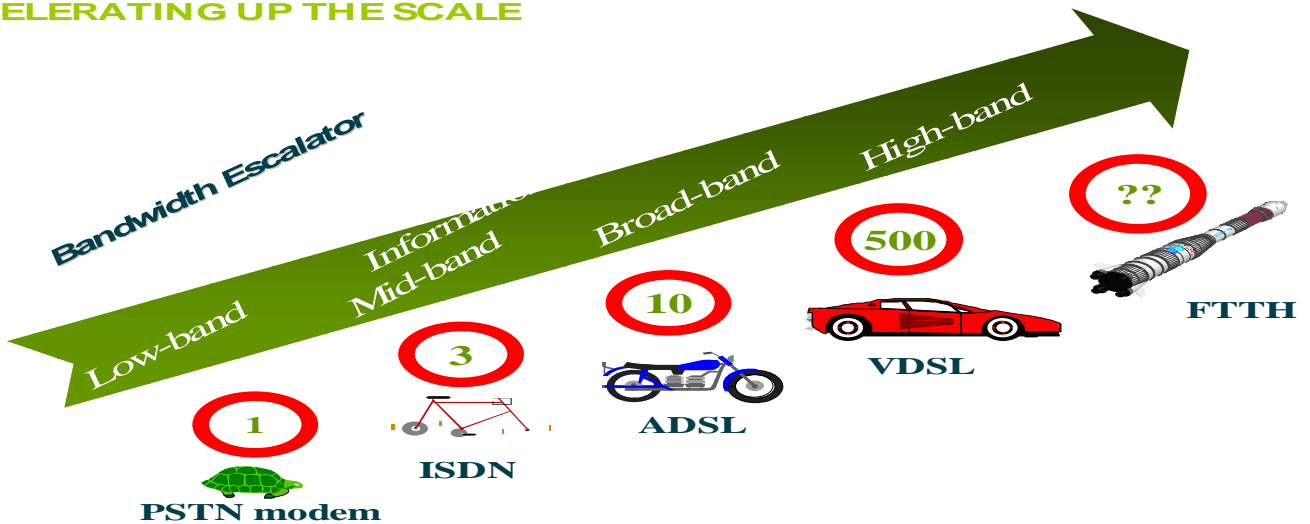
At its most basic, broadband is generally accepted to be an 'Always on Service', with a fixed rental cost that delivers data at speeds of 512 kbit per second or above. Asymmetric Digital Subscriber Line (ADSL) is BT's chosen technology to deliver mass-market broadband. The 'asymmetric' of ADSLindicates that users can download data at a faster speed than they can send information, which mirrors the typical internet user's profile. Speeds are typically 512kb/s to the user and 256kbit/s from the user. There is no

agreed minimum or maximum speed for what constitutes 'broadband'. BT's basic ADSL product is at speeds of up to 512 kbit/s (i.e. up to ten times faster than a normal 'narrowband' telephone line.)   Some suggest broadband means anything over 128 kbit/s, whilst 200 kb/s seems to be the definition in the USA.

The various components of Broadband can be broken down as follows:

- 'Always On' means that the internet or data connection is not a service that you have to dial into everytime you wish to access it. It means that communication channels are connected permanently and its importance is significant in making communication instantaneous. No need to dial up to retrieve e-mails for example.

- The fixed cost element is very important to users in that they can budget for their communications needs safe in the knowledge that however much they use their broadband service, the cost will remain the same. This means no more rationing internet access due to cost considerations.

- The speed element can best be illustrated with the aid of fig 1. above. PSTN is the basic connection that is possible throughout Wales. This operates at approximately 40kilobits of information being transferred every second. ISDN2 can operate at speeds three times as fast as PSTN (128kb/s) and the slowest broadband link that BT would supply (512kb/s) is approximately 10 times faster to download than PSTN. BT has recently announced that it intends to offer a mid-band service, a flat rate 128kbit/s product. Wales has an advantage in the provision of this service as thanks to the Strand 6 project, referred to below, Wales is the only UK nation to be able to offer 128kbit/s services from every single exchange.

3.   BT Wales - background

BT Wales has one of the most experienced teams of broadband specialists in the UK, having delivered the first European funded broadband deployment, the LlwybrPathway Strand 6 project in 1999. This project delivered ADSL to 10 exchanges in the old 'Objective 5b' footprint bringing broadband services to more rural communities. Vital lessons were learnt in this project, the biggest being that supply side initiatives alone will not succeed in delivering active broadband communities. Although by no means poor, the take up on these exchanges still trails that of more urban exchange areas. Broadband can be justifiably compared to the advent of personal computing in the early 1980's. The real upsurge in demand for PCs came once providers such as Microsoft produced applications or content that consumers actually wished to use. Broadband by itself is not enough to guarantee economic prosperity rather it is the applications and usage of this technology. This is why BT Wales commissioned groundbreaking research at the end of 2001 to work with small businesses in Wales to identify the real, tangible, benefits of broadband.

4.   Broadband Case Studies

The work, carried out by Cardiff University's electronic Commerce Innovation Centre (ecommerce.ac.uk) has recently been published although many of the preliminary findings have already been used across Wales and the UK to demonstrate the benefits of broadband.

The main findings centred on the benefits that the speed brought

– immediacy of access to the internet and the range of applications that could now be run;

– the fact that 'always-on' meant that firms were constantly on-line to react to customer correspondence;

– the fact that many more staff could now be provided with internet access, live e-mail etc; and finally

– the cost savings. Typically firms studied were using ISDN2 lines, charged on a per minute basis. Savings ranged from a few hundred pounds per annum to thousands of pounds per annum.

The case studies focused on:

- A broadband connection allowing an Aberystwyth company to lead the way in using eCommerce to reduce costs and improve efficiency in the agricultural supplies industry.

- How broadband enabled a small Cardiff computer retailer to beat customer service targets.

- How the introduction of broadband cleared bottlenecks as well as creating a wealth of efficiency across operational and research based activities of the Institute of Welsh Affairs.

- How the introduction of broadband communications helped reduce costs but more importantly enabled a much higher quality of customer service at a Pembrokeshire Engineering firm; and

- How broadband eliminates the "leg work" for a cutting edge new media company, enabling them to streamline their business processes and make significant cost savings.

A major driver for broadband demand is, however, the home user. BT sells approximately 9 homeuser broadband connections to every 1 business line. BT has targeted the demand situation in this market very heavily with its recent broadband promotional campaign, one of the biggest marketing campaigns ever undertaken in Europe. Fig 2 below seeks to explain the life cycle of ADSL, showing who will use the service and when.

Figure 2 – The Broadband Life Cycle
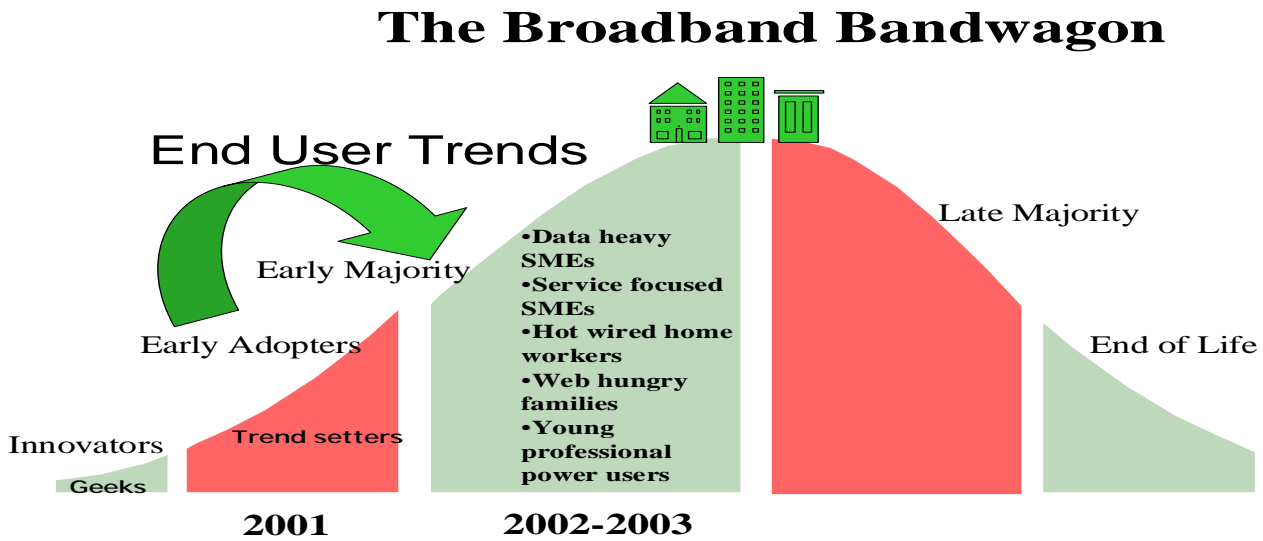
Based on BT's own experience, the UK including Wales lie within the second section 'Early Adopters'. This section suggests that the vast majority of connections sold are taken up by those people/businesses with a strong understanding of technology. To realise the real benefits of broadband, the area where exponential growth occurs, we have to move towards connecting all of the people/businesses who are unaware of the benefits of broadband. Critically, one of the main findings of our Welsh research has been that not only is the bandwidth vital, but so is the quality of the broadband service supplied. The 'Early Majority' will not adopt the technology unless the experience of using broadband is satisfactory, i.e. the content is provided seamlessly. This is a major factor for both BT and the National Assembly to consider in deploying newer technologies such as wireless and satellite services.

5.   Broadband Users

Wales continues to lag behind in both broadband take up and in the use of ecommerce. In the four years that the DTI has run its Regional Benchmarking study 'Business in the Information Age' (www.ukonlineforbusiness.co.uk), Wales has been placed either last or second to last under the DTI's Connectivity index, measuring use of e-mail and the internet. This why the demand stimulation segment of the WAG's Broadband Wales programme is so critical to any ambitions of mass market broadband usage and why BT has teamed up with Opportunity Wales, amongst others, to promote Broadband across the Objective 1, and soon Objective 2 areas of Wales. Wales has seen significant gains in the take up of broadband over the past year, with ADSL connections rising from just over 1,000 to just under 10,000. Wales remains, however, the second from last user of broadband services measured by users per enabled exchnage.

Figure 3 – Wales ADSL Take-up


IP Services - Wales
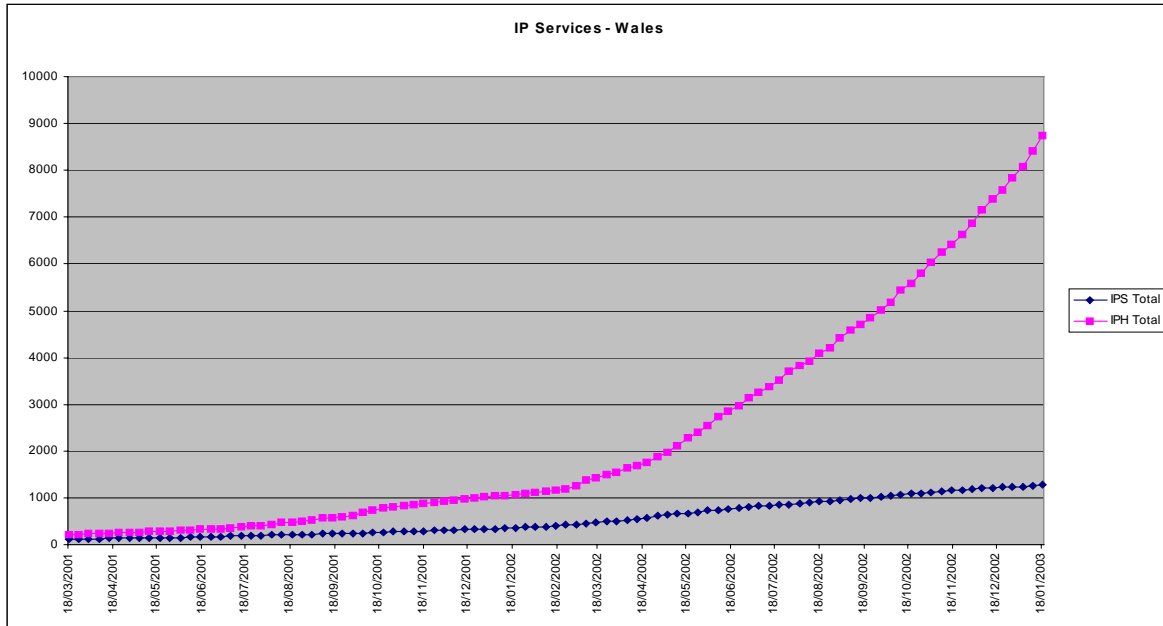
6. Price reductions.

BT has made significant strides in lowering the price of broadband, something that has made a significant difference to the take up levels. On the take-up graph above, for example, a significant spur in demand from February 2002 onward can be seen. This is when BT Wholesale halved its monthly rental charge, bringing the retail price of broadband down to a price that is among the cheapest of the OECD nations at circa £27-£30 per month. As an additional spur to accelerate the take-up of broadband, BT has recently announced the suspension of the activation charge, previously £60, and the lowering of the cost of the ADSL Modem from £85 to £50, a total saving of £95 in set up costs. This is expected to increase the rate of connections by 33 percent by removing one of the last barriers to taking up broadband, the connection charge.

7.   Broadband Coverage

Figure 4 – ADSL coverage Wales
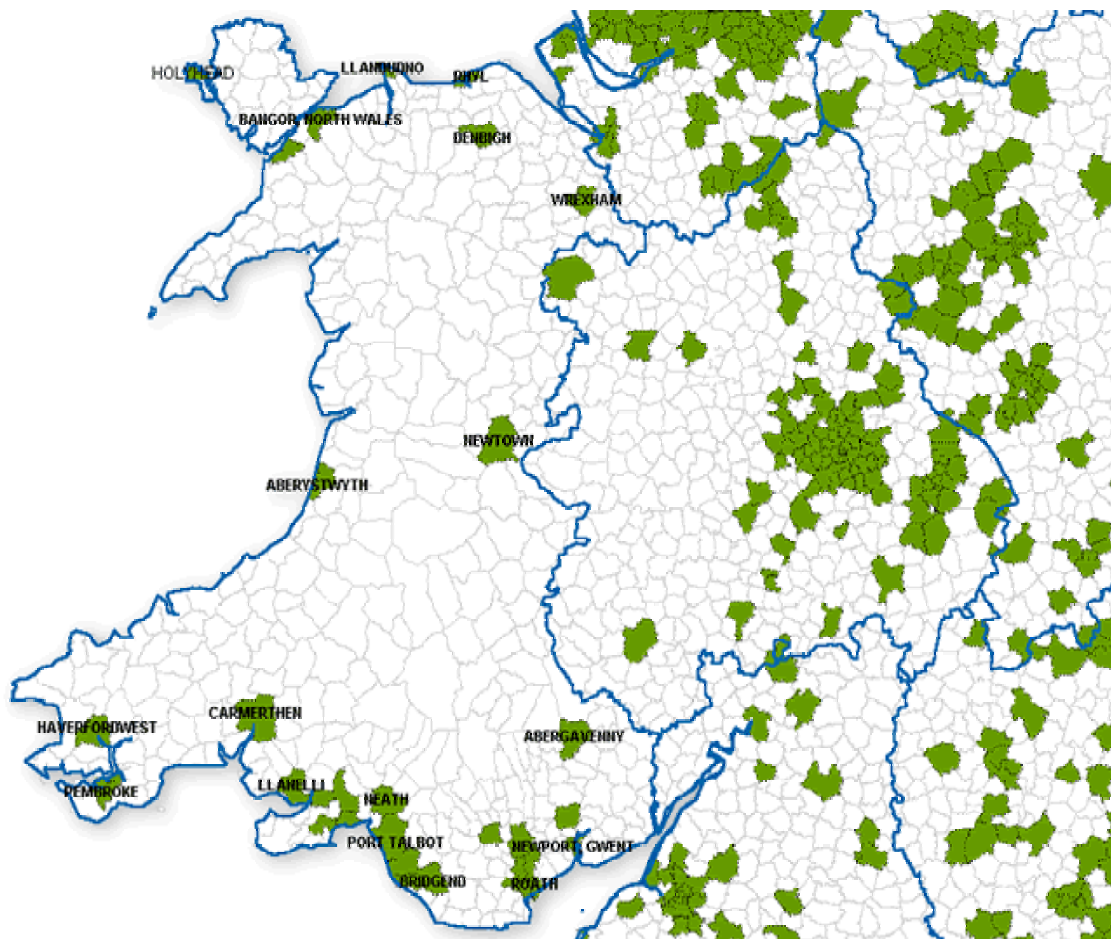
BT has currently rolled out ADSL to exchanges covering approximately 35% of the Welsh population. BT, as a commercial operator, looked at its 5,000+ exchanges across the UK and prioritised delivery according to a range of demographic statistics, including the number of internet users per exchange.

Currently there are 35 exchanges enabled across Wales, as demonstrated on the map (with the exception of Buckley, which was enabled on 15th January 2003):

Abergavenny	Kenfig Hill
Aberystwyth	Llandaff
Bangor	Llandudno

Bridgend	Llanelli
Buckley	Llanishen
Caernarfon	Morriston
Caerphilly	Neath
Cardiff Central	Newport
Carmarthen	Newtown
Cwmbran	Pembroke Dock
Denbigh	Pontypridd
Gorseinon	Port Talbot
Haverfordwest	Porthcawl
Holyhead	Rhyl
Roath	Sketty
Swansea Main	
Whitchurch	Wrexham

There are currently a further 8 exchanges being enabled as part of special projects and as a direct result of the Registration Scheme (discussed below):

Merthyr Tydfil	Caerleon
Chepstow	Rhiwderin
Bargoed	Blackwood
Hengoed	Newbridge

This means that already this year (2003) there will be twice as many exchanges being enabled than last year with 11 months of the year remaining, such is BT's commitment to rolling out these services. To date BT has invested approximately £10m in bringing ADSL infrastructure alone to Wales, this figure is increasing rapidly.

8.   BT Wholesale Registration Scheme

BT, like all other telecommunications firms, receives frequent requests for yet more exchanges to be enabled. BT is very strictly regulated to ensure that it does not act in an anti-competitive manner. BT cannot, therefore, invest in the enablement of ADSL exchanges unless it can demonstrate a reasonable expectation of achieving an appropriate return.   BT has introduced an innovative approach to measuring and stimulating demand through the creation by BT Wholesale of a Broadband pre-registration scheme where people are empowered to register their interest in receiving

broadband service. Registration numbers are recorded for all exchanges in the UK where those exchanges are not enabled already. Prior to this, BT had set 'Trigger levels' for approximately653 exchanges across the UK, with these trigger levels representing the number of people who needed to take up the service for BT to have a reasonable expectation of payback over a three year period. It should be emphasised that the trigger levels themselves are not numbers that would ensure profitablility, merely an indication that future demand could be expected to lead to profit. In other words, a significant element of risk is still borne by BT.

**Figure 5 – Example of BT Registration Internet page**

The trigger levels vary from exchange to exchange and depend on a number of factors that affect the cost of enabling those exchanges. To date one exchange in Wales has already been enabled under the scheme, Buckley, with four currently in the process of being enabled.

In addition to the commercial roll out of ADSL, we have also been trialing our ADSL Exchange Activate programme in Corwen and Penrhyndeudraeth. The trial brings broadband to small rural exchanges by means of the introduction of smaller and cheaper ADSL equipment suitable for providing access to multiples of 16 users to a single ISP. Local community sponsors would aggregate demand and select an ISP. These trials will operate until the end of March when a decision is to be made on whether BT can roll out the technology this summer.

9.   Other broadband technologies

ADSL is of course not the only method of delivering broadband. Broadband has been available over fibre for many years in Wales, with BT having invested over £100m over the past three years in completing a 550,000km fibre network, a fibre network that is currently expanding faster than in any other similar region/nation in the UK. Fig 6 demonstrates the extent of BT's fibre network in Wales.

Figure 6 – BT Wales Optical Fibre Map
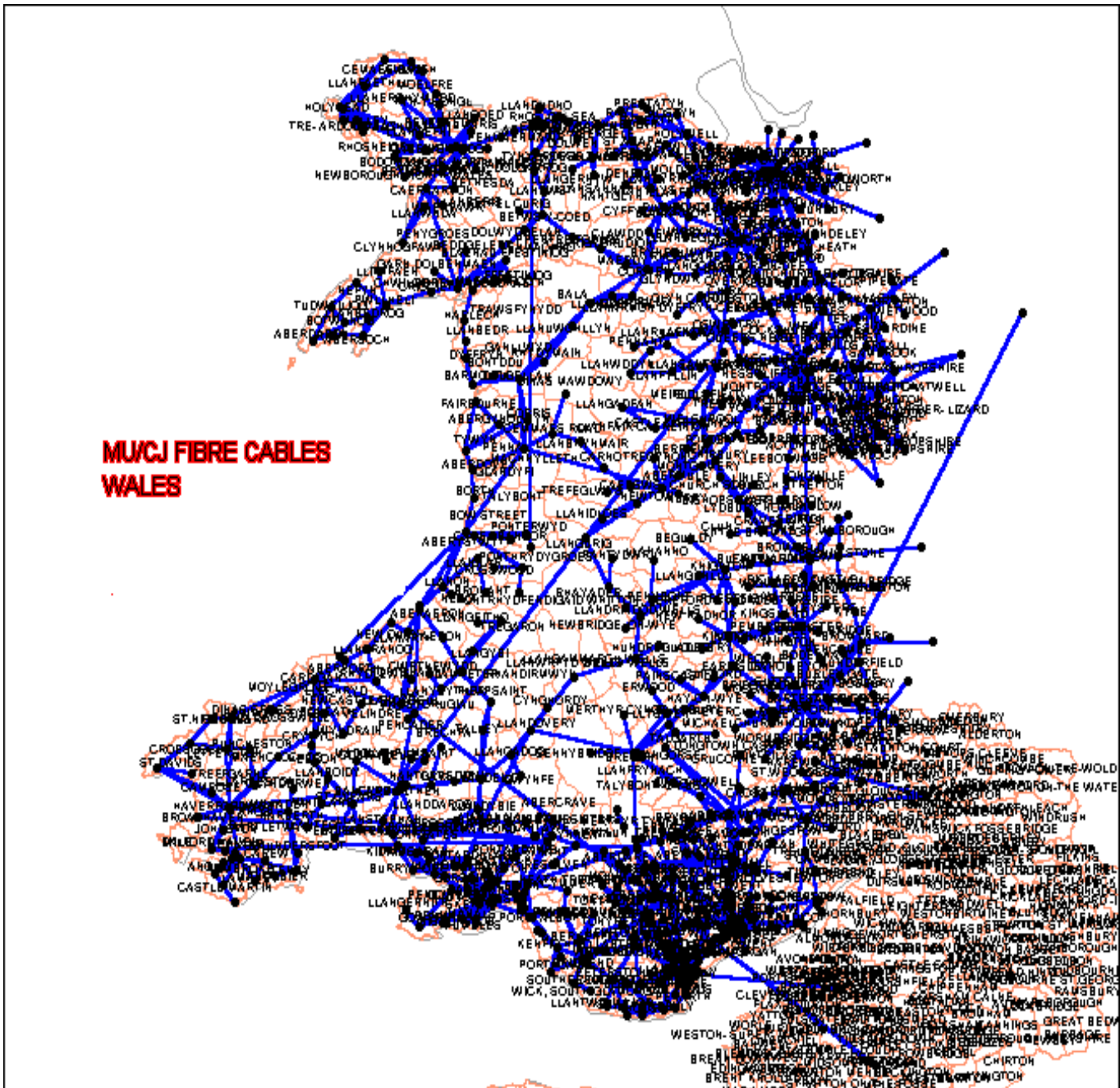
Other technologies such as Cable modem, wireless and satellite also exist. Cable modems are used by the cable operators. BT has already launched a Broadband satellite service to tie up with the WAG and WDA's satellite subsidy scheme. It provides an option for those businesses not linked to an ADSL exchange to get broadband. We have also trialed one wireless Mesh technology option with another trial to come later this year. The first trial involved a partnership between BT, Yes Television of Cardiff, and Radiant Technologies, to trial a high bandwidth radio network as demonstrated in Fig 7. Wireless links grow from a central point and link to each other, providing a mesh of interlinked sites. This technology was primarily suited to the delivery of broadcast quality media content. The trial has recently ended and although BT does not propose to adopt the technology it is working with the partners on the next phase of the equipment development.

BT is currently working with the WDA and other partners to run a subsidised trial of similar technology but providing an ADSL equivalent service. This technology is particularly suitable for use in connecting small communities to 512kb/s type services. The technology is new, however, and BT must demonstrate that the quality of service provided is adequate in advance of a commercial service being offered.

Figure 7 – Mesh Radio Trial
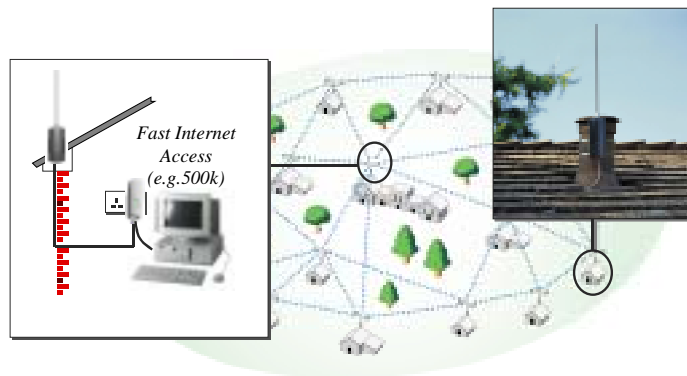
The long-term deployment of radio point to multipoint (P2M) solutions is inextricably linked to the availability of suitable spectrum. For economic reasons the favoured spectrums lie around the 2Ghz range, where the most suitable spectrumhas recently been assigned to the MoD and NATO under national security protocols. It is hard to see how any supplier could provide an economically sustainable wireless P2M at other frequency ranges and still provide the bandwidth, reach and quality of service required.

BT is also running UK trials of S (Symmetric) DSL technology, an ADSL variant that provides the same speed in both directions (upload/download). Although superior in that

respect the distance from which it operates from the exchange is less than that of ADSL, limiting the actual availability of the service. The service is likely to be far more expensive than ADSL, which will further limit the attractiveness of this technology in a market that is behind in even ADSL adoption. There is little doubt, however, that SDSL is a technology of the future and BT's trials will provide a guide as to future roll-out.

10.   Future Technologies

In the future it is expected that there will be a gradual extension of optical fibre from the local telephone exchange to the home. Optical fibre is the only transmission mechanism currently capable of conducting the highest bandwidths. The likely cost of providing fibre based solutions to the household are likely to be prohibitive in the medium term and only represent a longer-term aspiration. What is critical is that the National Assembly invests now in stimulating both broadband reach and demand rather than wait for new technologies to emerge. Unless it does so there is a risk of losing the opportunity to place Welsh business at a competitive advantage.

11.   Defeating the Vicious Circle

Figure 8. – The Vicious Circle
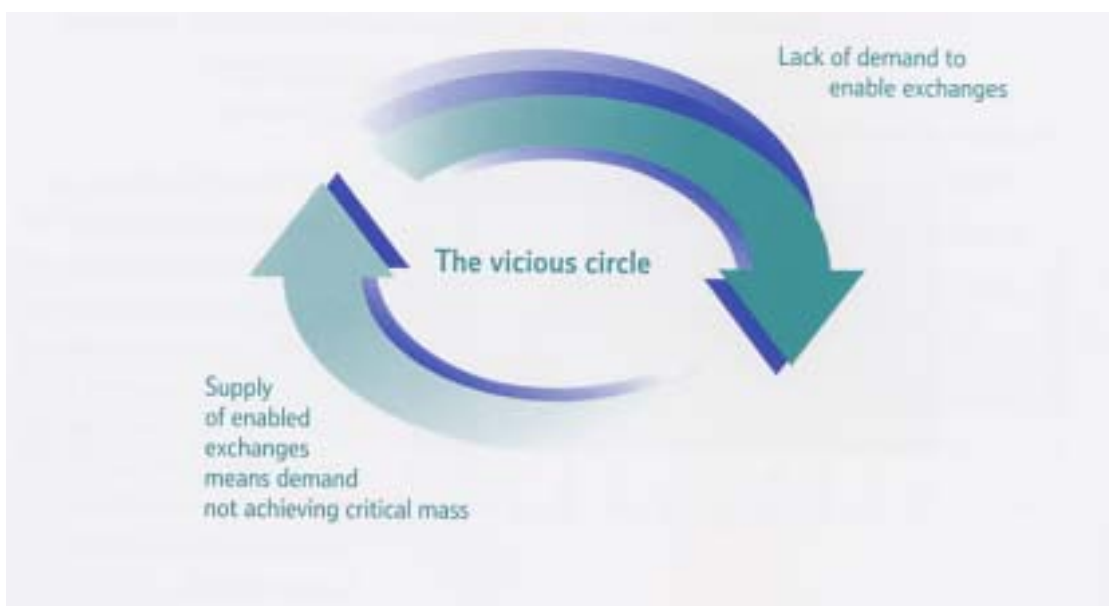
The main challenge facing policy makers is breaking the vicious circle that is presently limiting broadband roll out in Wales. Figure 8 demonstrates the classic 'chicken and egg' situation. Content and awareness are critical here and could provide a way of breaking the circle. The WAG is already considering a Digital Content subsidy. This is welcomed, as broadband provision must not be idle for lack of services and content that people will be willing to pay to use.

12.   Cardiff – the Connected City

On the awareness side, BT Wales has been working on innovative methods to address this problem and create a virtuous circle of increasing demand backed up by an increase in the number of enabled broadband exchanges. The first project to focus on

Figure 9 – Take up comparison Cardiff and London
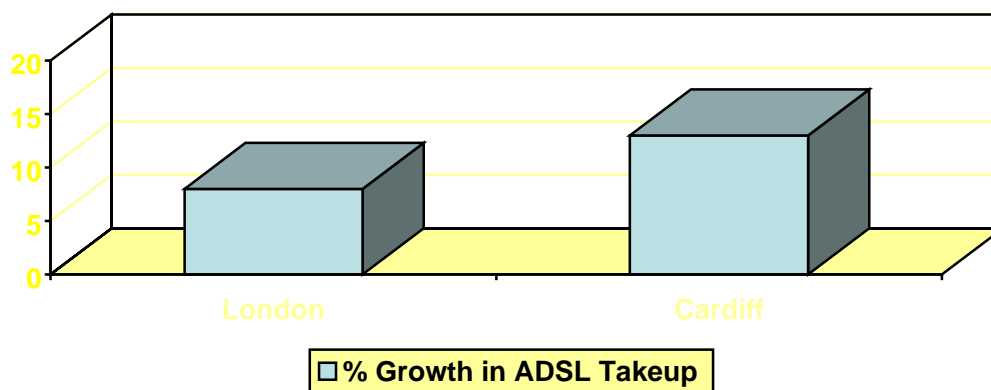
this issue in Wales was conducted in a partnership between BT, the Economic Development Unit of Cardiff Council and the electronic Commerce Innovation Centre at Cardiff University. Cardiff County Council were quick to realise that Broadband was an economic development issue rather than an IT issue and in eCIC Wales has a world respected centre of excellence for ecommerce and now broadband applications. Using local case studies, sponsored by BT, two broadband brochures have been created for the local business community. The brochure does not focus on the technical superiority of broadband but rather on what local firms think of broadband and where the service was actually available. Cardiff Council sent copies of the brochure and invitations to a series of broadband events launching 'Cardiff – the Connected City' to over 4,000 businesses in the city. The results have been impressive with broadband connections in Cardiff now growing at a faster rate than London (See Fig 9.) and 30% above the national average. What is also significant from a public policy perspective is that across the UK BT tends to sell 90% of circuits to the home market and 10% of lines to businesses. In Cardiff 25% of connections are business connections, illustrating the value of what local marketing and real public/private partnerships can achieve.

The next phase of the Cardiff Connected City initiative is the creation of a Broadband research and demonstration centre, which is due to launch in March 2003. This facility, already in existence, has been designed to provide pro-active expertise to the local SME community and again is a partnership between the council, eCIC and BT. The next phase also includes targeting exchanges that have not been ADSL enabled and creating demand for the service to raise the registration levels. The Cardiff partnership has been

so successful that the template has been replicated in 13 cities across the UK and even in several London boroughs.

13.   Caerphilly – Corus Regeneration Partnership Project

The Connecting Caerphilly *Cysylltu Caerffili* project will use an innovative model to break this vicious circle of supply and demand, based on collaboration between several organisations, all of which share the same aim of increasing the up-take and use of broadband technology in Caerphilly County Borough.The partners in this project are Caerphilly County Borough Council, BT and the Welsh Development agency, supported by the Corus Five Counties Regeneration Partnership, ELWa, Opportunity Wales and local business agencies.   Broadband technology is seen as a critical enabler of Caerphilly County Borough's economic development strategy.   The Connecting Caerphilly *Cysylltu Caerffili* project is a fundamental pillar of the Corus Five Counties Regeneration Partnership's ambitions.

The shared mission of the project is:

> **"To make a substantial contribution to economic development and regeneration of Caerphilly County Borough by providing pro-active and sustained support to SMEs, micro businesses and a range of organisations and consumers in order to equip them with the necessary knowledge, understanding and infrastructure to enable them to gain full benefit from their use of ICT and developing broadband technologies. "**

An outline of the project is given in the following paragraphs:

- Caerphilly County Borough Council has secured funding from the Corus Regeneration Partnership to provide a direct subsidy for up to 1500 small businesses to purchase broadband. The broadband subsidy will pay up to 50% of the cost of connection and rental for the first 12 months for participating SMEs, to a total of £350k. The subsidy is applied in addition to any reductions or special offers made by BT as part of a wider UK marketing campaign.

- Given this public sector funding for demand stimulation, BT has agreed to pre-enable up to five exchanges in Caerphilly County Borough and underwrite the risk of achieving insufficient uptake to justify the considerable financial investment. The Council has agreed to target the subsidies in these pre-enabled exchange areas to stimulate demand for broadband. The Council will ring-fence sufficient subsidy towards each exchange area provided with ADSL as a result of this project to help ensure that pre-enablement trigger levels are met.

- The SME broadband subsidy scheme is being offered to SMEs as part of a wider initiative within Caerphilly, the Caerphilly Bisnet Project, aimed at stimulating demand and increasing usage of information and communications technologies. The Connecting Caerphilly *Cysylltu Caerffili* project will also harness the support of local business agencies and initiatives, including Opportunity Wales and Business Connect, through their networks of ICT advisors and demonstration centres, and the WDA WIS trailer.

- Caerphilly County Borough Council has already engaged in a major broadband demand stimulation project with BT, including a mail-shot of broadband literature and pre-registration scheme material to all of its 9500 employees and 2000 SMEs. This targeted marketing activity will continue through the life of the project, and BT will also support a localised face-to-face campaign to raise awareness and connections amongst the 28,000 consumers that will be provided with access to broadband as part of the project.

- A further aim of the Connecting Caerphilly *Cysylltu Caerffili* project is to bring the benefits of broadband to other sectors of the community, including education, the voluntary agencies and the disadvantaged or disabled. The partners will investigate other means of extending the project using further incentive schemes and/or public funding to facilitate the take-up of broadband in communities such as these.

The Connecting Caerphilly *Cysylltu Caerffili* project fully supports the Welsh Assembly Government's Broadband Wales programme in bringing the benefits of this technology to all sectors and communities in Wales. BT hopes that, in ongoing partnership with public and private sector organisations, it will be possible to replicate the Caerphilly model in other parts of Wales.

14.   Future deployment and the potential role of broadband Wales

BT, through its innovative broadband programme and technology trials, is working hard to find commercially viable ways of serving as many customers as possible. Telecommunication regulation in Britain has created, perhaps, the most competitive environment for internet access in the world. This emphasis on competition has, however, meant that whilst there is fierce competition in densely populated areas there is very little in other areas. BT is the only network provider to have a truly all-Wales network and very often is the sole supplier of broadband or telephony services at a Wholesale infrastructural level.

Currently the WAG are monitoring the activities of broadband infrastructure suppliers such as BT before deciding on the exact details of their infrastructure support programme. The intention is to let the market serve as many people as possible before intervening. Although this is clearly effective in ensuring that the subsidies are used as effectively as possible, there is a danger that Wales will lose the competitive advantage it will gain if it acts quickly.

15.   Will the aggregation of public sector networks release sufficient funding to pay for ubiquitous broadband?

BT has already been working with the Scottish Parliament to understand how best to roll out broadband in non-commercial areas and has learnt much from this experience. This work included a study of one of the main suggestions of the Analysys report in to

Ubiquitous Broadband for Wales, whether the aggregation of public sector demand would release sufficient funds to pay for ubiquitous broadband coverage. The finding was that the aggregation of public sector voice and data services would not release sufficient funds to contribute to creating ubiquitous availability of broadband.

16.   How can the Assembly maximise broadband coverage in Wales?

On this evidence, BT believes the National Assembly and WAG should focus its activities on direct market intervention, an element that is already central to its Broadband Wales strategy. To this end BT has created a blueprint for intervention that will meet the WAG targets of accelerating the availability of affordable Broadband to 30% more of the population than pure market forces will provide.

BT has developed a statistical model to gauge where the market will deliver broadband over the short term (0-6months) and then categorised the remaining areas by the level of direct subsidy that is likely to be required per user to provide broadband services.

The exchange areas can be broken up as follows and are displayed visually at Fig 10:

Band 1

- Exchange areas that have already been enabled or that will be through the registration scheme over the next six months.
- Characterised by the fact the majority have at least two network operators providing Wholesale competition
- Multiple Retail suppliers active.

Band 2

- Exchange areas that with a direct subsidy of £200-£300 per users as a one-off payment could be broadband enabled. The users would then pay the same rental as any other broadband user.
- The exchange, due to the poor market characteristics would have a single network supplier and, therefore, no Wholesale competition. Only a with a single supplier would there be sufficient demand to allow such a low intervention level.
- The exchange area would have multiple retail suppliers and effective competition at a retail level.

Band 3

- Exchange areas where a direct one-off subsidy of in excess of £1,700 per user would be required for broadband enablement to occur.

- The exchange, due to the likely low population density, would only support one network supplier and one retail supplier.

Figure 10 – BT Exchange areas by Band
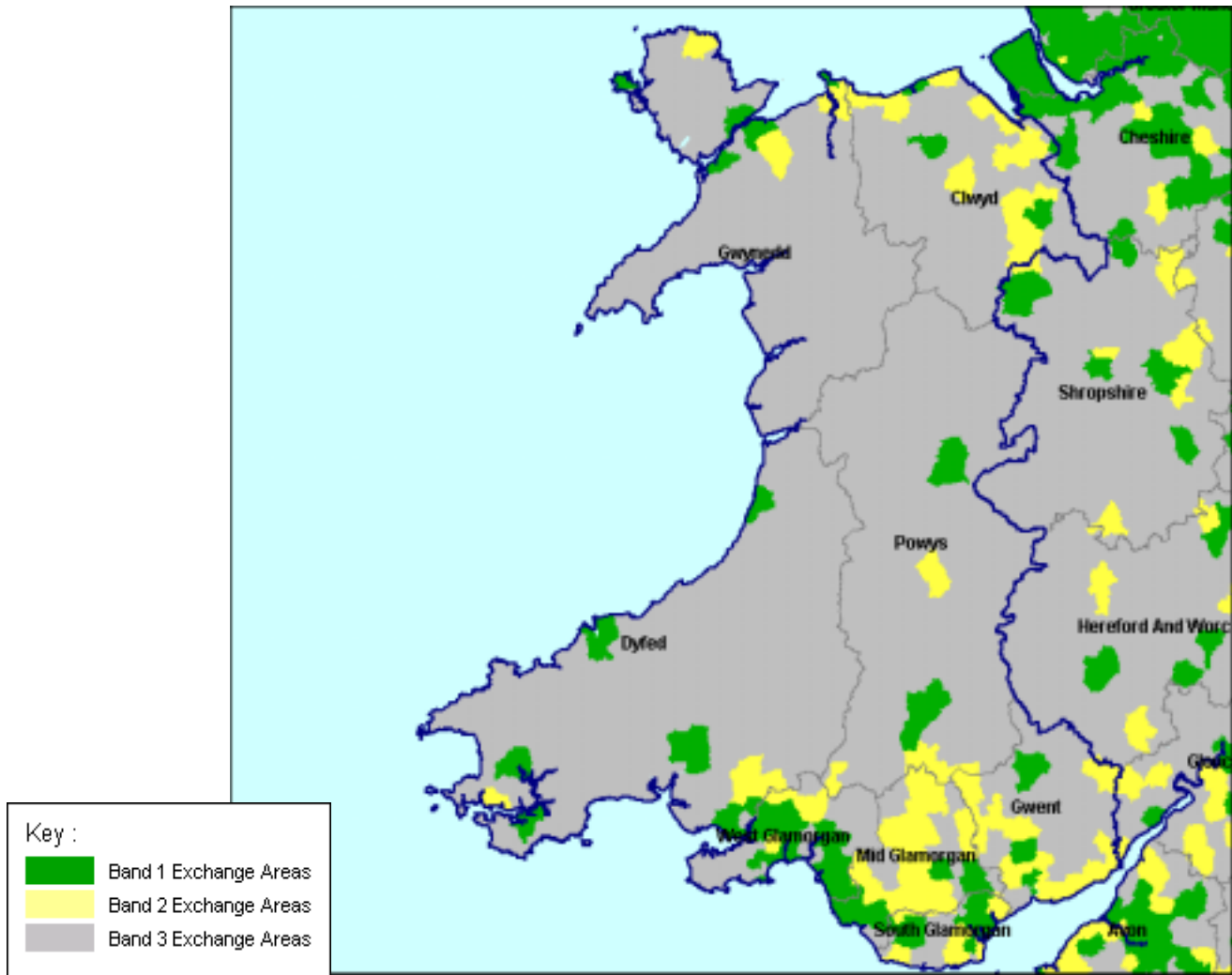
17.   Policy Considerations for National Assembly for Wales

BT recommends that the National Assembly should consider:

1.   whether to engage a single supplier to maximise the broadband footprint for Wales. The more suppliers, the fewer the economies of scale and the smaller the footprint will be;

2.   what mix of exchanges to target. The £40m suggested as the direct intervention fund under Broadband Wales, is not enough to provide ubiquitous broadband in Wales. It is, however, sufficient to meet the policy objective of the Wales Assembly Government by providing broadband access to an additional 30% of households and businesses in Wales beyond those which it is believed can be supported by market forces. Broadband is very often at its most effective as an enabler of economic development in rural areas. BT's suggestion would be to target the entirety of the Band 2 exchanges and selected communities within Band 3 to ensure that rural communities do not miss out on the benefits of Broadband Wales. Targeting such as this would provide additional broadband access, through a range of technologies, to approximately 470,000 households. This type of intervention would also provide broadband access to an additional 30,000 businesses, which is in addition to the number that will benefit from broadband access through the Broadband Wales Business Park programme. This intervention would mean that over 70% of Welsh households would have access to sustainable broadband services and virtually 100% of businesses users (70% non-satellite/the remainder via satellite);

3.   ensuring that the technologies and economic models employed guarantee the sustainability of the broadband services;

4.   the policy trade-off between competition and broadband coverage, if it is to maximise the broadband footprint of Wales;

5.   becoming, through its staff and elected members, a broadband ambassador for Wales demonstrating best practice, building on its existing position as a centre of excellence; and

6.   taking early action to implement its proposals.

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As part of BT's bilingual policy, a Welsh language version of this report can be obtained.

Appendix 1

Tow case studies have been included although another three Wales based case studies are available.

1.   Broadband Case Study – Welsh Farm Suppliers Ltd

A Broadband connection allows Aberystwyth company to lead the way in using eCommerce to reduce costs and improve efficiency in the agricultural supplies industry.

Introduction

Welsh Farm Suppliers (WFS) is a buying co-operative which works on behalf of Welsh agricultural co-ops to achieve costs and efficiency savings. The company was set up in 1972 to provide a group purchasing scheme for 30 or so different Agricultural Co-operatives which existed in Wales at that time. The original groups have subsequently consolidated, others have joined and membership now stands at 12. On behalf of these members WFS now purchases in the order of £30m worth of goods and services per year representing between 30,000 to 40,000 different products/services. Typically in any one year WFS buys 48,000 rolls of field fence, 30,000 tonnes of sugar beet, 1,200 tonnes of bale wrap and much more including £2.5 million of pet food.

Based in Aberystwyth in Mid Wales, WFS has recently installed a BT ADSL connection, costing less than £30 per month, to improve their Internet access speed, allow more staff to use the Net and to use as a key tool in their drive to receive invoice data in an electronic format from their suppliers.

WFS is an example of a number of traditional companies getting together to benefit from group purchase and where as well as using eCommerce developments in the procurement process, are benefiting from improved communications and reduced operating costs in a business to business trading environment.

About the company

Background

WFS employ seven staff, headed by John Rees the managing director. They also run a subsidiary company Border Distribution 2000 Ltd, based in Craven Arms on the Shropshire/Wales border.

WFS have 12 member organizations who own the company and who in turn supply to a high percentage of the Welsh rural community. They include:

Carmarthenshire & Pumsaint Farmers Ltd

Carrs Billington Agriculture

Clynderwen & Cardiganshire Farmers Ltd

Corwen Farmers Ltd

Countrywide

Dyfed Seeds Ltd

Eifionydd Farmers' Association Ltd

Hay & Brecon Farmers Ltd

Isle of Man Farmers Ltd

WAOS Ltd

Wrekin Farmers Ltd

Wynnstay Group Plc

The member organizations are based predominantly in Wales and the borders and between them they operate over 100 local depots acting as SMEs in their own right.

WFS negotiates price and terms on behalf of members who in turn can order either direct on the nominated suppliers or via WFS. Goods are delivered to the ordering members whilst invoices are dispatched to WFS. In turn member organisations get a summary invoice with a copy of the suppliers invoice attached (rather than a detailed line by line listing of products and prices). The processing of invoices and their subsequent distribution to members has traditionally been a manual process involving some 12,000 plus sales and purchase invoice each year.

The agriculture supply sector and eCommerce

The agriculture supply sector in general has been reluctant to embrace modern technology and electronic trading. However the volume of invoices received by WFS and the need to analysis product information within their own IT systems were the driving forces behind their exploration of possible electronic alternatives. At the time WFS was the first agricultural supply business in the UK to go down this path and Wales could be said to be as the forefront of an industry sector's adoption of electronic trading practices.

WFS still make use of the phone and fax to communicate with their member organisations and their individual depots. Each depot has a unique Article Numbering Association or ANA code which uniquely identifies the depot and its location. This is used by all suppliers to ensure goods are delivered to the correct address. The intention is certainly to make greater use of eMail to support all aspects of communications. eMail works well with suppliers but not many of their member depots, the sites on the ground who have direct interface with the agricultural community, have Internet access. It is thought that the wider availability of a better communication links at an affordable price could significantly improve the way that rural businesses operate. They eagerly await the arrival of ADSL.

Hywel Davies, the IT and Finance Controller could see WFS should reduce their reliance on paper documents. In 1998 the company invested in their first EDI (electronic data interchange) system which used a common format for the receipt of invoice data from suppliers. It cost in the order of £10,000 to set up and £1500 a year to run and whilst no formal cost benefit analysis was undertaken, it was calculated that the cost would be more than recouped.

Certainly the major benefits identified in early discussions have materialized. They were the improved information which they would have to hand when negotiating future contracts as well as keeping control over the growing clerical task of inputting invoice data into their systems. Prior to EDI, staff had to manually calculate the volumes of specific products purchased prior to any supplier negotiations. This could take several days for each supplier but now it takes only a few minutes for those suppliers using EDI.

WFS deals with companies who already trade with the retail supply sector and builders merchants, two areas which were strong users of EDI. None of these suppliers approached WFS about the possibility of EDI links. It appears they thought the agriculture sector was lagging behind and any suggested use of electronic exchanges would be rejected.

It was WFS who made the first move to replace a high percentage of paper documents by electronic equivalents. They have approximately 300 suppliers although some of these are small and the volume of business is limited. 20 major suppliers were identified who provided 30% of invoices by value and they were approached with a view to implement an EDI solution. Existing EDI users were happy to start trading electronically but there were a number who still relied on paper. As such WFS became the central EDI hub and had to take into account the fact they needed to provide help and support to enable their non EDI suppliers to adopt a new way of working.

After two years the number of trading partners using EDI was roughly the same. Some suppliers had been dropped and new ones taken on but overall the EDI uptake was disappointing. WFS particularly struggled to persuade many of its smaller suppliers to exchange information electronically. They, along with some existing users, were fearful of spiraling costs and technical complexity associated with traditional EDI and many smaller organisations simply preferred to stick with paper based invoices. Even some of the existing 20 EDI users, who didn't use EDI for links with any other customers, started to push for an alternative to EDI.

Business case for ADSL

The search for an alternative solution

In 2000, WFS employed a student on an 8 week project to look at EDI developments and what solutions were available which would make it easier and cheaper for the smaller suppliers to trade electronically. Various options were identified including the use of EDI solutions such as bureau services or completion of on-line Web forms. Whilst these did make EDI potentially "easier" the benefits from integration were usually lost. The student identified the growing significance of XML (eXtensible Markup Language), a way of defining data and which increasing numbers of software developers were adopting for use with their products. The possible alternative to EDI was quickly limited to XML, particularly as documents formatted to the XML standard could easily be transmitted as eMail attachments. This did away with the cost of a dedicated EDI network and had the potential to make the electronic exchange of invoice data possible with even their smallest supplier.

Whilst XML defines data formats it was the fact that eMail could be used to transfer data that made it attractive. The possibility of integration with different back office systems was an added benefit. In order for the new approach to be successful, WFS would need to improve their Internet connection and this is when they started thinking about broadband. They required an always on Internet connection and a "big" communication pipe which could support their ultimate objective of total process to process exchange of invoice data.

The company installed an XML product from Freeway Commerce known as Spectrum Professional which in addition to handling incoming XML messages also provided full integration into the central Sage package that WFS used. The product cost in the order of £1500.

In the smaller suppliers, Freeway Spectrum was installed at a basic cost of £500. The package is able to extract invoices automatically from supplier systems and send them to WFS as XML messages attached to eMails via the Internet. Whilst one of the initial suppliers paid extra for the product to be installed by Freeway, another took the free, remote installation route which cut down the overall cost.

Suppliers

XML links between a supplier and Welsh Farm Suppliers

As of October 2002, WFS has two additional suppliers sending invoices electronically using the Freeway XML solution and one of the initial EDI users has switched from EDI to the XML option. This number will rise over the next 12 months as part of WFS's strategy to move to an all electronic exchange of invoices.

Typically one supplier sends 12 invoices every 2 or 3 days whilst another sends between 20 and 30 invoices at a time. This shows that where such numbers may not have been viable for an EDI solution, the XML route is more attractive. All the invoices are combined into one large eMail attachment and they are subsequently unwrapped by the receiving system and treated as individual invoices.

Whilst the exchange format is XML the data is transferred between two identical software packages. In theory they could have used any two XML compliant packages but there are still minor compatibility problems and it was easier to use products from the same supplier. At the WFS end the Freeway software converts the XML formatted invoice into the TRADACOMS invoice V9 format as used by the major suppliers still sending EDI. This ensures that the WFS Sage system deals with only one imported file format.

Using dedicated EDI networks, full end to end security is provided. However, the Internet has the potential for greater security risks and these were taken into account by WFS. They were aware that in theory documents could go missing or someone could intercept a message. This was a risk they were prepared to take as there were various procedures in place which would ensure if a message did go astray (and these were only invoices) someone would know. Either the supplier would shout if they didn't get paid or the depot would say something as they didn't have a match with a delivery note.

Benefits of Broadband

With the growing use of the Internet and the drive to exchange invoices as eMail attachments, a fast, always on Internet connection was important. WFS were using a BT ISDN2 link to their Internet Service Provider (ISP) who was also BT.

At the cost level, ISDN was £150 per quarter and £15.99/month for their ISP connection. This gave an annual cost of £792 and whilst connection speed was much better than their original dial up connection, with an increasing number of staff using eMail or needing to look for information on the Internet, access speeds were slowing down.

WFS selected the Broadband Business 500 solution from BT which gave download speeds up to ten times faster than a 56K modem and five times faster than their ISDN link. Their monthly cost is £29.99 or £360 a year, giving a cash saving of £432 on their ISDN Internet connections. What is more important than their reduced costs is the improved service and ability to offer fast access to all staff.

ISDN (5 USERS)   ADSL (30 USERS)
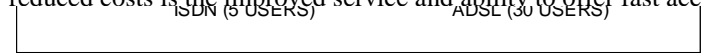
The Business 500 solution is aimed at home users and single user businesses but WFS have sufficient resources in-house to enable the single user solution to be adapted for multiple users even though BT would not support the product used in this way.

ADSL has significantly improved the speed at which staff can access the Net as well as being able to offer Internet connection to an increased number of staff not only within WFS but also within the building in Aberystwyth which they share with other agricultural organisations. Not only is Internet access and speed better but ADSL has enabled faster services to be offered to members.

In particular FAWL, Farm Assured Welsh Livestock are now able to update their Website of approved suppliers on a daily basis, rather than do it once a week due to the limitations of the old Internet link. FAWL provides an important livestock certification scheme which is used by supermarkets, slaughter houses, vets and others in the food chain and which until the arrival of ADSL was always at least a week out of date. The weeks delay was a bigger problem because new certifications where the ones interested parties were typically looking for on the FAWL Web site and it was these which took time to upload.

The Future of eCommerce and Broadband

WFS certainly see that what they have achieved to date with EDI and XML is only the beginning. In 12 months time they see that they may well have to accept a wide range of file formats but increasingly they will be all process to process electronic exchanges but Broadband has given them a communications link that can cope with future expansion.

Whilst already exchanging information electronically, they have yet to use technology to capture the basic information and this is where their plans for bar-coding will be beneficial. Border Distribution is already undertaking a trial which could be extended to all members.

WFS have also been approached by a leading agricultural eMarketplace provider. First4Farming (F4F) aims to bring together farmers, merchants and manufacturers in one on-line marketplace. First4Farming are targeting farm supplies as first priority within their business plan. The forward thinking nature of the company, their experience with EDI and their desire to adopt the latest eCommerce solutions was one of the reasons why F4F asked WFS to be one of the first to make use of the on-line facility. The initiative is being supported by many agricultural manufacturing companies as well as the likes of "Farmers Weekly". 100% of all trade done through F4F will be paperless and WFS could well use the F4F facility as their future electronic links with member organisations and ultimately the interface to individual end customers, the farmers. Again, broadband gives them the communication capability to take part in such projects.

Various member organisations from WFS are also looking at replacement business packages with an underlying objective of selecting a solution which could be used by each partner. If they opt for the common software package approach, WFS could well adopt the same package and then they would have a straightforward communications issue with their members with no file format compatibility issues. Some suppliers would still send EDI invoices and others XML files via eMail.

When ADSL is available in Craven Arms, WFS will set up a Virtual Private Network with their subsidiary Border Distribution 2000 Ltd improving the real time communications link to their depot 50 miles away. At the moment they have to make use of a 64K Kilostream link from Aberystwyth.

Within their member organisation, Hywel Davies can see a significant benefit when ADSL is available to all. At present, most depots can only upload local data to their parent company using a dial-up link overnight. ADSL would allow an almost real time update and help overcome the fact that because of the way the uploads are managed, information at present may be up to 2 days out of date and central systems may not give the correct information required for re-ordering.

In North Wales, one of their members installed a Kilostream link to each of their depots at a cost of £1000 per year. This had a significant impact on the profits from some of their smaller depots and they are now taking the Kilostream link out and going back to overnight updates.

Summary

Welsh Farm Suppliers know that all future information exchanges both with suppliers and also member organisations must be in electronic format. The price and technical complexity of any solutions is a prime consideration, especially with their small trading partners. The technical complexity they think they can overcome by the use of XML compliant solutions and the Business 500 ADSL Broadband offering from BT has given them the communications capability they had always wanted and at half the cost of their previous solution.

2.   Broadband Case Study – Computer Finder Ltd

Broadband enables small computer retailer to beat customer service targets.

Introduction

Computer Finder Ltd is a small computer retailer based in a busy area of east Cardiff. They are able to compete with larger competitors by

providing customers with quality products at competitive prices with particular focus on high quality customer service.

Broadband is essential not only for their core business of building computer systems but also as a key component in communicating with customers and providing high quality support. This case study looks at the problems the company had with existing business processes, how they have changed and improved as a result of implementing Broadband and identifies the benefits they have achieved to date and expect to achieve in the future.

About the company

Background

The owner and manager, David Zephir, started Computer Finder in 1999. The company's main activity is building desktop computers to individual customer specifications. They are able to offer very competitive prices, which enables them to compete with large High Street retailers such as PC World. They also carry out PC repairs and upgrades as well as selling computer components such as graphic cards, peripherals and consumables. They are based in a busy location of east Cardiff near the town centre and in April 2002, as a result of outgrowing their earlier premises in the same area, re-located to larger premises which provide a retail shop, workshops and office space above.

Their customers include Cardiff students and the general public, as well as businesses and organisations in the Health and Education sectors e.g. colleges and hospitals in Cardiff and Newport.

The company currently employs three full-time members of staff including the owner, a technician and an administrator. They also employ one casual worker and usually have up to three trainees at the premises on work placements. They support local comprehensive schools by providing work experience opportunities for students. As well as managing the business the owner, along with the full-time technician, builds and repairs computers and deals with customers in the shop itself.

They buy from five key suppliers of computer components but as yet do not use any form of eCommerce, preferring to use traditional methods of phone and fax to place orders. The reason given by the company was that they prefer to negotiate with suppliers and feel they can do this more successfully over the telephone. The order is then sent to the supplier by fax.

Like many Welsh SMEs they found they were so busy dealing with day-to-day activities that they simply had no time to improve basic business processes.

Technology

They still have separate phone lines for fax and the credit card swipe (PDQ) machine and a dedicated line for sales and support enquiries and have just installed a small ePOS system for stock control purposes.

With Broadband in place they have installed a firewall to provide security for their always-on connection.

Several of their key business systems have been developed by a local freelance computer programmer who was also used to design and build the company Web site. This is hosted by Innerhost and is used extensively to interact with customers, provide up-to-date information and after sales service. At the moment customers can view product information, delivery times and prices but cannot make payments on-line. However, the company is currently testing the World Pay on-line payment system for possible implementation in the near future. The company maintain their own Web site as they need to update price and product information on a regular basis.

Future plans

Computer Finder aims to continually improve customer service and is eager to use the latest technology to achieve this. In the near future they plan to automate certain aspects of support by using the software customer service interface "Antonio" on their Web site to answer technical questions.

They intend to expand and improve their sales and support processes, which will require hiring additional staff to create a dedicated sales and support team with their own office space on the premises.

They are also in the process of developing their own on-line auction facility to sell off surplus stock.

Business case for ADSL

Prior to implementing Broadband, Computer Finder used a standard 56 kbps dial-up connection to access the Internet, and had three separate lines for Internet access, telephone and fax. They utilised two different ISPs – AOL's flat rate Anytime service (£14.99 per month) and a service from Onetel which was charged at 1p per minute. The reason given by the company was quality of connection – they would choose whichever ISP provided the fastest access at the time.

A key requirement for Computer Finder is the ability to search for and quickly download large software files. The Net is also vital to providing high quality customer service and interacting with their customers – something which they feel differentiates them from their competitors.

The company knew they could benefit from using the Internet in many areas of their business but a dial-up connection with slow access speeds simply was not capable of supporting this.

They found that with a dial-up connection *"it was very difficult…we hardly used the Net in work and often had to take work home and make use of Internet access at home to complete it"* (administrator). ISDN was not considered a viable option by the company as in their view it did not offer significantly faster speeds and was too expensive before the flat rate tariff was introduced.

The company looked at the emerging options and felt that they could be much more productive with a fast, always-on connection and decided to install a basic ADSL connection. In November 2001, they opted for BTs Business 500 service (500kbps) at a cost of £29.99 per month. When they relocated in April the next year, they had ADSL installed in the new premises.

Table 1. Comparison of first year costs for dial-up and ADSL (based on AOL flat rate Anytime service and Business 500)

	Charges for 56 kbps Dial-up Per annum	**Charges for ADSL per annum**
	£	**£**
Monthly charges	179.88	359.88
One off set-up fee	00.00	210.00
One off additional costs (hardware)	00.00	00.00
Total	**179.88**	**569.88**

Benefits of Broadband

The convenience and fast access speed of ADSL has allowed Computer Finder to make far more efficient and effective use of the Internet. The company's main uses of the Internet are:

Searching for and downloading files (software drivers and patches)

Regularly updating price and product information on their Web site

Communicating with customers, such as answering technical queries or providing quotes and confirming orders to customers submitting their system specifications

Monitoring community building aspects of their Web site such as the Message Board facility

Bank on-line e.g. to monitor cash flow and manage staff wages

Source suppliers, compare prices and pay on-line (where available) for office consumables

They also use the Internet to participate in on-line auctions for one-off items e.g. office equipment.

Downloading essential software files

Computer Finder's core business is building computer systems. They build anything from 70-100 computers per month and estimate that there are at least five computers for repair and/or upgrade in the workshops at any one time.

One critical aspect of this process is searching for and downloading software drivers and patches. A driver is a piece of software that controls a particular device, such as a printer or disk drive, and allows other programs to use that device. A patch is a "fix" to a program problem (or "bug"). Drivers and patches are used regularly by Computer Finder either to build new computer systems or to carry out computer upgrades and repairs. Customers frequently lose drivers, which Computer Finder then has to find in order to carry out a repair.

Prior to installing ADSL, searching for drivers, especially older drivers, was a slow and above all time-consuming process. Regular sources of such files are "bookmarked" but there are literally thousands of drivers and patches available which are regularly updated. Consequently, there is no guaranteed central source of such files and some searching is therefore unavoidable. They estimate staff have to search for drivers or patches on average twice a day. Using a slow and often unreliable dial-up connection made the whole process painfully sluggish – pages take an age to appear on the screen, staff might then have to wade through several pages on a particular Web site only to find the software they were looking for was not there and then have to go back to the search engine and start the whole process again. Laptops are more of a problem because components are specific to the model of laptop and become outdated very quickly, whereas with PCs components are typically appropriate for most models. The company estimates anything from 1-3 hours might be spent searching on the Web for a particular file.

In addition, such files can be quite large (the average size of the files they use is 20MB) which are very slow to download over a dial-up connection even without disconnection problems (approximately 2.5 hours for a 20MB file). Having only one PC connected to the Internet also severely limited the number of files they could download in a day. They could not operate at 100% effectiveness as staff suffered a lot of "dead time" as they waited for essential files to download and were interrupted from jobs they might be doing in the meantime by the need to check whether the download was complete or if the connection had been "dropped". There was always a potential for bottlenecks to occur.

As an example, to build a very basic computer system typically takes Computer Finder one hour to put the hardware together and another hour to install the software and configure the system. However, if a patch is required e.g. to enable MS Windows to operate correctly with a particular hard drive specified by the customer, then staff have to find it (if not already available to them) and download the patch from the Internet. With a dial-up modem connection this could delay completion of a job by several hours – *"It was a real problem and could take all morning or sometimes all day!"* (Owner)

ADSL has brought significant time savings, allowing the company to complete jobs the same day where previously it might take 2 days or even longer in the case of laptops. Broadband access therefore enables Computer Finder to offer a vital "same day" service to their customers – *"before we were less gung ho about telling customers to come back the same day or the next morning. We were much more cautious about the deadlines we set for ourselves."*

Prior to ADSL they effectively lost time equivalent to half a full-time employee each week on downloading essential software. Based on downloading just two files a day (2.5 hours per 20MB file) time spent downloading has decreased from 25 hours per week to just under an hour (50mins).

ADSL

With a broadband connection Computer Finder can:

Operate effectively – no more "dead time"

Meet customer expectations – "same day" service

The valuable time freed up by Broadband has enabled Computer Finder to develop and put in place proper procedures to further improve and speed up internal processes.

Table 2. Cost savings for downloading files

	Cost with dial-up connection £	Cost with ADSL connection £
Cost of time spent downloading files	*6,000.00	**200.00
Total annual cost	**6000.00**	**200.00**

* (25 hours x 48) x £5.00 with dial-up

** (50 mins x 48) x £5.00 with ADSL

Based on an hourly wage rate of £5.00

Updating the company Web site

Their Web site is viewed as an essential interface with their customers and considerable time and effort is committed to ensure its success and usefulness to the business. They use an on-line catalogue to provide product and pricing information to customers via their Web site and this information must be kept current which means the site has to be updated on a daily basis. ADSL has cut the time spent on this essential activity from around 2 hours a day to half an hour.

Providing customer service and communicating with customers

The Internet is used in a variety of ways to interact with customers e.g. when serving with a customer in the shop staff will use a PC to carry out product checks and find information (usually by searching their own Web site).

Customers are encouraged to submit questions and enquiries to the company from the Web site. When staff arrive in the morning there are usually 3-5 eMails from customers which need answering. Further eMails then come in throughout the day. These are now answered when they arrive whereas prior to ADSL this had to be fitted in as and when it was possible.

Customers are also able to "build their own computer" via the Web site by constructing and submitting their own specification on-line. Computer Finder is able to give them a quote and delivery time and the customer can either telephone or eMail them to discuss their choice. Then they can eMail their order or print it out and use more traditional means e.g. sending it by fax or bringing it in to the physical shop.

The company has had considerable success in building an on-line community through their Web site. Customers can make use of Message Board and Exchange (buy and sell) facilities on-line. Computer Finder is responsible for updating the message board. They also have to monitor it on a regular basis, not just to check that people are not posting messages that are likely to offend other customers (and so ensure the board remains an attractive and useful resource) but also they have found that competitors post on the board in a bid to steal their customers!

The Exchange facility allows customers to trade second hand computers, components and other items amongst themselves, like a classified ad section in a newspaper. This is updated by the company, but they are not involved in any financial transactions. Updates to the Message Board and Exchange are done daily.

In addition, Computer Finder produces an electronic newsletter which they distribute by eMail to customers every 2 weeks. Customers can subscribe to this newsletter on the company Web site and so be kept informed of new products, special discounts etc.

This kind of interaction with customers was time consuming and inefficient with a dial-up connection. With a fast, always-on ADSL connection eMails come in immediately (no need to connect and wait for eMails to download any longer) and uploading, such as updating the message board, is done at the push of a button.

Other benefits

An interesting benefit of ADSL resulted from the company's use of on-line auctions. They participate in auctions to bid for one-off items such as office equipment. They have lost out on several "bargains" right at the last minute in the past with a slow dial-up connection but have found that this activity is much easier and quicker with a fast, always-on connection. ADSL's speed and reliability (i.e. no dropped connections) allows them to really take advantage of such auctions and secure some bargains to boot!

A technology the company has not considered, which they could take advantage of now that they have Broadband, is the use of Application Service Providers (ASPs). This technology could enable them to outsource certain aspects of their ICT needs and potentially cut costs. ASPs offer businesses access to applications and related services on a rental basis via the Internet and could potentially relieve many of the problems associated with the purchase of software, such as large investment costs, IT support

and outdated software. Computer Finder might consider using customer service and customer relationship management software applications which they might otherwise find difficult to justify or afford.

Summary

Computer Finder is typical of many small Welsh businesses in that although they operate in a "high tech" area, they have many of the problems and issues faced by any small company.

They have always known that they could benefit from using the Internet in many areas of their business especially when interacting with customers but a dial-up connection simply was not capable of supporting their ideas and alternative communications options were too expensive.

The fast, always-on Internet access provided by ADSL has enabled them to dramatically increase productivity, improve and streamline customer service and carry out essential business processes far more quickly and effectively.

"It's so convenient and fast...we are saving time everywhere you go, right along the way."

The valuable time freed up by Broadband has enabled them to develop and put in place proper procedures to further improve and speed up internal processes.

Computer Finder is only just beginning to experience the benefits of an always-on, low cost Broadband connection.

"We now do as much as possible on-line... the internal effects are already clear, as speeding up administrative tasks leaves more time to concentrate on commercial activities".

Savings in time and money were what initially attracted the company to the BT ADSL connection but in the longer term the major benefits will be in the new ways in which Broadband will allow the company to work.