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# Can broadband access rescue the rural economy?

Broadband  
access

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## Abstract

**Purpose** – Government is promoting broadband for all, and specifically, is advocating business up-take of broadband that affords high-speed internet activity, to foster global competitiveness. Urban areas have economies of scale and the effect on price of concentration of demand. Rural areas do not, and potential broadband provision is thus problematic. The paper aims to study technology roll-out in rural areas, and provide a commentary, based on empirical work, on the potential of demand for, and use of, the service.

**Design/methodology/approach** – The paper draws from secondary research sourced from academic papers, government and agency documents to evaluate rural broadband provision, and analyses the suitability of current “solutions”. It also draws together conclusions of various empirical and survey researches on the potential of uptake and business use of broadband.

**Findings** – The paper questions whether broadband access in rural areas has the potential to contribute to economic development. It also identifies the limitations of current broadband technologies, concluding that, in fact, none are appropriate for rural and remote locations. The paper finds that rural businesses tend to lack propensity for growth and diversification; therefore, accessibility for rural businesses may be an issue secondary to that of lack of enterprise in many rural areas. Therefore, efforts to roll out technology to rural areas may not provide results desired or expected.

**Originality/value** – The value of the paper lies in providing a holistic viewpoint, based on research and technology considerations, from which policy can be informed.

**Keywords** Rural areas, Small enterprises, Broadband networks, Electronic commerce

**Paper type** Viewpoint

## Introduction

In modern economies the roll-out of technology is increasingly being seen by government as that which has the potential to enhance economic development and competitiveness. The take-up and use of, specifically, information and communications technology (ICT), over the last couple of decades throughout the social and economic environments has been rapid to the point of current ubiquity in many cases: ICT now impacts on most aspects of modern life. The trading environment is no exception, and firms are currently experiencing challenges, risks and rewards as a result of internet inclusion and participation, particularly. The internet and world wide web have revolutionised the way in which companies can operate, trade and compete. Most recently in the UK, as elsewhere, government has encouraged the up-take of broadband technology which affords high-speed internet access and activity (DTI, 2004a). Particular attention has been paid to solving the problem of creating broadband accessibility in hard to reach places such as rural[1] and remote rural locations (defra, 2003). The current paper seeks to investigate the potential and appeal of broadband and, based on empirical studies of the nature of rural economies, analyse the extent to which broadband technology solutions in rural areas can and will impact to any extent on rural economic development.



### **The e-business revolution**

International communications technologies such as the world wide web have created an environment that presents advantages to individual firms. Zinkhan (2002, p. 412) estimates that in the USA, for example, "approximately 50 million Americans are currently on-line", and cites Granic (2001) by stating that "more than half of those ... also shop there". Baker (1999) observes similar in the UK context, and Grant (2003) reports that the International Data Group estimates that "e-commerce grew to \$600Billion in 2001, a 68 percent increase over 2000". Buhalis and Main (1998, p. 201) specify that "the Internet is gaining commercial viability and is particularly suited to small business, where it enables [them] to keep doors open 24 hours a day, at minimal cost to customers all over the world". With access to increasing markets throughout the world, businesses, including those in rural areas, have a unique opportunity to expand from the traditional and local, to the global (Reynolds, 2000; Amit and Zott, 2001; Lawson *et al.*, 2003). Whether a firm trades online with customers or not, however, the internet can give firms the advantage of increased profile, in that it can allow companies to present information to potential customers (Tse and Soufani, 2003), and provide another channel for the purposes of brand building (Jacobs and Dowland, 2000), advertising, and marketing (Turban *et al.*, 2000) via the ability to develop relationships with customers through information gathering and personalised marketing (Anderson and Lee, 2003). The internet can also allow access to increased and improved supply chains (Kaplan and Sawheny, 2000; Hawkins and Prencipe, 2000) in that "firms have the ability to find a greater number of suppliers, to communicate and interact internationally with a larger number of companies involved in the supply chain" (Baourakis *et al.*, 2002, p. 582). The internet can also have a positive impact on business networking. Tse and Soufani (2003, p. 310) refer to "strategic networks consisting of different players in the market [becoming] an essential form of organisation" via electronic business participation. This could have important implications for rural firms in that "the unique characteristics of the virtual market enable firms ... to identify and incorporate valuable complementary products and services offered by different companies into their bundle of offerings in a novel way" (Tse and Soufani, 2003, p. 310). In rural areas it has been shown that the locality itself can be marketed (McKain, 2003; Deakins *et al.*, 2004), so by extension, businesses within a locality can group strategically online to exploit this potential. Empirical evidence bears this out. For example, Sparkes and Thomas (2001) and Baourakis *et al.* (2002) have identified collective presentation of niche products, from Wales and Crete respectively, on the internet; and Galloway *et al.* (2004) have identified similar collective activity amongst rural businesses in Scotland, using the rural locality as the common brand.

The story is not, however, entirely one-sided. Disadvantages associated with online business presence prevail also. The most obvious of these is that while a company can access global markets, those markets are able to access a vastly increased number of companies that collectively comprise global competition for a firm (Brynjolfsson and Smith, 2000). Indeed, accessing remote markets is not appropriate for all firms, and is often highly industry, or firm, specific (Hawkins and Prencipe, 2000; Tse and Soufani, 2003). For example, trading on-line is not feasible for firms that provide customers with perishable or low value products due to considerations such as time for transport and profitability, respectively. Hawkins and Prencipe (2000) also note that where "the physical movement of material goods" is involved, there is a need for policy acknowledgement of "the relationship between e-commerce growth and the national

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transport infrastructures". In rural areas where distances to markets can be greater than in urban centres and economies of scale and environmental considerations have an effect on the quality of transport infrastructures, this has considerable implications.

Additionally, in the ever-changing world of technology, the need for appropriate skills and competencies to take advantage of ICTs for business benefit is constant (Ramsay *et al.*, 2003). For example, a firm using on-line means of communicating or trading with customers must ensure that the experience for the customer is both efficient and reliable. In order to achieve this, a firm requires proper strategic management of its internet activity (Rodgers *et al.*, 2002, Ramsay *et al.*, 2003), which in turn requires operational management and ICT skills. Factors such as geographical location, industry and demography all impact on the availability (and affordability) of skills appropriate for the effective exploitation of ICTs for firms. While the world wide web has made available any information one might require, the reality with a constantly evolving medium, is that the more information one receives, the more one finds there is to learn (Small, 2000).

Notwithstanding risks and other considerations, however, in general, the potential of on-line presence and trade for a firm are both considerable and observable, in that as Cardinali (2001, p. 347) observes, "e-commerce is growing at a meteoric rate of greater than 150 percent per year."

### **The broadband effect**

Dial-up internet connectivity has been available in most areas since the mid-1990s "in part because it piggybacked on the successful and expansive telephone system, which had been built incrementally over decades" (Friedlander, 2002). However, as technology evolves problems are emerging with respect to maintaining access suitable for business purposes. Smyth *et al.* (2001, p. 43) point out, "rural lines that used to be suitable for internet access are becoming overloaded, and data transfer is much slower than it was a year ago". Thus, as Galloway and Mochrie (2005a) note, "telephone wire dial-up is no longer suitable for the volume and sophistication of many modern internet technologies".

Governments throughout the world are keen to promote broadband technology use, in the belief that its improved facilitation of the internet and complex technologies associated with the internet, will provide improvements in all sectors, including the business sector. In the UK, the promotion of broadband is particularly ambitious in that it aims "to have the most competitive and extensive broadband market in the G7 by 2005" (DTI, 2004a, p. 1) in order to "ensure the UK is a world-leader in the new knowledge economy" (DTI, 2004b).

Broadband affords internet access at higher speeds than dial-up wire-based technology, and has the benefit of being always on, and independent of the telephone line. Essentially the telephone line is then freed up for other telephone-based technologies such as voice communications and fax transmissions, although to a large extent broadband internet access can replace both of these services. UK-business.net (2004) list benefits of broadband to firms:

[...] emails with large file attachments ... web pages with lots of pictures, complex graphics or animations ... video ... music or sound ... webcasts ... internet radio ... online game playing, fast exchange of files ... marketing and international sales by allowing real-time interaction with customers and colleagues.

It goes on to claim that “savings can be made by communicating and trading on-line. Marketing can be more efficient. Customer service can be enhanced” (UK-business.net, 2004).

Indeed, there is much evidence to support the contention that broadband can and does have a positive economic role to play. The Fletcher Advisory Group (2001) estimated that “by 2005 broadband will be making £3.5 billion productivity savings and £1.2 billion cost savings a year for the UK small and medium sized enterprise sector”. Similarly, from a survey of broadband use among small and medium-sized enterprises (SMEs), BCC (2004) report that there was significant perception on the part of their respondents that broadband had afforded considerable benefits: “46.4 per cent thought they had benefited from improved productivity, 45.3 per cent from reduced costs and 13.4 per cent from increased sales”. cebr (2003) state that “macroeconomic predictions for the UK economy have suggested that there may be a £22 billion increase in GDP from mass adoption of broadband”.

For rural businesses specifically, the potential of broadband is impressive, theoretically. In a UK government’s Department of Trade and Industry (DTI) commissioned survey of the economic impact of broadband, a fibre optic network (see below) in South Dundas, Canada, a “semi-rural” community, was made available to a sample of firms with more than ten employees, as well as a sub-sample of micro-enterprises. Results were very promising: within a year, benefits in the form of increased job creation, economic expansion and increased turnover within the area as a whole were observed. Further, the impact was expected to be spectacular within the next two to four years, in terms of increased gross domestic product (GDP), increased employment and increased tax revenue: “the data suggests that there is a strong link between job growth and broadband access” (Strategic Networks Group, 2003, p. 3). The UK government’s Department for Rural Affairs (defra, 2003, p. 3) claim that broadband access “can dramatically level the playing field for rural businesses, giving them access to a huge range of new services and allowing them to cut costs, improving efficiency and offer a better service to customers [*sic.*]” It is for these reasons that government is promoting broadband access for all. However, the extent to which this is feasible is highly dependent on the availability of broadband access solutions.

### **Technology issues**

There is “no generally agreed definition of broadband” (DTI, 2004c). In fact, specific details about speed seem to vary by stakeholder. For example, “international standard bodies like the ITU (International Telecommunication Union) say broadband starts at 2 Mbps” (*The Observer*, 2003), while the UK’s Department for Rural Affairs claims that “broadband is a generic term for any way of connecting to the internet at faster than 256 Kbps” (defra, 2003, p. 15). For the purposes of analysis for business use, it is sufficient to state that “‘broadband’ is the common term for a high bandwidth internet connection” (UK-business.net, 2004). How this connection is made varies by location, however, as availability is not consistent. Most pertinent to the current paper is the fact that various types of provision are not possible, or not economically viable, for rural and remote locations.

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*Fibre*

In densely populated areas fibre technology can be made available, and it affords very high speeds and ease of access to the internet. However, it requires the installation of an entire infrastructure, so currently its availability is concentrated in urban business districts where companies opt, often collectively, to bear the cost.

*Fixed wire*

Digital subscriber line (DSL) uses ordinary copper telephone lines or cables to provide higher bandwidth, and thus higher speed, connection. DSL services most often comprise 256-512 Kbps, although 1 Mbps and 2 Mbps are also available to a limited extent (DTI, 2004a, p. 9). At present, in the UK, around 80 per cent of the population has access to DSL technology, 45 per cent of whom have access via cable as well as copper wire (DTI, 2004d). The remaining 20 per cent are those who are based in rural and remote locations. The problem with DSL wire technology is that it is “only effective when used over relatively short distances (approximately 6 km) from the local exchange” (DTI, 2004d), as high frequency signals degrade over distance. Thus distance to telephone exchange is a significant factor for many rural and remote potential subscribers. As with fibre, for cable or wire-based broadband availability to be cost-effective for the supplier, there has to be a concentration of demand that affords provision profit-based viability. In rural and remote areas, this too can be hard, sometimes impossible, to achieve. For example, in the UK, while currently BT has only enabled 1,708 of the approximately 5,600 exchanges it operates (DTI, 2004a, pp. 8-9), the impact of scale leaves as many as 600 exchanges (serving around 100,000 customers) without even the potential for provision of wire-based broadband, because the exchanges “have less [*sic.*] than 300 customers each” (DTI, 2004d). For government to reach their target of having broadband available to all, alternative technology solutions are necessary.

There are currently two main contenders for the rural bandwidth technology solution. These are wireless technology and satellite technology.

*Wireless*

Fixed wireless broadband relies on “radio links between an aerial located on the user’s premises and a provider’s base station” (DTI, 2004d). Mobile wireless is a development of mobile phone technology, and adapted for laptop users. Again, location of the providers’ aerials is an issue. Like availability of wire-based technology, wireless providers will concentrate their efforts on areas in which sales and profits will be most viable. Without population concentration, rural areas do not have the same commercial appeal as urban areas, so cover may be sporadic. Government have recently widened the wireless market by selling an increased number of licences to providers, thus attempting to create a more competitive environment, and through this increase coverage geographically. It remains to be seen how successful this will prove to be, particularly in light of cost of provision versus potential income from customers (who will remain limited in number in rural areas regardless of number of licensed providers).

### *Satellite*

Satellite technology is based on linking direct with space-based satellites. According to one DTI (2004d) information source, satellite technology “is capable of reaching remote rural areas where other types of provision may not be technically feasible or economically viable”. However, in its National Broadband Strategy, the DTI (2004a, p. 10) claim that while “wireless and satellite technologies have specific potential to reach more rural areas”, “the delay inherent in satellite signals ... means that this technology will not suffice for some interactive applications” (DTI, 2004a, p. 9). Therefore, several benefits of broadband, such as real-time interaction, are not possible with this technology. Additionally, while downloading can be achieved at high speeds via the satellite technology, uploading is still based on fixed wire (or some other technology), and fixed wire, due to problems associated with DSL availability in rural areas, is likely to be dial-up access only. As such, broadband access is only one-way. Since the appeal of broadband is that interactivity and high speed transmission of data are possible, both of which are based on two-way capabilities – in the case of the latter, particularly if you are selling – this solution is not actually a solution at all. Therefore, while satellite technology can be made available to all, it does not actually do the whole broadband job.

To summarise, the two main issues with regard to broadband provision in rural areas are that the technological capability is limited (and therefore, limiting), or that commercial provision is unfeasible: “infrastructure providers – whether telephone, energy or internet – are unlikely to venture far into markets where profitability is low” (Friedlander, 2002, p. 3). While capability should improve over time as technology develops, it is likely that level of demand in rural areas will continue to affect provision of access. Indeed, the level of demand appears to be a fundamental issue, not only in terms of population dispersion, but also in terms of perceived need amongst populations. It is likely that lack of demand is more prevalent in rural areas, particularly within the business communities, than in others, for a variety of reasons.

### **The nature of rural-based business**

Defra (2003, p. 7) claim that the use of broadband can prompt a situation in which “businesses can grow and stay in rural communities ... and companies could relocate to rural communities”. While it may be the case that if some disadvantages of rurality can be diminished by broadband internet access, rural areas could focus on attracting established firms, it is more likely that the non-technical limitations of the rural economy, such as low availability of skills and poor transportation infrastructure, will continue to limit the attraction of these areas for business purposes. Additionally, there is, in fact, little evidence that exiting rural firms will be more inclined to growth as a result of the technology, or indeed, be attracted to the technology at all.

There is considerable evidence that business use of technology can prompt development at both the firm and economic levels (Colecchia, 2002; cebr, 2003; BCC, 2004). However, it is now well documented (e.g. Fillis *et al.*, 2003, Jones *et al.*, 2003) that SMEs tend to lag behind larger firms “both in terms of awareness and implementation” of ICT use (Hawkins and Prencipe, 2000). The lag in, specifically internet use, is even more marked. Ramsay *et al.* (2003, p. 251) cite statistics from the European Observatory for SME’s that show that “SMEs are not using ... the internet ... for commercial transactions” to any great extent, and Anderson and Lee (2003) note that



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business internet use is highly variable as “progressive SMEs engage in e-commerce, but many [others] are stuck at the web presence point”. For businesses in rural areas, studies have found that technology use is even less prevalent (Keeble *et al.*, 1992; Buhalis and Main, 1998; Smallbone *et al.*, 2002). These findings are paradoxical given the “potential [of the internet] for overcoming the disadvantages of rural and peripheral locations with respect to markets and suppliers” (Smallbone *et al.*, 2002, p. 18), as noted above. Apart from lack of availability of technology, availability of expertise for implementation and maintenance of ICT-related strategy is identified as a supply-side barrier to small firm’s adoption (Lawson *et al.*, 2003), and particularly in rural areas (Thomas *et al.*, 2002, p. 35). Associated with this, Farmer (1996) identifies that costs of implementation as well as ongoing expenses of ICT use in SMEs act as a barrier for many.

At its most basic, many small firm owners may be unaware of the potential and advantages of technology use, and at firm level “much confusion prevails” (Galloway and Mochrie, 2005a). For example, in terms of internet use, Ramsay *et al.* (2003, p. 255) claim that “SMEs may not understand the ways in which such an information infrastructure could enable them to operate their businesses more efficiently or cost effectively”. The implications for broadband uptake amongst these owners are thus obvious. In rural areas specifically, Leatherman (2000, p. 10) suggests that low levels of technology awareness and skills are connected, in part, to the demography commonly found in rural areas where factors such as lower incomes and education levels, and disproportionately high representation of disabled and elderly people “are known to influence computer access and use”.

For all firms, effective business use of the internet comes about as a result of considered implementation as part of strategic direction of a firm (e.g. Rodgers *et al.*, 2002; Ramsay *et al.*, 2003). Perceived lack of need is identified by Ramsay *et al.* (2003) as a significant barrier to take-up amongst SMEs generally. Where a specific industry collectively adopts a technology, individual firms within that industry are also required to adopt in order to maintain competitive and network advantage. There is evidence that sectoral variation of ICT use is based on the degree to which an industry (often internationally) has adopted technology-based communications or inter-firm operations (e.g., Hawkins and Prencipe, 2000; Daniel, 2003). However, rural economies particularly, are known to rely disproportionately on small (often micro) firms in the retail and services industries (Smallbone *et al.*, 2002; Deakins *et al.*, 2003) where supply chains can be eclectic and network requirements accordingly flexible, thus leaving technology uptake decisions to individual firms. Hawkins and Prencipe (2000) identify that barriers to adoption in SMEs include “organisational inertia.” Fillis *et al.* (2003, p. 338) extend this idea by identifying a lack of “entrepreneurial orientation.” This may be more significant in rural areas, in that empirical studies (e.g. Scottish Executive, 2000; PERC, 2000; Deakins *et al.*, 2003; Galloway *et al.*, 2004) have found “that businesses in rural areas tend to be smaller scale and less growth-oriented than those in urban areas” (Galloway and Levie, 2001). Huggins and Izushi (2002, p. 113) claim that the tendency for rural firms to focus on local trade also results in a “lower propensity for ICT awareness”, based on lack of need. Similarly, Mitchell and Clark (1999) claim that rural firms are less likely than urban firms to be “globally oriented”. In short, rural areas have a greater proliferation of what Deakins and Freel (2003) call “lifestyle” rather than “entrepreneurial” firms. This is borne out by empirical data

(Galloway and Mochrie, 2005b). In terms of technology take-up, Grant (2003) (corroborated by Gray and Juhler, 2000; Huggins and Izushi, 2002; Smallbone *et al.*, 2002) observes, in her study of female rural business ownership, that “skills deficiency in terms of other business skills, personal and interpersonal skills and business communication” has led to low levels of “enterprise” in rural areas, and that low levels of technology use are simply symptomatic of this. This is problematic in that, as Vaessen and Keeble (1995) note, with the decline of the traditional rural industries, rural economies now have a greater need for globally-oriented, entrepreneurial firms.

Lack of entrepreneurial motivation and orientation and an associated business skills deficit in rural areas clouds the rationale behind government promotion of broadband access for all. Implied within the justification for the promotion of broadband is the presumption that businesses seek performance improvement. Empirical work has found, conversely, that in rural areas in particular, for many business owners there is no drive beyond maintaining the status quo, and there is evidence of a dearth of skills for enterprise-oriented improvement within rural business communities. Therefore, if ICT technologies, including broadband, are a means of enhancing business performance, then it is the lack of interest in performance improvement that is the real barrier to ICT adoption. Thus, the technology and its availability are less relevant than the management and strategic orientation and capabilities of the firm. Since technology implementation and effectiveness for business are only fruitful when part of strategic direction and ongoing operational inclusion and development, it is these latter issues that require to be addressed if rural business adoption of broadband (or any ICT) is to be generally successful. To illustrate, the requirements at firm level for various promoted benefits of broadband-associated activities are given in Table I.

Within the context of the reported limitations of the rural business environment, it is possible to summarise activity in Column B, cumulatively, as that involving strategic

Column A Declared benefit	Column B Requirement at firm level
Cut telephone bills by moving much communication from telephone and letter to e-mail	Operational change
Face-to-face meetings replaced by virtual communications	Training and software cost implications
Reduce paperwork, in favour of automated business systems	Operational change; training and software cost implications
Streamline business processes using automated information processing	Operational/strategic change; training and software cost implications
Foster closer relationships with customers and business partners	Operational/strategic change
Access a wide range of outsourced services, like accounting or distance learning	Requires thorough research
Facilitation of networked mobile or home working staff	Requires remote staff to be online and BB enabled Staff training implications

**Table I.**  
Broadband-associated activity v. firm requirements

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change, or the application of strategic management, within the firm. These are the very activities that have been identified by empirical studies as lacking in rural businesses, however. Essentially, therefore, technological access, and training and support thereof, may be of secondary importance in the context of a business environment that lacks skills, expertise and inclination to strategic business and enterprise.

### **The implications for policy**

Thomas *et al.* (2002, p. 38) point out that “it is, rightly or wrongly, considered that all effort and money invested in ICT will result in a benefit for society”. For policy regarding technology solutions for rural areas, the objective is for that technology to contribute to, and in some cases prompt, economic development. Commentators such as Fuller and Southern (1999), however, criticise government policies based on “technology push” within the business sector as being unlikely to engage with the development needs of many rural SMEs. Indeed, Ramsay *et al.* (2003, p. 252) claim, for small firms in general, there is “naïve understanding of what motivates [them] to adopt and assimilate ICTs in their business activities . . . particularly in micro enterprises who are the least likely to be involved with e-commerce or the internet”. In rural areas it is micro-enterprises that dominate the economic landscape, making this lack of understanding at policy level all the more concerning for the rural economy.

In terms of broadband roll-out specifically, the UK government is highly committed, spending £30Million via the regional administrations, on technology solutions for rural and remote locations (DTI, 2004d). The idea is that broadband will not just be of benefit within the business sector, but throughout the social context. With this in mind, government has pledged “over £1Billion for public sector connectivity” (DTI, 2004a, p. 7). Further, government is “stimulating production of new broadband content and applications” (DTI, 2004d).

The greatest danger posed by the promotion of ubiquitous broadband access is that rural and remote locations are actually further excluded. Notwithstanding the current high cost of alternative technologies deemed suitable for rural and remote areas, there are also serious technical limitations to these advocated potential solutions. In the face of these cost and technological limitations, the roll-out of broadband elsewhere throughout the UK may actually impede the rural economy: as the rest of the community uses high specification software and services facilitated by high bandwidth, those with low bandwidth only may not realistically participate. E-business will move on as “the additional bandwidth provided by a broadband connection allows new services to be delivered to consumers and businesses” (DTI, 2004c), and those without, including the rural and remote economy, will be left behind. In fact, the advisory body on broadband for the UK government, the Broadband Stakeholder Group, advocate what they call the “broadband virtuous circle”. This involves encouraging “early adopters” and “market makers” to upgrade to broadband, leading to the establishment of a market large enough to drive new broadband-enabled ICT applications and content, thus driving further demand for broadband. In this way then, government advocates “working to support and accelerate the pace of change [to broadband]” (DTI, 2004b) in order to meet its 2005 target of having the most extensive broadband use in the G7. This policy focus on acceleration of take-up and use of broadband technology is of serious concern for rural businesses in the absence of suitable roll-out solutions in rural areas.

Appropriately, there are various projects and other activities currently being developed in the UK by parallel government agencies to facilitate the development of broadband to rural communities. These include the Community Broadband Network to be run by RuralNet which will facilitate collaborative networks for community-owned projects; the creation of ten pilot wireless broadband facilities in libraries to raise the profile of broadband and improve access for those rural communities involved; and the production of support materials such as the Broadband Case Study CD-ROM produced by defra which profiles examples of the benefits of broadband for users, and a broadband toolkit to increase understanding of broadband (DTI, 2004b). The contradiction is, however, that while government aims to accelerate broadband take-up, its development work in rural areas remains very much at the pilot stage, and is targeted, sporadically, at community and public sector potentials rather than business ones. While rural access solutions are likely to be slow to develop, government seems focused on developing demand within rural areas for a technology that will be inaccessible in many remote and rural locations. Thus, while perceptions of the benefits of internet use for business may be increased in rural areas by the promotion and encouragement of use of broadband, while it remains inaccessible in rural and remote locations any subsequent take-up of older internet access technologies will prove, at best, frustrating to a business attempting to exploit it, as applications and content are likely to have been pushed beyond the practicable when using older access technologies (such as dial-up). Additionally, attempts to “drive” demand in rural areas may be further misguided by a lack of policy appreciation of economic (and ICT) development issues in rural economies. Research has shown that in terms of ICT take-up in general, lack of demand is a major contributory factor to under-use. Researches such as Smallbone *et al.* (2002) and Galloway and Mochrie (2005a) suggests that economic development is hindered not by lack of technology, but by lack of enterprise – in fact, lack of technology up-take amongst rural businesses is likely to be symptomatic of this lack of enterprise. For government, therefore, tackling the issue of enterprise and the development of business skills in rural areas requires policy intervention, and this must be at least in parallel with intervention to promote broadband access.

Broadband access alone will not change rural economic circumstances, and funding and promotion of it, in isolation, will be wasted if there is no development of enterprise motivations and skills for business. Essentially, the situation could mirror that of Australia, where “rural areas . . . lobbied to get broadband technology but, once they got it, they didn’t know what to do with it” (Mathison quoted in Manning and Marsicano, 2002).

#### Note

1. For the purposes of this paper, which draws from a variety of sources where rurality is defined as per the requirements and objectives of the particular agent, a very broad interpretation of “rural” is inferred, in order that various researches and commentaries can be presented and compared.

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