



Welsh Economy
Research Unit

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Superfast Broadband Business Exploitation Project

Horizon Scanning Synthesis Report

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Summary

This report provides a synthesis of the main Horizon Scanning findings from the Superfast Broadband Business Exploitation (SFBE)– Research and Intelligence project. The aim of the report is to inform both policy makers, business representative bodies, businesses and local authorities about the future challenges and opportunities linked to digital technology diffusion.

The main findings of the research can be summarised as follows:

Digitalisation and business and sectors - The findings show that digitalisation is likely to offer both challenges and opportunities for businesses to adapt and improve efficiencies in their business processes. Digitalisation, however, is likely to be highly variable according to business size and their sector of operation. The reports examine the particular challenges and opportunities faced by the construction and foundational economy sectors.

Digitalisation, work and employment –These implications are explored in relation to employees located in rural areas, where such technologies are found to be increasingly providing opportunities for greater remote working, and the potential to redress the digital skills deficits in relation to urban areas. The development of new automation technologies, associated with AI, however, highlights potential vulnerability of a wide range of occupations and tasks.

Digitalisation and geographical space - Uneven access to, and use of, digital technologies across areas of Wales represents a long-term challenge. This is evident in differing needs and issues for urban and rural areas, and Wales’ economic regions. This is likely to continue to require continued attention to broadband infrastructure connectivity and digital skills, as new technologies emerge.

The policy implications of the Horizon Scanning findings include:

1. Review the ongoing need for connectivity across Wales to minimise the disadvantages faced by rural areas in the broadband deployment
2. Ensure that business digital advisory capacity keeps abreast of emerging technology developments
3. Enable business advisory support to adapt delivery models to digitalisation and the emerging range of private operators in Wales
4. Examine the potential opportunities associated with digital hubs to support digital skills and adoption in rural areas
5. Consider the potential for the public sector to support the future employment skills needs for AI and automation

1. Introduction

The Horizon Scanning work programme formed part of the core SFBE Research and Intelligence project's activities undertaken by the Welsh Economy Research Unit (WERU). This strand of research began in 2017 and supported the research project's objectives to look beyond the current context for digitalisation of SMEs in Wales, and to examine the technological, social and economic factors that could shape business activities and competitiveness in the coming decades.

The purpose of the Horizon Scanning reports was to provide research and intelligence that could help to inform policy makers, business representative bodies, businesses and local authority stakeholders. To achieve this the research team worked closely with the SFBE Advisory Panel (led by Professor Tony Davies) to identify topics and review outputs. This synthesis document acts as a final statement of the SFBE Horizon Scanning research, drawing out key findings and implications for policy practice and SMEs in Wales.

All Horizon Scanning reports were developed through a mix of primary research (for example, Digital Maturity Survey data) and secondary data (for example published reports) analysis. Expert interviews were also undertaken to inform the findings of several reports, and the research team attended a range of technical and industry events to further understand the trajectory of digital technological developments.

The reports were made available to partners and stakeholders through a number of routes, including presentation to the Advisory Panel and other forums such as the Superfast Broadband Champions (Local Authority) group, and the Serco / Superfast Business Wales team. All reports are available via the SFBE Research and Intelligence [project website](#). These reports (including this synthesis) form part of the final Project Repository of SFBE research.

The structure of the Horizon Scanning Synthesis report is as follows. It begins by setting out the aims and objectives of the Horizon Scanning research activity (Section 2), the research completed (Section 3) and the dissemination approach adopted (Section 4). This is followed by analysis of the main synthesis themes (Section 5). The final section draws together the conclusions and implications for policy and practice (Section 6).

The author of this paper is Dylan Henderson.

2. Aims and objectives of Horizon Scanning

The Horizon Scanning research was intended to raise awareness of new practice and technology developments amongst business and policy makers alike, and to capture developments that were likely to impact on the ability of firms to exploit superfast broadband in the future.

It was recognised, however, that technology-focused Horizon Scanning could only provide a partial picture of the opportunities and challenges associated with superfast broadband use and would need additional consideration of wider social and economic factors to appreciate trends in business adoption, use and impact on productivity and success.

While a strict definition of horizon ‘time’ was not established for the research, the majority of the reports deal with topics concerning the near horizon - those emerging over the next five to ten years - with some dealing with longer-term issues (for example, the AI and Automation Horizon Scanning report).

Each report provides a non-technical statement of horizon technology or socio-economic issue, the implications for businesses in Wales, likely scope and scale of impact on businesses (radical, incremental, disruptive), and lessons for policy.

During the project a case-study of a business in the early stages of adopting superfast broadband was undertaken. This was intended to provide a longitudinal, in-depth perspective of digital adoption. The business selected was [Melin Tregwynt](#) – a woollen mill located in West Wales.

3. List of reports published

The following Horizon Scanning papers were produced over the course of the project (including author, and date published):

- ‘The transformative potential of cloud technologies for SMEs in Wales’, Dylan Henderson, 26th April 2017.
- ‘The potential of business model digitisation for SMEs in Wales’, Laura Norris, 19th July 2017.
- ‘AI and automation: Examining the future implications for business and employment in Wales’, Dylan Henderson, Calvin Jones and Neil Roche, 30th November 2017.
- ‘Digital technologies and future opportunities for the foundational economy in Wales’, Laura Reynolds, Dylan Henderson, Neil Roche, 17th October 2018.

- 'AI and automation: Examining the future implications for business and employment in Wales - Updated', Dylan Henderson, Calvin Jones and Neil Roche, 7th December 2018.
- 'Digital technologies and future opportunities for rural businesses and areas in Wales', Laura Norris and Dylan Henderson, 31st January 2019.
- Digital Technologies and Future Opportunities for the construction industry in Wales, Laura Reynolds, Dylan Henderson and Neil Roche, 1st October 2019.
- SME Digital Maturity in Wales – Opportunities and challenges for Wales' economic regions, Dylan Henderson, Laura Norris, Laura Reynolds, Neil Roche, Chen Xu, 20th December 2019.
- Melin Tregwynt Case Study and Update, 10th February 2020.

4. Dissemination

Horizon Scanning reports were disseminated to a range of regional partners and stakeholders, with the intention of informing debate and policy delivery. Table 1 below summarises the main audiences, objectives and dissemination activity undertaken in the project period.

Table 1 SFBE Research and Intelligence Horizon Scanning Dissemination

Audience	Dissemination objectives	Dissemination activities
WG SFBE programme manager	Research is aligned with the SFBE programme, delivering high quality research evidence on business exploitation of SFBE	All Horizon Scanning draft reports were submitted to Professor Tony Davies, who acted on behalf of the Programme manager, to receive and review the reports.
SFBE Advisory Panel	Regular interaction with the Advisory Panel and its Chair on Horizon Scanning topic development.	Horizon Scanning topics were developed with input from Advisory Panel members. All reports were presented to the Advisory Panel prior to publication.
WG Business Wales / SFBE Advisors	WG Business Wales agree format, contribute towards topic development and support for the dissemination of the Horizon Scanning findings. Raise awareness and validate horizon-scanning issues through the Advisory	Horizon Scanning reports were developed with input from WG and Superfast Business Wales, via the Advisory Panel. Copies were subsequently made available on the project website, and to Superfast Business Wales.

Audience	Dissemination objectives	Dissemination activities
	Panel and information provision work of Superfast Business Wales (SERCO).	
Local authorities	Superfast Broadband Champions are aware of the Horizon Scanning outputs, engaged in their dissemination and contribute to topic development.	Horizon Scanning reports were disseminated to local authority partners via the Advisory Panel and project website.
Business representative organisations	Organisations are aware of the Horizon Scanning outputs, engaged in their dissemination, and contribute to topic development.	Horizon Scanning reports were disseminated to Business Representative bodies (FSB Wales, IoD Wales, EstNet) via the Advisory Panel and website.
Businesses	Businesses are aware of the Horizon Scanning outputs, take action on the findings (as appropriate) and contribute to topic development.	Horizon Scanning reports were made available to businesses via Business Representative bodies, the project website and various events.
Academic	<p>National / international research partnerships established.</p> <p>High quality academic research outputs developed around Horizon Scanning topics.</p>	<p>The research team have presented their Horizon Scanning research and networked with partners at the following national and international conferences:</p> <p>2018 – Regional Studies Association Annual Conference, Lugano, 3rd-6th June (AI and Automation).</p> <p>2019 Regional Studies Association Annual Conference, Santiago de la Compostela, 5th to 7th June (Rural).</p> <p>2019 Regional Studies Association Annual Winter Conference, London, 14-15th November (Foundational Economy).</p> <p>2019 Regional Studies Journal ‘Industry 4.0’ workshop, 4th December (AI and Automation).</p>

Source: Adapted from WERU (2018) Superfast Broadband Business Exploitation Project: Horizon Scanning Plans

5. Synthesis of Horizon Scanning findings

The Horizon Scanning reports examine the socio-economic and technological context for business, sector, and geographical aspects of digitalisation, alongside their implications for policy. They highlight the growing range of technology applications that are emerging, many of which are benefitting from the greater availability of high-speed broadband networks. Although terms such as digital transformation have emerged to describe such developments (Henderson, 2019) WERU's research shows this to be both incremental and uneven across businesses, depending on their size, location and area of activity (WERU, 2019). Indeed, they suggest that while many businesses can be classed as 'digitally embedded' there is a significant proportion of firms that have some way to go towards achieving full digitalisation, particularly as new technologies continue to be developed and mainstreamed across the business community and society more widely. This challenge of both embedding digital technology within business process and updating capabilities can be seen in WERU case studies such as Melin Tregwynt – a business that has long struggled to secure superfast broadband connectivity and maximise its impact on the business.

The following section explores the horizon from the perspective of business and sectoral issues, employment and work, and geographical space.

5.1. Digitalisation and business / sectors

Digitalisation of businesses and sectors is a constant theme in the Horizon Scanning research undertaken for the project. This included Horizon Scanning studies of the [construction](#) and [foundational economy](#) sectors, as well as businesses and sectors located in particular areas of Wales. These findings show that digitalisation is increasingly becoming an enabler of growth and development for all sectors, with potential for it to impact across business processes. The [business model](#) Horizon Scanning report, for example, illustrates how digitisation can affect how businesses operate, make money, and interact with the market. This can impact on both manufacturing and service sectors, with new approaches to customer and supplier interfaces, back office functions, supplier interfaces, and new product offerings emerging. Such developments suggest opportunities for businesses to adapt their models, helping them to respond to competitive challenges.

The research shows that while advanced technology solutions are emerging in areas such as AI and sector-specific tools such as BIM (Building Information Modelling) and Precision Agriculture tools, incremental adoption is likely to represent the most prevalent strategy for most SMEs. Sectors starting from a low base of digital maturity include construction and foundational businesses. Here the challenge faced is one of encouraging individual SME take up and use, with a potential role for government and sector bodies to support this process. In contrast, digitally mature sectors such as IT services face challenges of ensuring they keep abreast of new technology developments and skills, and able to access the fastest fixed and mobile broadband speeds in all parts of Wales. In such cases, technologically advanced businesses may be able to gain from ‘first mover status’ from digital innovation.

WERU’s Digital Maturity Survey data suggests that SMEs in Wales have increasingly adopted technologies highlighted in the Horizon Scanning research, such as cloud computing. It also indicates that some technologies are likely to impact over the next five to ten years (and possibly longer), for example AI and Automation. This indicates that digitalisation will continue to evolve, and businesses will need to ensure they have the capabilities to respond over time. WERU’s digital maturity research, however, points to there being many businesses that are digitally disengaged and passive adopters.

The [Cloud computing](#) Horizon Scanning report notes that many advanced applications such as AI are increasingly bundled into pre-existing digital products. The Microsoft 365 productivity software, for example, includes access to long standing desk top tools such as Word and PowerPoint, with cloud integration and access (One Drive). These tools allow businesses to access and work on files remotely, and for these to be synchronised across multiple devices. Such bundling suggests a process of adoption is likely to occur sometimes without the knowledge of users and have the potential to overcome the complexity of digital technology adoption and improve their usability.

5.2. Digitalisation, employment and work

The Horizon Scanning research points to a range of implications for employment and work associated with digital technology adoption and use. This can be seen in the [Rural](#) Horizon Scanning report which identifies the potential it offers for remote work in such areas. Such opportunities may enable workers to live in rural areas, taking advantage of quality of life factors. It may also offer assistance to workers in undertaking their tasks (so-called labour augmentation), for example, by enabling machines to undertake repetitive tasks under worker supervision. In the foundational economy Horizon Scanning report the findings illustrated how digital technology skills development may provide a mechanism to address the generally low-paid, low-skilled nature of work in the sector, with little access to career progression opportunities. This, it is argued, can aid the dissemination of knowledge, resources and shared opportunities across foundational occupations. These positive benefits can be seen in the Digital Maturity Survey findings which point to the increasing digital skills in Welsh SMEs over the period of the survey. The evolution of digital technologies highlighted in the Horizon Scanning research, however, suggests that such skills development will need to continue in the future to ensure that workers adapt to the challenges and opportunities of digital transformation.

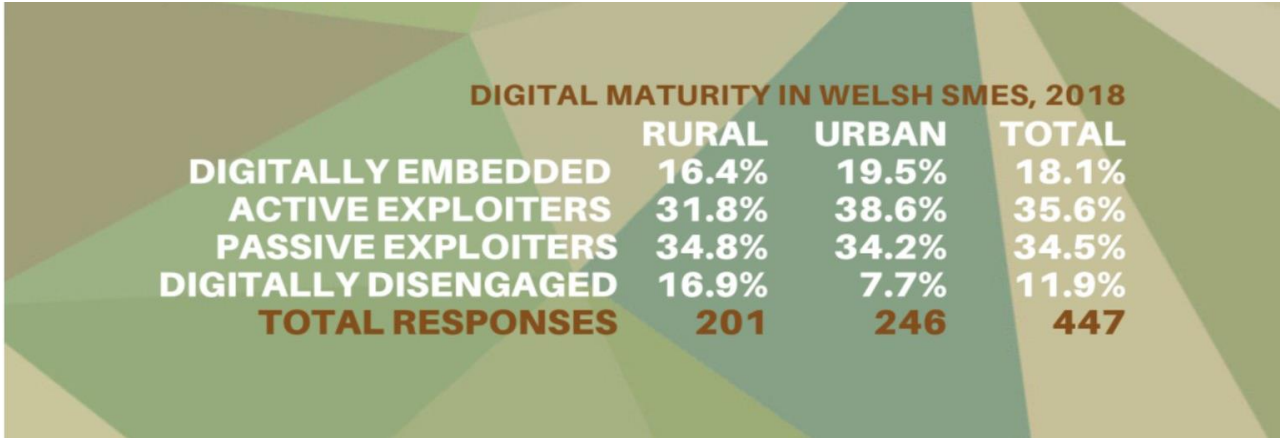
Alongside the positive impact on employment and work highlighted in the research, the [AI and Automation](#) Horizon Scanning Report examines the future challenges associated with these technological developments. This analysis highlights the potential for digitalisation to change the nature of work and its interaction with technology. The emergence of AI technologies capable of automating routine ‘back office’ tasks, and for this to spread to higher end skills in future decades is noted in the research. This, however, is likely to have uneven effects on work in particular occupations and tasks. The potential impact, here, can be seen in the automation of the customer interface with technologies such as chat bots (Business Reporter, 2016). At lower risk of replacement, however, are those occupations that require intuition, manipulation, creativity or social intelligence (Frey and Osborne, 2013). Current estimates suggest that between 30-50% of jobs are automatable as a result of digital technologies, with the largest impacts felt on lower qualified, service workers. New business creation, however, is also expected to replace and generate new jobs.

5.3. Digitalisation and geographical space

The Horizon Scanning research examines the impact of digitalisation of geographical areas in the rural and [Welsh economic regions](#) reports.

The rural Horizon Scanning paper highlights the challenges faced by SMEs in both access to digital networks relative to urban areas (see Figure 1), but also the significant opportunities that are likely to become available through improve connectivity in the future. Here the research suggests that digital technologies such as cloud computing, video conferencing and e-commerce can help to reduce costs and improve access to external markets for many businesses, and that in rural areas such benefits are potentially relevant to sectors such as farming, tourism and rural production. The report categorises these opportunities as short- and long-term in nature. In the short term, for example, it points to the potential for rural businesses to benefit from the efficiency, sales and benefits highlighted by the Digital Maturity Survey (WERU, 2018). Such benefits may also be relevant to new sectors and businesses wishing to relocate to take advantage of factors such as improved quality of life. This, it is argued, has the potential to improve the diversity of business activities in rural areas and strengthen their resilience to social and economic challenges.

Figure 1 Digital maturity in Welsh SMEs, 2018



Source: <https://blogs.cardiff.ac.uk/business-school/2019/02/14/wales-in-the-digital-economy-emerging-evidence-on-the-importance-of-place/>

The uneven nature of digital maturity is, in part, linked to availability of digital infrastructure but also the presence of greater number of lifestyle businesses in rural areas. Broadband adoption, however, may offer more varied opportunities for work in rural areas. This may help to address key challenges such as brain drain, underutilisation of skills and so on.

The challenges and opportunities associated with digital technology adoption and improved access to superfast broadband can also be seen in the Welsh Government Economic Regions Horizon Scanning report (hyperlink to be added). This shows that businesses in urban areas of the three economic regions – South East Wales, Mid and South West Wales, and North Wales - tend to report higher rates of adoption of digital technologies enabled by broadband. While many of the challenges are shared across the regions, distinctions were found in the importance of ensuring access to fixed and mobile broadband (most relevant in North Wales and Mid and South West Wales, where infrastructure access is comparatively underdeveloped) and where more advanced technology support for adoption may be needed (South East Wales).

6. Conclusion and implications for policy

The Horizon Scanning results show that while leading edge technologies such as AI have traditionally been developed and used by larger businesses operating in digitally intensive sectors (such as IT and software services), the growing availability of cloud-based digital technologies is resulting in many such technologies becoming mainstream in SMEs. The research further implies that while the notion of digital transformation captures the changes that are underway in many SMEs, the extent of such transformation is likely to continue at varying pace, leading to the danger that some businesses and places are left behind by such developments. Five potential areas for digital policy intervention emerge from the research and are outlined below:

- 1. Review the ongoing need for connectivity across Wales to minimise the disadvantages faced by rural areas in the broadband deployment*

Public intervention is likely to have a continuing role in the deployment of high speed fixed (fibre), mobile broadband (5G) and specialist networks (e.g. Internet of Things networks). The level of need for this requirement is likely to be greatest in rural and remote parts of Wales, given the persistent deployment challenges faced and their implications for local populations and visitors alike.

- 2. Ensure that business digital advisory capacity keeps abreast of emerging technology developments*

The requirement for business advisor skills to be constantly updated in line with advances in digital technologies (and the sophistication of SME questions) is noted in the Horizon Scanning research. It suggests an ongoing role for advisory services to not only engage in continuing professional development, but to develop strategies to manage the ‘hype’ associated with emerging technology solutions, and to represent digital technologies as opportunities for a broad range of business processes.

3. *Enable business advisory support to adapt delivery models to digitalisation and the emerging range of private operators in Wales*

The findings point to the potential impact of digital technologies on the delivery of business support itself, with the possibility of integrating more sophisticated forms of online information and support, and for hybridised forms of delivery seen in initiative such as Amazon Academy (online and offline dimensions) to take greater precedence. Current business support for digital technologies has the potential for greater mainstreaming into general business support. The growing introduction of private sector providers in this space is adding to support available, but also complexity, suggesting an ongoing role for policy to manage this through greater coordination.

4. *Examine the potential opportunities associated with digital hubs to support digital skills and adoption in rural areas*

Place-based opportunities to provide advice on digital technologies may present an area for policy intervention. Hubs or virtual networks have been adopted in other regions such as Lincolnshire (Price et al., 2018). This, it is argued, is an area where there may be potential to consider virtual networks of like-minded businesses, or indeed physical solutions such as regional hubs, where co-working space and business support is available. Such hub and spoke models have recently been announced in four locations in Wales¹, and may provide the basis for place-base support for future digital exploitation.

5. *Consider the potential for the public sector to support the future employment skills needs for AI and automation*

The potential role for government in helping to strengthen outcomes from digital technology use and ensure that business and employees are able to adapt is highlighted in the research. The AI Horizon Scanning paper, for example, points to the implications of automation for jobs and tasks, and suggests preparation for the future skills requirements of workers may be needed. Such responses may require a cross-governmental policy action targeting key weaknesses such as policies for entrepreneurship, innovation (R&D) and skills. The findings also suggest the need for research such as WERU's [Vulnerability Index](#) to be refreshed over time to monitor the evolution of the potential impact of digital technology development on Wales.

¹ <https://gov.wales/newsroom/businessandeconomy/2018/181121-new-enterprise-hubs-to-spark-welsh-business-announced/?lang=en>



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