



Welsh Economy
Research Unit

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Superfast Broadband Business Exploitation Project

**Digital technologies and future opportunities for rural
businesses and areas in Wales**

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Table of contents

1.	Summary	1
2.	Introduction	2
3.	The rural context – broadband and digital technology use in Wales	3
4.	The emerging opportunities for businesses in Wales’ rural / remote areas	5
5.	Case study: Melin Tregwynt	8
6.	Potential areas for policy intervention	10
7.	References:	12

1. Summary

This report considers the future role of broadband to help revitalise the rural economy in Wales. The key findings can be summarised as follows:

- While rural areas have traditionally faced challenges with respect to broadband connectivity, fixed superfast broadband is increasingly becoming available to premises across Wales. The Welsh Government and mobile operators are also seeking to address mobile broadband 'not spots'.
- In light of the current and future connectivity improvements, businesses in rural areas are likely to be better able to address the challenges associated with remoteness to major markets. Here digital technologies such as cloud computing, video conferencing and e-commerce are helping to reduce costs and improve access to external markets. Such potential benefits are relevant to existing sectors such as farming, tourism and rural production, but also new sectors wishing to relocate.
- Better connectivity may also help encourage businesses seeking access to quality of life benefits to relocate to rural areas. This has the potential to introduce new types of business activities to rural areas, and improve the diversity and resilience of businesses in the area.
- Evidence from Scotland suggests that the benefits of digital technologies might be accessed incrementally by businesses over time, as confidence, skills and new business ideas emerge. This may result in some short-term benefits in efficiency, with the possibility of larger scale socio-economic benefits emerging over time.
- Findings from a case study of Melin Tregwynt – a Welsh producer of upmarket woollen products – illustrate how digital technologies might be exploited to improve business productivity in rural areas.
- Policy makers have a role to play not only in supporting rural fixed and mobile connectivity, but in supporting awareness and the wider context for digital enterprise in rural areas.

2. Introduction

Rural areas have traditionally been characterised by lower levels of access to high speed broadband, relative to their urban counterparts. This has been explored extensively through the concept of the 'digital divide' and reflected in gaps in access and use of Internet-based digital services (OECD, 2018). While not unique to Wales these challenges have been exacerbated by the sparse nature of the population in many rural areas, and topological factors (mountains and hills) that make the roll-out of fixed and mobile broadband infrastructure more difficult (Welsh Government, 2017).

In recent years these challenges have begun to be addressed by the Superfast Cymru programme (and its successor), part-funded by the European Regional Development Fund (ERDF) through Welsh Government. This has resulted in many of Wales' rural and harder to reach areas gaining access to superfast broadband, with download speeds in excess of 30 Mbps. The installation of full fibre connections in many parts of Wales (via Superfast Cymru) is also helping to ensure future connectivity capacity. Other policy developments have sought to address so-called not-spots in mobile broadband availability in Wales (Welsh Government, 2017).

The growing access and take-up of superfast broadband in Wales is increasingly bringing faster broadband speeds to both businesses and households. This is providing opportunities for businesses in rural areas to challenge the disadvantages of their remote location relative to the market place, by making greater use of digital technologies to trade and collaborate more widely, and to gain benefits in efficiencies and sales (WERU, 2018). It also offers the potential for new sectors and business activities to emerge that take advantage of the so-called 'distance shrinking' properties of broadband alongside the quality of life benefits associated with rural areas. This report considers the specific opportunities that this connectivity offers to businesses within rural locations in light of current and future developments in connection technologies.

As part of this paper a case study of Melin Tregwynt – a Welsh rural business, specialising in the production of traditional woollen products - is presented to illustrate the prospects for growth from digital technologies and high speed broadband. This identifies both the challenges and opportunities for businesses as better connectivity and new digital technologies impact across internal processes, and the reach of business activities grows.

The paper forms part of a series of Horizon Scanning reports which are available on the Cardiff Business School website: <http://www.cardiff.ac.uk/superfast-broadband-project/horizon-scanning>

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3. The rural context – broadband and digital technology use in Wales

Wales has the largest rural population of any region or Devolved Administration in the UK, with some 33 percent of its inhabitants living in areas classified as rural in the last Census (ONS, 2013). Against the main measure of regional economic prosperity – Gross Value Added – Wales’ output per head in rural areas is £17,000, relative to £22,000 in its urban areas (Pooten et al., 2017).

Businesses in rural areas face specific challenges associated with comparatively small local markets, combined with distance from major national and international markets. This has traditionally added a premium to the cost of trading from rural areas (Jones-Evans, 2017). Research has found that rural areas contain a greater number of ‘lifestyle’ rather than ‘entrepreneurial’ businesses, in comparison with urban areas (Deakins and Freel, 2003), with such businesses tending to be ‘smaller scale and less growth-oriented’ (Galloway and Levie, 2001). Rural areas also contain a greater number of businesses in sectors such as agriculture and food-related businesses.

For those that are in employment, insufficient broadband access can result in a greater need to commute and corresponding living costs that are up to 20% higher¹. These additional costs are in part caused by a restricted ability to work from home or access services online. Another impact of this work-related travel is that often workers commute to higher paid opportunities, which generally leads to an increase in the rural prices of properties. Continued in-migration can also lead to pressure on house prices, services and infrastructure in rural areas. Indeed such factors can mean that those ‘who work in the countryside increasingly cannot afford to live there, while the people who can afford to live there increasingly do not work there’².

A further restriction relates to the increasing provision of essential services online. For example, a number of government services are now offered online, coupled with a decline in rural post offices that would otherwise support the community in these tasks³. Those that have healthcare concerns may also miss out, with limited access to Telehealth services; technology that could help overcome the difficulties and costs incurred by Local Authorities in providing healthcare to rural homes. Lastly, the use of broadband and mobile technology socially can help to reduce isolation for residents, and increasing opportunities for businesses to find new information, remain competitive and pursue new opportunities.

¹ <http://www.bbc.co.uk/news/business-11812384>

² http://www.wensumalliance.org.uk/publications/Taylor_Review_Livingworkingcountryside.pdf

³ <http://www.telegraph.co.uk/news/election-2010/7652983/General-Election-2010-Two-post-offices-a-day-closed-in-rural-areas-under-Labour-last-year.html>

The potential for rural SMEs to develop their use of digital technologies may be seen in data extracted from responses to the Digital Maturity Survey for Wales 2017 (WERU, 2017). Analysis indicates that rural businesses are associated with lower levels of digital maturity than urban businesses. Table 1 shows the breakdown of businesses in the survey by their level of digital maturity, identified in four clusters (from highest to lowest levels of digital maturity): Digitally Embedded; Active Exploiters; Passive Exploiters; and Digitally Disengaged.

Whereas nearly one-in-five urban businesses (19%) were found in the highest category of digital maturity (Digitally Embedded), Table 1 highlights that only one-in-twenty rural businesses (5%) were in the same category. The Digital Maturity Survey for Wales 2017 indicated that higher digital maturity is associated with better business performance in terms of turnover, profitability, employment and innovation activity (e.g. introduction of new products, processes or services).

Table 1 Rural and urban businesses in Wales by level of Digital Maturity (%)

	Digitally Disengaged	Passive Exploiters	Active Exploiters	Digitally Embedded	All
Rural businesses	21.3	38.4	35.1	5.2	100.0
Urban businesses	15.2	39.3	27.0	18.5	100.0
All	18.2	38.9	31.0	11.8	100.0

Source: WERU, 2017 (Analysis supplementary to the Digital Maturity Survey report)

Despite these challenges the quality of life benefits associated with rural areas mean that the emergence of broadband networks and greater connectivity for businesses and households opens up the potential for the disparity in digital maturity to be rebalanced. In this respect the findings suggest potential to support existing and new business activity, as well as attracting businesses to relocate to rural areas. They may also provide greater opportunities for new ways of working, including greater levels of remote working for staff located in such areas. These opportunities are discussed in more detail in the section that follows.

4. The emerging opportunities for businesses in Wales' rural / remote areas

The opportunities associated with broadband for rural areas can be both short- and long-term in nature. In the short term, for example, there may be modest increases in business and job growth as existing businesses benefit from the efficiency, sales and benefits highlighted by the Digital Maturity Survey for Wales 2017 (WERU, 2018). In the longer term population growth, per capita income growth, creation of new business activities, and attraction of external businesses and skills to the area have the potential to alter the nature of work and business activity in these areas. Broadband resources may also offer more varied opportunities for work in rural areas. This is particularly important in addressing key challenges such as brain drain, underutilisation of skills and so on.

The introduction of superfast broadband, as noted above, offers businesses the potential to trade more widely. This can increase SMEs' opportunity to both trade with customers outside of the immediate area. Research in Scotland, however, suggests that internet access for rural businesses is less about 'dramatic gains' and international business, but more about improving the function and efficiency of the business and experiences for the local rural economy (Galloway, Sanders, and Deakins, 2011).

Many of the benefits associated with broadband access in rural areas relate to the concept of new forms of agglomeration. Here cities and city regions have natural advantages in terms of access to local markets, availability of skills, but also knowledge (from other individuals, businesses and education institutions for example). Such resources and linkages have been found to be at the heart of innovation and competitiveness (Marceau, 2014). While rural areas do not, by definition, offer agglomeration benefits, the arrival of fast broadband can aid 'virtual' linkages by opening up the potential to collaborate more easily with partners outside the region or country.

In relation to key rural sectors, the farming industry has significant potential to make use of broadband and associated digital technologies. Here, digital technologies are emerging to support traditional farming practices, including automated vehicles to allow greater precision in planting, seeding, weeding and crop maintenance, harvesting and so on. Drone technologies are beginning to be adopted to aid mapping and managing crops. Such technologies offer the potential for farming businesses to secure greater production efficiencies and quality benefits (Brown, 2018).

While connectivity challenges have traditionally prevented the full exploitation of digital technologies, the increased availability of broadband, offers benefits in areas such as (NFU, 2018):

- Online compliance cost savings, associated with the growing requirement for regulatory information to be submitted online.
- Diversification, including in tourism, offering premises for business use etc.
- Health and safety benefits, including better access to emergency services.

Other areas where broadband (and future technologies such as 5G and wireless technologies) can contribute towards efficiencies include monitoring of farm assets. Here the decreasing costs of sensor technologies can help farmers to remotely monitor aspects such as gates, slurry pits, security and so on. Indeed by enabling efficiency savings, supporting income generation broadband connectivity can help to aid the overall resilience of the farming sector. The case study of [Melin Tregwynt](#), presented in section 5, provides further evidence of how production businesses may be able to exploit the opportunities of better connectivity through improved efficiency of operations, and trading across borders.

Other established sectors such as tourism are also likely to benefit from increasing broadband speeds. As highlighted in the SFBE case studies, tourism businesses are already experimenting with new digital technologies to manage bookings and promote service offers. The case studies point to the increasing expectations of tourism customers for access to both fixed and mobile broadband for social and business purposes, with operators reporting that fast connectivity is an important decision factor when customers are making bookings (see [Cefn Cae'r Ferch Farm](#) case study). Tourism operators also report the role of broadband as being central to the addition of new services such as access to entertainment (see [Royal Victoria Hotel](#) case study).

In the future, broadband connectivity is beginning to allow experimentation in areas such as video and virtual reality, helping customers to experience aspects of the service (e.g. accommodation) remotely prior to booking. The high data requirements for such services emphasise the importance of superfast connectivity not only for the tourism sector but also other services (for example IT services) seeking to take advantage of rural areas in the location of their business activities.

By bringing rural areas closer to markets, while offering quality of life benefits, rural areas may increasingly attract business and customers more generally, based on factors such as the environment amenity, low crime rates, health benefits and so on. Existing rural business may also be able to benefit from accessing skilled staff from both inside and outside of the area, by making use of technologies such as cloud computing to allow remote working. Alongside the principles of remote working reducing transportation costs for residents, the ability to share data online may open up worldwide markets to businesses who offer knowledge-based products and services.

These principles can be extended to the supply chain, allowing a wider portfolio of businesses and an improved supply chain to be accessed through web-based searching (Kaplan and Sawheny, 2000; Hawkins and Prencipe, 2000). These opportunities may reduce costs, improve the quality of the product or service, and introduce novelty into the product offered by the rural business. Moreover, the communication benefits increases the likelihood of a rural business becoming part of the supply chain or communicating with urban or international businesses (Baourakis et al., 2002).

With this extended market reach, it is also possible for rural businesses to gather and share more information for use in their business, much in the same way as business or science parks facilitate information exchange in urban areas. This may be in the form of working collaboratively with a new supply chain, seeking out information for new trends within the industry, or accessing learning materials or online courses. Further to this, with reliable connectivity a small employer in a rural area is more able to provide training to their staff, with the National Employer Skills Survey (2006) finding that fewer rural businesses had formal commitments to employee training. This is perhaps understandable as alongside the training itself, businesses would have to factor in long travel times to training providers. Online training can provide cost and time effective modular opportunities for learning that can be fitted in to the normal working day.

5. Case study: Melin Tregwynt

The case study of Melin Tregwynt highlights many of the opportunities noted in the previous section. Established in 1912, this third-generation family business offers upmarket and authentic Welsh woollen products that are manufactured using traditional processes of production. The business portfolio extends beyond manufacturing, to encompass sales, retail, hospitality and increasingly tourism. This includes the opening of an onsite café in 2017, attracting visitors and locals to the site. With 28 full-time equivalent staff, Melin Tregwynt is one of North Pembrokeshire's biggest employers.

At the heart of the business operations is the woollen mill, supplying “shops, designers, specifiers, architects and hotels with a very distinctive range of woollen blankets, throws and cushions, together with upholstery” (Melin Tregwynt, 2018). Sales of the products derive from onsite retail, e-commerce and B2B clients. The business benefits from a range of clients and markets, including retailers and high-quality upholstery for aerospace, automotive and office furniture.

Despite the mill's rural location on the outskirts of Fishguard, Melin Tregwynt sells its products locally, nationally and internationally. The business stands out as one of the limited number of international producers in Wales, with 25% of sales coming from exports. The key markets include Japan, China, the United States and to a lesser extent continental Europe.

Up until March 2018 (when the research was undertaken) the West Wales based business struggled with low standard broadband speeds of approximately 0.8 Mbps for download and a mere 10% of this bandwidth for upload. In spite of this, the mill owners have sought to introduce a range of digital technologies across their processes, including Magento for e-commerce, Genesys for stock control, and Sage for accounts and finance. Digital technologies also augment its internal and external communication channels, including multiple social mediums, including Facebook, Instagram, LinkedIn and Twitter.

Despite the superfast broadband adoption barriers, Melin Tregwynt operates as a largely digitally mature business, using a range of digital technologies. The benefits of these technologies can be seen in the terms of the delivery of high-quality and niche products, a national and international customer base, and enhanced internal and external communications.

However, the pitfalls of standard versus superfast connectivity for business performance are highlighted by the case study. One important pitfall is reduced efficiency, with time being wasted when the internet connection is lost. The business experiences a connectivity blackout most days between 4:30 to 5:00pm, coinciding with the time that the platforms are running daily backups. This impedes the business processes and causes frustration for staff. In many instances, the business owners work from home after 4:30pm to allow emails with attachments to be processed.

The daily syncing of platforms, such as Genesys for stock control, causes problems beyond reduced functioning for internet enabled tools. When superfast broadband is adopted the business will move from daily syncing to real time updates. At present, the lag between the real time stock quantities and the previous update means that the business needs to mitigate for potential sales and stock extra products. It is estimated that approximately 10% of the stock held in storage is held as a buffer:

Despite these challenges the adoption of superfast connectivity provides future opportunities. One example looks at attracting walkers passing along the Pembrokeshire Coastal Path. In addition, the onsite café would benefit from accessible guest Wi-Fi, allowing visitors to access emails and social media. Further areas of advancement include greater use of video conferencing, a move to cloud-based storage, enhanced WeChat adoption, as well as streamlining of business functions.

The case study illustrates the opportunities that a rural business has to exploit superfast broadband. As a relatively digitally mature business it stands ready to not only improve its efficiency, but also use the connectivity to expand its business to new markets, and adapt its business model to local opportunities. This demonstrates the potential for other rural businesses to make a step-change in their productivity as future fixed and digital technologies become available.

Over the course of the project this case study will be updated to explore how the business responds to these opportunities in practice.

To find out more visit <https://melintregwynt.co.uk>

6. Potential areas for policy intervention

Rural areas are likely to require more tailored support to address the opportunities noted in the earlier section. The rationale for such support is one of addressing the lack of economic opportunities for individuals and businesses in rural areas, by helping to produce a more vibrant and connected economy. In this respect broadband has a potentially important role in supporting business activity in traditional business sectors such as farming, forestry, mining and tourism, but also as a basis for creating new rural-based economic activities. Such developments offer policy makers opportunities to strengthen the socio-economic foundations of their areas. Policy intervention, however, will require careful consideration of the impact of economic activity on the essence of what makes rural areas attractive to its residents and businesses.

IoT refers to an ecosystem in which applications and services are driven by data collected from devices that sense and interface with the physical world. In the Internet of Things, devices and objects have communication connectivity, either a direct connection to the internet or mediated through local or wide area networks. (OECD, 2016)

Maintaining and ensuring connectivity in rural areas is likely to remain an ongoing challenge. While the current roll-out of superfast broadband is scheduled to ensure all premises are able to gain access by the end of 2021, the longer-term policy challenge of ensuring connectivity is likely to remain. One particular challenge is the task of ensuring access to mobile technologies and emerging wireless technologies such as the so-called 'Internet of Things' or IoT (see box) in rural areas. Ensuring connectivity in rural areas is not simply a question of local residents and businesses. It is equally important for ensuring connectivity for tourists and others 'on the move'.

Promotion of the benefits that broadband brings to rural areas will be a further area for policy makers to consider. Research by WERU highlights the productivity benefits that can be gained by businesses, and the opportunities broadband resources provide for businesses to trade without needing to be close to major customer bases. Promotion will need to ensure that enhanced awareness of connectivity benefits are targeted at potential businesses and entrepreneurs both within and outside rural areas. In this respect, promotion will require clear messages on how broadband can help businesses achieve efficiency, while benefiting from the improved quality of life available in many rural areas.

Practical support for new and existing economic activity in rural areas is required, achieved through providing advice, supporting networks, or establishing hubs. While broadband offers the potential for businesses to trade globally, the remote nature of many rural areas can mean that businesses and entrepreneurs may lack the ability to network with other businesses more locally, or indeed find suitable support or locations to start-up. This is an area where there may be potential to consider virtual networks for like-minded businesses, or indeed physical solutions such as regional hubs⁴, where co-working space and business support is available. Such hub and spoke models have recently been announced in four locations in Wales⁵, and provide the basis for place-base support for digital exploitation.

In summary, the findings in this report highlight the opportunities for SMEs associated with the connectivity improvements being made in rural areas. Such developments will help to increase parity with urban areas, and enable SMEs to access new markets, sources of knowledge and efficiency savings. These benefits, alongside the quality of life offered in rural areas, will also provide opportunities for SMEs to innovate and become more productive. The role for the public sector will be to support the availability of infrastructure, but also its use through innovative strategies to address use of digital technologies.

⁴ <http://www.wlga.wales/SharedFiles/Download.aspx?pageid=62&mid=665&fileid=1184>

⁵ <https://gov.wales/newsroom/businessandconomy/2018/181121-new-enterprise-hubs-to-spark-welsh-business-announced/?lang=en>

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