Welsh Economy Research Unit

Yr Uned Ymchwil i Economi Cymru

Superfast Broadband Business Exploitation Programme: Research and Intelligence

Digital Maturity Economic Impact Report 2018

22nd May 2019

Cronfa Datblygu Rhanbarthol Ewrop
European Regional Development Fund

Table of contents

Summary 5

1. Introduction 8

2. Case study performance 10

2.1. Cost and time efficiencies 11
2.2. Customer value 13
2.3. Sales and promotion 15
2.4. Innovation 17

3. Economic impact 18

3.1. How many Welsh SMEs might have been positively affected by the adoption and use of broadband-enabled services? 18
3.2. Numbers of Welsh SMEs positively affected (turnover and employment) by adoption and use of superfast broadband-enabled services 22
3.3. A comparison of SME effects in 2017 and 2018 26
3.4. Summary 27

4. Conclusion 29

References 31

List of figures

Figure 0-1 Percentage of Welsh SMEs benefitting from broadband adoption and use, by broadband type 6

List of tables

Table 2-1 2018 case study businesses – new and revisited businesses 10
Table 3-1 Size band analysis of enterprises active in Wales in 2018 19
Table 3-2 How many Welsh businesses are expected to have seen a sales increase as a result of adoption and use of broadband-enabled services 20
Table 3-3 How many Welsh businesses are expected to have seen an employment increase as a result of adoption and use of broadband-enabled services 22
Table 3-4 Size band analysis of Welsh businesses and broadband adoption type 23
Table 3-5 How many Welsh businesses are expected to have seen a turnover increase as a result of adoption and use of superfast broadband-enabled services 24
Table 3-6 How many Welsh businesses are expected to have seen an employment increase as a result of adoption and use of superfast broadband-enabled services 25

Summary

Seizing the opportunities provided by broadband infrastructure and digital technologies has the potential to strengthen Wales' regional economic performance. The *Digital Maturity Economic Impact Report for Wales 2018* provides evidence of the digital transition taking place in the Welsh economy. It shows how continued adoption and use of digital technologies is leading to greater digital maturity of SMEs, with positive knock-on effects for regional productivity in Wales. This is important for Wales in order to bridge the regional prosperity gap with the UK.

The *Report* presents findings from case studies of SMEs in Wales and their adoption and use of digital technologies over time, analysis of SME productivity, and calculations of the economic impacts that derive from adoption and use of broadband in Wales. These calculations draw on the results of the *Digital Maturity Survey for Wales 2018*.

Case-study evidence highlight how SMEs in Wales are continuing to adopt digital technology such as social media, cloud computing and videoconferencing across multiple businesses processes. They further point to growing SME confidence in digital technology use, and its role in enabling efficiencies, improvements in the customer interface and innovation. These results highlight the mainstreaming of digital technology adoption and use *across* SMEs in Wales.

The Report goes on to provide evidence of the positive effect of digital technologies and their potential impact on productivity. It shows that 39.6% of SMEs that responded to the Survey had increased their sales as a result of use of standard or superfast broadband, of which the majority (93%) reported this to be a sustained effect over time. Positive effects were also noted with respect to employment, with 25% of SMEs reporting a positive effect from broadband use.

Its findings show that more than half of the SMEs, who were able to estimate the percentage increase in turnover due to superfast broadband use, reported an increase of up to 10%. Likewise, of those SMEs that had adopted superfast broadband and who provided an estimate of the employment change as a result of adoption, some 27.5% reported an increased effect. In making these assessments a number of businesses noted the difficulty of providing precise percentages.

Analysis of the survey data reveals that broadband enabled technology adoption and use could have improved turnover prospects for 102,600 SMEs in Wales, of which 51,700 were superfast broadband users. Based on a conservative assessment of 1% increase in turnover in affected SMEs for illustrative purposes, it is estimated that the total turnover for SMEs attributable to broadband adoption and use in Wales could be £166.8m (£91.5m was associated with superfast broadband users).

Employment benefits are also evident, with the analysis showing that 48,600 SMEs (of which 24,500 were superfast broadband users) could have seen a sustained employment increase resulting from superfast broadband adoption and use. Based on the same 1% conservative assessment of increase in employment in affected SMEs, it is estimated that employment attributable to broadband adoption could have increased by 1,637 (859 new employment opportunities were associated with superfast broadband users).

The analysis shows that the employment and turnover benefits attributable to broadband adoption and use (all business with broadband, and superfast adopters) have declined over the past year (see Figure 1). This, in part, reflects the difficult SME context facing businesses, and a decrease in SMEs' assessment of benefits. Such trends may reflect a levelling off, or decline in the impact of broadband adoption and use of businesses over time, giving some support to the assertion that SME digital transformation is not necessarily a linear, upward curve over time.

Superfast broadband users, however, continue to report positive increases in turnover, employment and profitability from adoption and use of digital technologies.'

Figure 0-1 Estimated Welsh SMEs employment and turnover benefits from broadband adoption and use, by broadband type

While the qualitative data points strongly towards greater digital maturity and SME productivity improvements resulting from adoption and use of digital technologies, the challenges of accurately measuring economic impacts on the Welsh economy continue. To this end, the research team has continued to use conservative measures to its assessment of the number of SMEs that have been positively effected in terms of turnover and employment.

Based on the conclusions from the 2018 analysis the research team in the next periods of the project will be focusing on gaining repeat survey responses from the SMEs who engaged with prior Digital Maturity Surveys, but also refining the performance and productivity analysis on individual sectors. The research team are also exploring ways to compare performance of SMEs that have participated in the Superfast Business Wales service[1], against non-participants.

This report was written by Dylan Henderson, Calvin Jones, Max Munday, Laura Norris, Annette Roberts, Neil Roche and Chen Xu. Results of the survey and other research activities can be found at http://www.cardiff.ac.uk/superfast-broadband-project

[1] The Superfast Business Wales service is a free business support service that helps eligible SMEs make the most of digital technology. Further details can be found at: www.businesswales.gov.uk/superfastbusinesswales/

1. Introduction

This report presents Cardiff Business School's analysis of the economic impacts associated with business use of superfast broadband in Wales. It draws on evidence from an annual Digital Maturity Survey of Small and Medium Enterprises (SMEs), and case studies of business adoption and use of digital technologies enabled by superfast broadband. This research forms part of the Welsh Government's Superfast Broadband Business Exploitation (SFBE) project, part-funded by the European Regional Development Fund (ERDF).

Business use of digital technologies has been identified as one of the factors that may help SMEs to improve their productivity, and respond to competitive challenges. This challenge is particularly important to Wales and its sub regions, where persistent socio-economic disadvantages have long been identified, and reflected at the regional level in low Gross Value Added, relative to other parts of the UK. Research by Cardiff Business School has charted the evolution of digital technology use since 2016, and points to the potential benefits to SMEs from the adoption of superfast broadband and associated digital technologies in areas such as turnover, profitability, innovation and employment growth. This evidence has started to show how broadband can lever productivity gains, and act as a component of economic convergence processes.

The Report builds on new Digital Maturity Survey data from 2018, and provides a comprehensive analysis of economic impacts of superfast broadband use by businesses in Wales. No comparable dataset is available for Wales, and the purpose of this report is to contribute towards understanding the impacts as they evolve over time. The economic impact research forms part of a wider programme of research undertaken by Cardiff Business School.

This report aims to:

- Present frameworks for understanding economic impacts from business adoption and use of superfast broadband in Wales.
- Provide case study evidence of impacts resulting from business exploitation of superfast broadband in Wales.
- Develop an evidence-base for policy-makers, to inform superfast broadband business support.

Results of all research activities, including Digital Maturity Surveys, case studies and horizon scanning research can be found at http://www.cardiff.ac.uk/superfast-broadband-project

The Report is structured as follows. Section 2 sets out evidence on the performance benefits associated with standard and superfast broadband use of a selection of case studies. This is followed by analysis of how broadband adoption and use links through to business productivity (Section 3). The report then discusses the wider Welsh economic implications of broadband adoption (Section 4). The report concludes with implications/lessons for subsequent economic impact research (Section 5).

2. Case study performance

The case study research examines SME use of standard or superfast broadband, and the resulting benefits. They draw on interviews with 14 businesses selected to reflect different sectors and geographical locations across Wales. Case studies were identified from respondents to the Digital Maturity Survey 2017, as well as from recommendations from our research partners (Welsh Government, Superfast Broadband Business and the Superfast Broadband Business Exploitation Advisory Group). Each case study comprised an interview with the business owner or manager, plus analysis of supporting evidence (for example, a survey return). Full details of the 2018 case studies can be found in Table 2 1.

Table 2-1 2018 case study businesses – new and revisited businesses

New cases: Business name	Business activity	Location	Sector	Employees (FTEs)
Melin Tregwynt	Woolen mill and café	South West Wales	Manufacturing	26.5
Trail Rides Wales	Motorcycle tours	Mid Wales	Business and other services	2
The White Room at Harlech Pottery	Pottery and sales	North Wales	Business and other services	2
Little Inspirations	Nursery	South East Wales	Business and other services	85
Resources for Change (R4C)	Sustainable development consultancy	Mid Wales	Business and other services	5
Myddfai Trading Company	Manufacturer of luxury toiletries and gifts	South West Wales	Wholesale and retail	2
Celtest	Materials testing	North Wales	Construction	147.5
Revisit cases: Business name	Business activity	Location	Sector	Employees (FTEs)
Bursali Towels	Towel embroidery and printing	South East Wales	Retail, Wholesale and Transport	5
Cloud Genius	CRM services	South West Wales	Information and communication	3
Method4 Ltd	Software and	South East	Information and	37

	Consultancy	Wales	communication	
Recycle Scooters	Motorbike and Scooter marketplace	South East Wales	Wholesale and retail trade	3
NLS Solicitors	Solicitors	South East Wales	Business and other services	8
D&G Office Interiors	Office furniture	South East Wales	Wholesale and retail	17.5
Royal Victoria Hotel	Hotel	North Wales	Accommodation and food service activities	63
West Wales Holiday Cottages	Retail of holidays	Mid Wales	Accommodation and food service activities	4.5

All case studies were analysed using qualitative data analysis software (NVivo), and coded under the efficiencies, customer value, innovation, and sales and promotion themes. To ensure validity and consistency in the coding process one researcher coded all case study transcripts for the 2018 Case study research.

Findings from the case studies are not intended to be generalisable to all businesses in Wales. Instead they provide in-depth evidence of the experiences of businesses that have adopted superfast broadband and illustrate the nature of impacts that are being achieved from using associated digital technologies.

2.1. Cost and time efficiencies

As with the 2016 and 2017 case studies, efficiencies gained through the adoption and utilisation of digital technologies remains the most commented upon feature. These benefits were measured in both monetary terms and a reduction in demand on individual's time. A number of respondents commented how tasks had become less onerous as new digital processes made everyday functions quicker, ultimately reducing stresses from their working day.

Case study participants were enthusiastic about the time and cost efficiencies that were gained from sharing information and communicating digitally, in many instances the unintended benefits were also positive for the environment. With a previous sales role that entailed a yearly journey of around 50,000 miles, the owner of Bursali Towels realised that "we've got to do this differently. I don't want to live on a motorway. We haven't got the staff to do it, and it's so expensive". This has enabled them to grow their sales base to some 4,000 clients; using digital technologies to reduce the cost of travel.

Efficiencies can also be gained from digitising documentation and reporting. Here, Celtest - a materials testing business – reported that the introduction of tablet technology enabled them to replace the paper system previously in place.

> "That cuts down turnaround time by days because the reports can be uploaded straight to the tablet and sent immediately to the office. Whereby, in the past, if someone has been on site and they're out all week, the worksheets wouldn't get to the office until that technician came back. In some cases, we can turnaround reports in 24 hours now."

Directly inputting the data into the tablets also means that an administrator does not need to retype the paper reports into a digital format, this saves several hours of labour a day. Tablet technology coupled with the improvement of the company's databases, has meant that the storage of information and invoicing have become seamless, saving the company a further three to four hours a month in invoicing processes. The business has used these changes to improve the value offered to customers with faster reporting time and clearer invoicing. Celtest have also achieved financial efficiencies through a switch to VoIP telephones, saving several thousand pounds a year, where "the savings from the telephone alone covers the cost of the fibre per year." Other businesses reporting benefits from replacing paper-based systems include Little Inspirations, a chain of nurseries in South Wales. Here, the business reported that handwritten sheets on a child's progress were replaced with a real-time app that is updated throughout the day. This allows parents to check-in and know what their child is currently doing and possibly see photos of them.

Similarly, D&G Office Interiors have gained time efficiencies from digitising their work processes and now have a faster turnaround that provides better value to the customer.

> "For us, it is more real time access to clients, whether it be us working on site, sending information back to the office, so then it can be acted on straight away. Whereas predominantly we would go out for a day, do a load of cold calls, write some notes, come back the day after, they would then be sort of transcribed into drawings, quotations and that kind of thing. So, realistically, we're just working faster".

The ability to remotely submit information is important to the company, with reduced employee mileage generating significant savings. Whilst exact costs are difficult to calculate due to the wide geographical reach of business activities, it is estimated to be approximately £10,000 a year when wages are also taken into consideration. Further to this, a more collaborative approach is being facilitated throughout the business. This is based on cloud storage enabling all staff to access project data, where previously it would have been attributed to one or a few members of staff. This has the further benefit that it can also compensate for staff absenteeism due to illness or other factors such as 'snow days'. The benefits of digitised communication were also evident in the NLS Solicitors case study. Here, business expansion was facilitated by cloud applications and VoIP telephones; where purchasing extra low cost hardware created a new deskspace, helping to reduce the risk associated with expanding the business.

> "Every time you open a new office it's going to be a risk because you haven't got a client base. We're minimising the risks by ensuring that it's not going to cost a lot to run, so it won't need to have many clients initially to at least pay itself."

Flexible and efficient office space is important to working remotely as a team. Here, Resources for Change reported that the use of cloud technologies enabled them to function without a central office, resulting in cost and time efficiencies. This meant that members of staff no longer need to commute to work daily, improving their work-life balance. Operating remotely is not without its challenges, however. In this respect Resources for Change noted connection challenges (associated with standard broadband), as well need to ensure that staff have consistent filing processes for documents in the cloud.

Recruitment of staff has also benefited a number of case study businesses. Resources for Change, for example, reported making use of LinkedIn to access a wider pool of talent. Cloud Genius are similarly examining the potential to make use of a wider talent base, with the potential to access remote support services for customers.

2.2. Customer value

Customer value through the use of digital technologies mainly derives from the ability to provide a quicker, more cost-efficient service. An example of this is D&G Office Interiors, who have been able to store project data (such as drawings) in the cloud, providing staff with easy access. This has allowed work to be allocated to a range of different staff members, rather than an individual:

> “I think then that’s moved into team collaboration… So again, there is more of a customer service approach that you could ring up the office now, and chances are someone would know about your office. Rather than before, if that person you had spoken to in the first place or the sales person wasn’t available, then you’d probably have to phone them on their mobile or wait for them to come back to you.”

This way of working adds further value for the customer as the large data files were previously delivered via USB. In contrast customers are now able to access the Cloud files and see the latest version of the work. Typically, the business uses the same systems as suppliers and customers, making information sharing particularly straight forward. This makes the design process a ‘real time’ conversation where requests can easily be factored in to create a particularly bespoke service. Digital technology is also helping the business communicate effectively with the supply chain particularly when there are parts missing or a fault with a product; a simple video can highlight the issue so that it is resolved quickly.

Digital technology use can help to bring consistency to the branding and promotion of a business. Little Inspirations, for example, noted how their use of social media enabled them to reach customers across the businesses’ sites. This enables a joined-up approach across the business: “that is what technology hopefully can bring, is the consistency across a growing business or a multi-site business.”

Providing customers with innovative ways of presenting goods and services is also possible. Melin Tregwynt’s website, for example, offers customers the opportunity to mix different materials with different designs such as cushions and throws. Recycle Scooters’ YouTube features photos and videos of their products enabling customers to see and hear the motorcycle products they wish to purchase. This platform provides opportunities for feedback:

> “It is still a big selling point for us and it still really helps the business. Not only does it help with the actual enquiry to conversion, it also helps in reducing returns because it's a lot harder for people to say, "I've bought it, it doesn't work, I'm sending it back," and send back their broken one, because obviously there's a video of it running. Also, it's pretty good for just promoting the fact that we're ethical and reputable and all the rest of it. So we're 99.8% positive feedback, 13,500 at the moment.”

Whilst digital technologies offer many opportunities for streamlining processes and provide additional customer value with faster report turn arounds amongst others, some businesses need to preserve the 'personal touch' to ensure that what they offer is indeed what the customer needs. Trail Rides Wales, for example, do not allow online booking as they "don't want people to book unless they are absolutely sure what we are offering is what they want. They either phone or email first and I reply asking a few questions. Then the booking usually goes ahead when we've had some personal exchange." This means that the business whilst having an entirely digital marketing presence feels better able to control their sales in order to ensure that the customers receive value.

2.3. Sales and promotion

Sales and promotion benefits linked to digital technology use were evident in many of the case studies. Bursali Towels, for example, have recently invested in VoIP telephones, enabling them to achieve increased broadcasting reach from 10m on Bluetooth to 100m. This means that staff can answer the telephone anywhere within their extensive warehousing, providing more freedom of movement and for calls to be answered quickly, which is part of their customer service motto. The CRM system is able to generate auto-replies with pricelists during the evening and weekends. This has helped to boost sales by keeping conversations live. The system also follows-up enquiries that do not lead to a sale or multiple visits to a particular webpage, sending an email that asks if further guidance is needed. After the initial setting up by the business owner, the system continues to do this without further input meaning that business generation is almost automated.

> "I love technology…it just makes everything so much easier for us. We could never have built this business up without technology, because we've made the technology work for us…That's the way we've done it…Always been heavily into our website and things like that, and Google. We advertise on Google, it's the most powerful thing in the world. It's phenomenal. It transformed our business. I mean, I always say the best thing I ever did in this business was start advertising on Google, and the worst thing I ever did was not to start for the first five months."

Website presence is an effective marketing and communication tool, D&G interiors are increasingly putting the general information that is requested by the customer on to their website. The brochures are available for download which often opens the conversation as the customer will contact the business for advice.

> "Whereas previously it might have been the case that we post a brochure and try and arrange an appointment to meet them. People don't really want face to face meetings if they're not ready to buy…It's more just information, I think that's probably the biggest thing, we can share information very quickly with our suppliers, customers, potential customers. There is no pressure, it's just filling the knowledge gap and we found that if you just give out free advice when it comes to the project, that element of trust has already been built up, the confidence is already there and it just helps us appear differently to our competitors."

Introducing e-commerce can bring about a change in the way business is done. Melin Tregwynt has a large variety of products and offering e-commerce has had implications on the stock levels that they keep. Previously a pre-ordered number of goods would be produced for a stockist, now it is necessary to keep stock of all items in their warehousing to furnish any online sales that they may have. It is also necessary to monitor stock levels so that they can fulfil orders in a timely fashion, this may mean dovetailing or stopping production of one item in order to replenish a stockpile. The website also means that whilst the business would previously attend trade shows to display the products, it is now possible to see them online any time. They still attend trade shows in order to network and develop contacts.

> "The biggest change in the business…is fulfilment. It's gone from packing large boxes to packing small boxes, and we just…have to have more storage. We're desperately short of storage space…
>
> There's a different dynamic within the business. It's no longer order driven. It's planning driven rather than specific orders, so you've got to take a view on what you think is going to be successful."

Businesses can also benefit from working with specialised IT consultants. Here, Myddfai Trading - a luxury toiletries company that provides work opportunities to people with learning disabilities - recruited an IT Business to design and manage their website. In lieu of a fixed-fee payment the IT business receives a percentage of the online sales. With the effective management of the website sales have increased year on year by 30 – 40%. The business also uses Facebook as a marketing tool as it can best convey the nature of this social enterprise and it is simple to upload new imagery without external support.

> "Facebook is free and it does seem to work. You can see the numbers of people who are looking at our post. Normally, it is anything between 500 and 2000. Shares and clicks, I mean that one 97 people clicked through to the website. If only 1% of those ordered then it could be £50-60 for basically posting a few photographs. So, to my mind, it does make a huge difference. I think from a website point of view then the communication that goes on via the website is really important, with the new and changing images. People can immediately see the bulk of the images and see what we do."

A new element addressed by several case studies this year was GDPR and its impact. Some businesses had allocated a member of staff to address the issue, contacting those that had previously provided contact details to ensure that they wanted further communication. These contacts are inevitably quite important as they are the channels through which the businesses can promote their products and services. Whilst it is a process that businesses are concerned that they do correctly, some acknowledge the opportunities that the process offers. Cloud Genius, for example, have introduced software for clients to ensure that they are GDPR compliant, particularly Sharepoint that has GDPR compliant data storage and email inbox at a low cost of £3.80 per mailbox. D&G Office Interiors also streamlined their data into one Cloud location in order to achieve GDPR compliance, but it has also ensured that everything is centralised, and nothing is missed during backup procedures. The business has found that this makes "life so much easier. Whereas before, there was lots of different data, the same data duplicated, some of it was on certain computers, some on the server, now literally we can see where it all is."

2.4. Innovation

While innovation is often not a central aim of digital technology adoption by businesses, the case studies show examples of how new products, processes and services can be launched as a result of broadband adoption. Bursali Towels, for example, have benefited from increased broadband speed (initially via Airband and subsequently by fixed broadband). This has allowed it to introduce a digital towel printing service with a turnaround time of 7 days. Introducing this service has helped to gain competitive advantage and boost their customer base.

Going forward, Celtest are looking to further their expansion into tablet technology and to innovate in automated on-site quality control. In this context a tablet would be attached to a paver and all readings would be taken without a technician needing to be on site. This would introduce even more time and cost efficiencies. Those businesses that support the use of large Software programmes are also witnessing innovation with the integration of new functions into the existing packages. Cloud Genius are supporting innovation within the Salesforce package with the integration of AI into the Einstein package.

In some of the case studies innovation takes the form of bespoke services for each client. Method4, as a custom software provider, designs new solutions for its customers. One example of this is their design of a forecasting system for Natural Resources Wales. This required close working with the organisation to understand the complex processes that feed in to a forecasting system to predict the impact of rainfall in specific locations.

3. Economic impact

The annual *Digital Maturity Survey for Wales* provides evidence on the benefits that businesses achieve from using broadband. It shows that a growing number of SMEs report performance benefits from using superfast broadband, in areas such as profitability, turnover, employment and innovation outcomes. In order to examine how such performance outcomes are contributing towards economic impact this section considers the potential regional scale of the turnover and employment effects resulting from SME adoption and use of standard or superfast broadband[2].

While the 2018 *Survey* allows comparison with results from the 2017 data, caution is needed as there continues to be problems in 'grossing up' findings from the *Survey* to the population of Welsh SMEs. For these reasons the approach adopted is cautious. In particular, while the 2018 Survey was representative in terms of industry sectors and location of SMEs responding, there could still be issues in that businesses are more likely to report positive than negative effects on jobs and turnover. Moreover, while the total number of respondents in the 2018 Survey was 479, only a proportion of this number gave finer grained details of expected employment and turnover effects resulting from adoption of broadband resources. Finally, for individual respondents, there is a strong element of subjectivity in terms of how they precisely assess the extent to which access to new services enabled by broadband feeds through to a change in employment or turnover. Indeed, it is possible that respondents might have some difficulty in assessing the nature of the counterfactual (i.e. what would have occurred had they not adopted the broadband services).

3.1. How many Welsh SMEs might have been positively affected by the adoption and use of broadband-enabled services?

The objective of this analysis is to first estimate overall numbers of businesses that might have been impacted by positive effects from broadband adoption (no distinction is made between standard and superfast broadband). A summary of the main findings from the 2018 *Survey* is set out below, identifying the effects of adoption and use of standard or superfast broadband services on turnover and employment in particular:

- A total of 430 of the 479 respondents (89%) answered the *Survey* question with respect to the actual broadband speed. As a result, there is no indication of the speed of broadband on the remaining 11% of respondents, and suggests that caution is needed in interpreting what follows. A total of 460 of the 479 businesses answered in terms of what effect the adoption and use of broadband had on turnover.

[2] This section uses unweighted data from the Digital Maturity Survey 2018.

- Of these 460 businesses, some 41.5% reported that turnover had increased as a result of adoption and use of standard or superfast broadband, and with just 1.3% revealing that their turnover had decreased. There was some variation of the effects of broadband by firm size-band.
- Around one-third (138) of those reporting a positive turnover effect felt able to estimate the percentage increase. Around 67 reported the increase was up to 10%, and with a further 27 specifying a turnover increase of between 11% and 30%.

Some inference can be drawn from the points above on the wider Welsh economy effects of broadband use by businesses in Wales. Information is available in terms of the size analysis of all Welsh businesses in terms of numbers of enterprises, employment, and turnover (Table 3-1). This highlights the very large number of enterprises in the cohort of employment between 0 and 9 people in Wales.

Table 3-1 Size band analysis of enterprises active in Wales in 2018

	Enterprises (000s)	Employment (000s)	Turnover (£bn)
Micro (0-9)	246.0	399.0	16.0
Small (10-49)	9.4	178.4	13.7
Medium (50-249)	2.2	142.3	16.2
Large (250+)	1.7	440.3	69.0
All	259.2	1159.9	115.0

Source: StatsWales (2018)

The employment size bands used in the 2018 *Digital Maturity Survey* are very slightly different from those shown in Table 3-1. These issues noted, it is possible to draw some broad conclusions on the numbers of businesses in Wales that might have been positively effected in terms of turnover and employment effects from broadband adoption. Here we adopt the conservative assumption of a 1% increase in turnover in SMEs citing a positive impact on turnover from broadband adoption.

Table 3-2 How many Welsh businesses are expected to have seen a turnover increase as a result of adoption and use of broadband-enabled services

	Welsh Enterprises (000s)	Assumptions based on Survey, i.e. est. % of firms seeing a positive and sustained turnover increase from broadband	Estimated Welsh SMEs (000s) seeing a turnover increase due to broadband adoption	Example of how much Welsh SME turnover increases assuming a 1% increase in turnover in positively affected firms in the size cohort (£m)
Micro (0-9)	246	40.1%	98.5	64.1
Small (10-49)	9.4	35.2%	3.3	48.2
Medium (50-249)	2.2	33.6%	0.7	54.5
All	257.6	-	102.6	166.8

Table 3-2 reveals that broadband-enabled services could have improved turnover prospects for around 102,600 (39.6%) Welsh SMEs, and that this may produce increased turnover of £167 million, based on the 1% assumption. These turnover increase estimates are lower than those given in 2017, of which there may be a number of explanations. This could also be linked to the sample itself, with the 2018 survey cohort naturally less positive than their earlier counterparts, or with the growing influence of macro-economic uncertainty, and poorer business confidence in 2018, affecting the perception of the value of the broadband resource.

The *Survey* findings suggest that the true turnover impact could be a multiple of that reported in Table 4.2. However, care is needed here because the *Survey* does not explicitly allow any inference to be drawn on how more successful businesses efficiently using broadband services might be working to displace turnover and economic activity in less efficient businesses. Under these circumstances the conservative turnover attribution assumption is more appropriate.

The *Survey* findings also allow analysis of employment impacts enabled by use of broadband. Here, the 2018 *Survey* revealed a total of 456 of the 479 respondents answered the Survey question with respect to effects of adoption of standard or superfast broadband services on employment.

- Of these 456 businesses some 25% reported that employment had increased as a result of adoption and use, and with just 3% revealing that their employment had decreased. There was some variation on the effects of standard or superfast broadband by firm size-band (for example 30% of businesses employing more than 50 people reported a sustained employment increase, whereas this figure fell to around 19% for the smallest businesses. This is not surprising as larger businesses have more potential for an employment increase given their existing scale of operations).
- Of those businesses reporting whether an increase in employment is sustained, 86.2% believed that the increase was sustainable rather than a one-off short term increase.
- Around 68.4% of those reporting a positive employment effect (78 businesses) felt able to estimate what the percentage increase was, with around half reporting the increase was up to 10%, and with a further 13 businesses reporting an employment increase of between 11% and 30%. This illustrates that the number of businesses able to put precise percentages around additional employment effects were quite limited.

When the *Survey* findings are applied to the Welsh population of SMEs (**Table 3-3**) it could mean that some 48,600 SMEs have seen an employment increase resulting from the broadband adoption. Given the average employment size of each SME in each cohort in **Table 3-3**, then were a 1% increase to have occurred around 1,637 new employment opportunities would have resulted. Again this is a conservative assumption for illustrative purposes. This represents a decline from the 2017 estimate (1,752), and again may be linked to the uneven nature of benefits achieved, and changes in the external business context.

It is important to note that while these estimates of direct effects are conservative they take no account of the multiplier effects (supply chain and household income effects) connected to new activity.

Table 3-3 How many Welsh businesses are expected to have seen an employment increase as a result of adoption and use of broadband-enabled services

	Welsh Enterprises (000s)	Assumptions based on Survey, i.e. est. % of firms seeing a positive and sustained emp. increase from broadband	Estimated Welsh SMEs (000s) seeing a sustained employment due to broadband adoption	Example of how much Welsh SME employment increases assuming a 1% increase in employment in positively affected firms in the size cohort (m)
Micro (0-9)	246	18.5%	45.4	736
Small (10-49)	9.4	27.0%	2.5	481
Medium (50-249)	2.2	29.4%	0.6	419
All	257.6	-	48.6	1,637

3.2. Numbers of Welsh SMEs positively affected (turnover and employment) by adoption and use of superfast broadband-enabled services

Section 4.2 repeats the analysis above but with a focus on the proportion of businesses that have adopted different types of broadband - superfast or standard.

Table 3-4 Size band analysis of Welsh businesses and broadband adoption type

	Enterprises (000s)	Employment (000s)	Turnover (£bn)	Superfast Broadband	Standard Broadband
Micro (0-9)	246	399	16	45%	55%
Small (10-49)	9.4	178.4	13.7	55%	45%
Medium (50-249)	2.2	142.3	16.2	63%	37%
All SMEs	257.6	719.7	45.9	49%	51%

Based on the 2018 *Survey,* a large proportion of superfast-enabled respondents were able to respond to how adoption of the resource had affected turnover. In summary:

- A total of 212 respondents who had adopted superfast broadband answered the *Survey* question with respect to effects of adoption and use of broadband-enabled services on turnover.
- Of these, 88 businesses (some 43.1%) reported that turnover had increased as a result of superfast adoption, and with 1 of these revealing that their turnover had decreased.
- Some 68 of those reporting a positive turnover effect felt able to estimate what the percentage increase was, with 51.5% reporting the increase was up to 10%, and with a further 23.5% specifying a turnover increase of between 11% and 30%.
- The vast majority of businesses (around 93%) reporting a turnover increase related to adoption and use of superfast broadband-enabled services believed that the turnover increase would be maintained (i.e. was not just a one off benefit).

Table 3-5 How many Welsh businesses are expected to have seen a turnover increase as a result of adoption and use of superfast broadband-enabled services

	Welsh Enterprises (000s)	Assumptions based on Survey, i.e. est. % of firms seeing a positive and sustained turnover increase from superfast broadband	Estimated Welsh SMEs (000s) seeing a turnover increase due to superfast broadband adoption	Example of how much Welsh SME turnover increases assuming a 1% increase in turnover in positively affected firms in the size cohort (£m)
Micro (0-9)	246	20.1%	49.5	32.2
Small (10-49)	9.4	18.0%	1.7	24.7
Medium (50-249)	2.2	21.4%	0.5	34.6
All	259.2	-	51.7	91.5

Table 3-5 adopts the same conservative position as earlier in terms of a turnover increase attributable to adoption and use of superfast broadband. This shows that 51,700 SMEs (20.1%) have seen positive turnover effects resulting from adoption of superfast (Subtracting this from the total of 102,600 businesses in **Table 3-2**, leaves more than 51,900 SMEs with positive effects from standard broadband). Using a conservative figure of a 1% increase in turnover attributable from adoption and use of superfast broadband services the Table suggests that total turnover in SMEs in Wales impacted positively by superfast would be around £91.5m. Again the Survey findings reveal that the real number could be a multiple of this. It is noted that around £91.5m of turnover in Wales would equate to an estimated £27-29m of gross value added (based on the relationship between firm turnover and GVA in Wales derived from ONS data).

In a similar manner the analysis now turns to consider the SMEs seeing positive employment connected to the adoption of superfast broadband. The 2018 *Survey* revealed the following.

- A total of 204 of the 479 *Survey* respondents had adopted superfast broadband and were able to respond to survey questions on employment change.

- Of these 204 businesses, some 27.5% reported that employment had increased as a result of superfast adoption, and with just 2.0% revealing that their employment had decreased. There was again some variation of the effects of broadband by firm size band (for example 18.5% of businesses employing more than 50 people reported an employment increase, whereas this figure fell to around 9.3% for those employing between 0-9 FTEs).
- Of those businesses reporting whether an increase in employment is sustained, an estimated 81.0% believed that the increase was sustainable rather than a one-off short term increase
- Around 69.6% of those reporting a positive employment effect (39 businesses) felt able to estimate the percentage increase, with around half reporting the increase was up to 10%, and with a further 10 suggesting an employment increase of between 11% and 30%.

Table 4-6 show that some 24,500 SMEs (almost 10%, **Table 3-6**) could have seen a sustained employment increase resulting from superfast broadband adoption and use. Given the average employment size of SMEs in each cohort, a 1% increase could see around 859 new employment opportunities. Again, and as above, this is likely to be conservative and with the *Survey* findings hinting at higher levels of new job creation.

Table 3-6 How many Welsh businesses are expected to have seen an employment increase as a result of adoption and use of superfast broadband-enabled services

	Welsh Enterprises (000s)	Assumptions based on Survey, i.e. est. % of firms seeing a positive and sustained employment increase from superfast broadband	Estimated Welsh SMEs (000s) seeing an employment increase due to superfast broadband adoption	Example of how much Welsh SME employment increases assuming a 1% increase in employment in positively affected firms in the size cohort
Micro (0-9)	246	9.3%	22.9	372
Small (10-49)	9.4	12.5%	1.2	223
Medium (50-249)	2.2	18.5%	0.4	264

	Welsh Enterprises (000s)	Assumptions based on Survey, i.e. est. % of firms seeing a positive and sustained employment increase from superfast broadband	Estimated Welsh SMEs (000s) seeing an employment increase due to superfast broadband adoption	Example of how much Welsh SME employment increases assuming a 1% increase in employment in positively affected firms in the size cohort
All	257.6	.	24.5	859

3.3. A comparison of SME effects in 2017 and 2018

Table 3-8 Broadband and superfast broadband comparisons

	Estimated Welsh SMEs (000s) seeing a turnover/employment increase due to broadband/superfast broadband adoption		Example of how much Welsh SME turnover/employment increases assuming a 1% increase in turnover/ employment in positively affected firms in the size cohort (£m or FTEs)	
Year	2017	2018	2017	2018
Turnover effect broadband adoption	111.4	102.6	229.3	166.8
Employment effect broadband adoption	32.1	48.6	1752.0	1636.6
Turnover effect	47.1	51.7	124.2	91.5

	Estimated Welsh SMEs (000s) seeing a turnover/employment increase due to broadband/superfast broadband adoption		Example of how much Welsh SME turnover/employment increases assuming a 1% increase in turnover/ employment in positively affected firms in the size cohort (£m or FTEs)	
superfast broadband adoption				
Employment effect superfast broadband adoption	16.6	24.5	1056.0	859.0

Table 3-8 provides some comparison of the headline figures in this section compared to those for 2017. Again there is some care required here. The figures relating to turnover effects based on our conservative 1% assumption are affected strongly in 2018 by a general decrease in average turnover per micro-sized firm last year, and with this probably associated with falling business confidence and growing uncertainty in the period running up to the original planned Brexit date. Notwithstanding, the figures for 2018, still reveal appreciable turnover effects associated with broadband adoption based on our conservative assumption.

More important, however, is the increase in the number of firms between 2017 and 2018 reporting turnover and positive employment effects resulting from superfast braodband adoption. This should be seen as particularly encouraging in the context of the challenging economic climate and points to strong economic dividends occurring as a result of the presence of the new infrastructure.

3.4. Summary

The results suggest that SMEs adopting and using superfast broadband may have experienced the greatest increases in turnover and employment in 2018, with some:

- 102,600 SMEs in Wales could have improved turnover prospects, with an estimated total turnover attributable to broadband adoption and use in Wales of £166.8m (£91.5m was attributable to superfast broadband adoption).

- 48,600 SMEs (24,500 were superfast broadband users) could have seen a sustained employment increase resulting from superfast broadband adoption and use, with an estimated employment effect attributable to broadband adoption of 1,637 jobs (859 new opportunities associated with superfast broadband).

The effects experienced by SMEs from the adoption and use of broadband are, however, smaller than those reported in the 2017 Digital Maturity Economic Impact Report. These differences may reflect some levelling off or decline in the impact of broadband adoption and use on turnover and employment over time, but are also a function of economic conditions affecting the statistics used in grossing up our estimates. It is also accepted that the differences between 2017 and 2018 reported impacts could also reflect the different characteristics of the two samples. Future *Surveys* will enable a better understanding of such trends.

The difficulties of estimating the marginal economic effects of improvements in adoption and use of the technology should also be noted. It is accepted here that it is difficult for the *Survey* respondents to be precise on how broadband effects both employment and turnover. However, encouraging from the *Survey* was that the respondents provided evidence of positive as opposed to negative effects, and with a high proportion of positive impacts expected to be sustained as opposed to short term. While the focus of the section has been on increases in turnover and employment there is a need to recognise that the technology could be having positive effects even were turnover and employment in affected SMEs to be falling i.e. either the job and turnover losses might have been worse without the adoption of broadband, or falling employment is connected with improving productivity. In this context it is important to consider the findings of this section, with that in the following sections which reveal performance and productivity impacts connected with businesses adopting and using broadband-enabled services.

4. Conclusion

The 2018 *Digital Maturity Economic Impact Report for Wales* is now into its third year, providing further evidence of the digital transition taking place in the Welsh economy. The report benefits from continued SME response rates to the *Digital Maturity Survey for Wales,* allowing the research team to better understand the processes of SME adoption and use of digital technologies.

The results show that greater digital maturity of SMEs is positively contributing towards economic impacts, with an increasing number of firms reporting positive benefits associated with use of superfast broadband. Analysis of the survey results indicate that more than half of the SMEs who were able to estimate the percentage increase in turnover due to superfast broadband use, reported an increase of up to 10%. Likewise, of those SMEs that had adopted superfast broadband and who provided an estimate of the employment change as a result of adoption, some 27.5% reported an increased effect.

The economic impact analysis finds that:

- 102,600 SMEs in Wales could have improved turnover prospects, with an estimated total turnover attributable to broadband adoption and use in Wales of £166.8m (£91.5m was attributable to superfast broadband adoption).
- 48,600 SMEs (24,500 were superfast broadband users) could have seen a sustained employment increase resulting from superfast broadband adoption and use, with an estimated employment effect attributable to broadband adoption of 1,637 jobs (859 new opportunities associated with superfast broadband).

They help to better understand the differences between sectors and places in Wales. The case studies, for example, point to SMEs continuing to adopt digital technology across multiple businesses processes. They further show growing SME confidence in digital technology use, and its role in enabling efficiencies, improvements in the customer interface and innovation. These results point to the mainstreaming of digital technology adoption and use across SMEs in Wales.

Analysis of the Digital Maturity Survey findings highlights differences between broadband types (standard and superfast). Here, the results show that those SMEs that have adopted superfast broadband tend to report more positive outcomes in areas such as profitability, employee numbers and innovation. Indeed, few businesses report having no broadband access.

The potential to analyse SME digital maturity and its economic impact over a three-year period is helping to provide evidence of trends. These results show that the progress towards digitalisation of the Welsh economy is not necessarily a smooth or linear transition. In this respect, economic impacts from digitalisation are influenced by SMEs adoption and use, but also the context that they operate in. In 2018, for example, this context was characterised by rising uncertainty relating to factors such as the progress of Brexit.

While the qualitative data points strongly towards greater digital maturity and SME productivity improvements resulting from adoption and use of digital technologies, the challenges of accurately measuring economic impacts on the Welsh economy continue. To this end, the research team has continued to use conservative measures to its assessment of the number of SMEs that have been positively effected in terms of turnover and employment.

Based on the conclusions from the 2018 analysis the research team in the next periods of the project will be focusing on gaining repeat survey responses from the SMEs who engaged with prior Digital Maturity Surveys, but also refining the performance and productivity analysis on individual sectors. The research team are also exploring ways to compare performance of SMEs that have participated in the Superfast Business Wales service[3], against non-participants.

[3] The Superfast Business Wales service is a free business support service that helps eligible SMEs make the most of digital technology. Further details can be found at: www.businesswales.gov.uk/superfastbusinesswales/

References

StatsWales (2018), Business structure in Wales by size-band and measure. Available at: https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/Businesses/Business-Structure/Headline-Data/latestbusinessstructureinwales-by-sizeband-measure

Cardiff Business School
Ysgol Busnes Caerdydd

Welsh Economy Research Unit

Cardiff Business School

Cardiff University,

Aberconway Building,

Colum Drive,

Cardiff CF10 3EU

For enquiries or to find out more please get in touch:

superfast@cardiff.ac.uk

http://www.cardiff.ac.uk/superfast-broadband-project/digital-maturity-survey

https://www.linkedin.com/company/welsh-economy-research-unit/

https://twitter.com/CUWERU