Cardiff University
Prifysgol Caerdydd

Welsh Economy Research Unit
Yr Uned Ymchwil i Economi Cymru

Superfast Broadband Business Exploitation Project

Digital Maturity Survey for Wales 2020

12th November 2020

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Summary

Superfast Broadband Business Exploitation Project

The Digital Maturity Survey for Wales 2020 – Summary

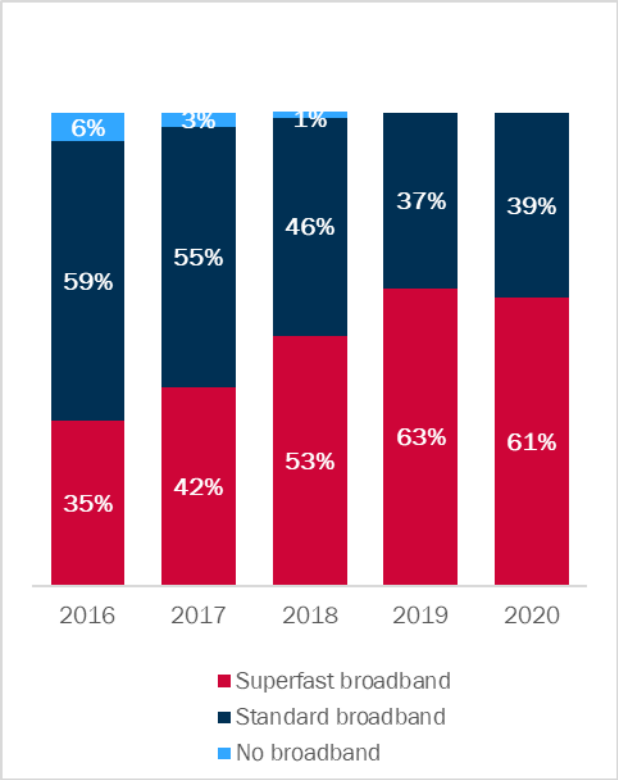
Improving the efficiency of Welsh SMEs is critical to improving Wales' future economic prospects and responding to the COVID-19 pandemic. The *Digital Maturity Survey* for Wales 2020 provides evidence on how SMEs are responding to these challenges by adopting and using the digital technologies enabled by broadband access. It draws on Cardiff Business School's fifth annual survey (and final survey under the Welsh Government's Superfast Broadband Business Exploitation Programme) and illustrates the growing digitalisation of Welsh businesses and the impact that this is having on their performance.

During 2020, the regional (and indeed and the UK and global) economy has faced severe disruption associated with the COVID-19 pandemic. This resulted in periods of national and regional 'lockdown' in which economic activity declined, as many businesses either ceased trading or encouraged staff to work from home. These challenges have been reflected in Welsh Government's strategy 'Leading Wales out of the COVID-19 pandemic: a framework for recovery' as well as the introduction of new business support and funding mechanisms, particularly those relating to the Economic Resilience Fund.

Survey findings

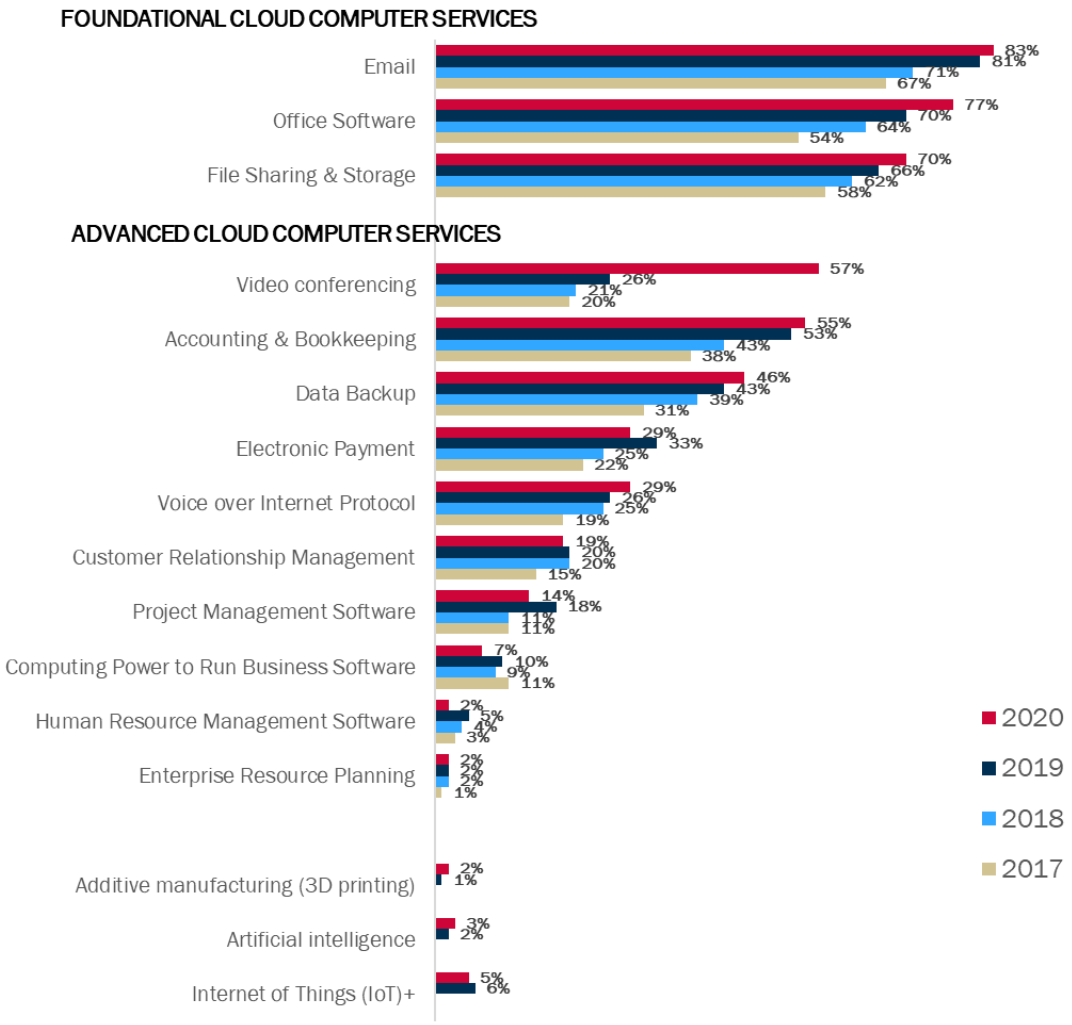
The Survey findings continue to show that the majority of SMEs in Wales have now adopted superfast broadband, with some 61% of businesses reporting access through a fixed connection (up 26 percentage points on 2016). These results have benefited from the increasing number of premises that now have access to superfast broadband, but also highlight the continuing potential for more SMEs to be connected and supported in future.

Adoption of broadband by type (% of SMEs)



Use of cloud computing services by SMEs has continued to increase in 2020. Here the *Survey* results suggest that more SMEs are making use of foundational cloud computing services, with use by 70% or above of all businesses. While comparatively fewer businesses reported using more advanced cloud services, increases can also be observed over the period 2017-2020. A much smaller proportion of SMEs, however, are making use of the leading-edge digital technologies such as artificial intelligence, additive manufacturing (e.g. 3D printing) and internet of things (IoT) technologies.

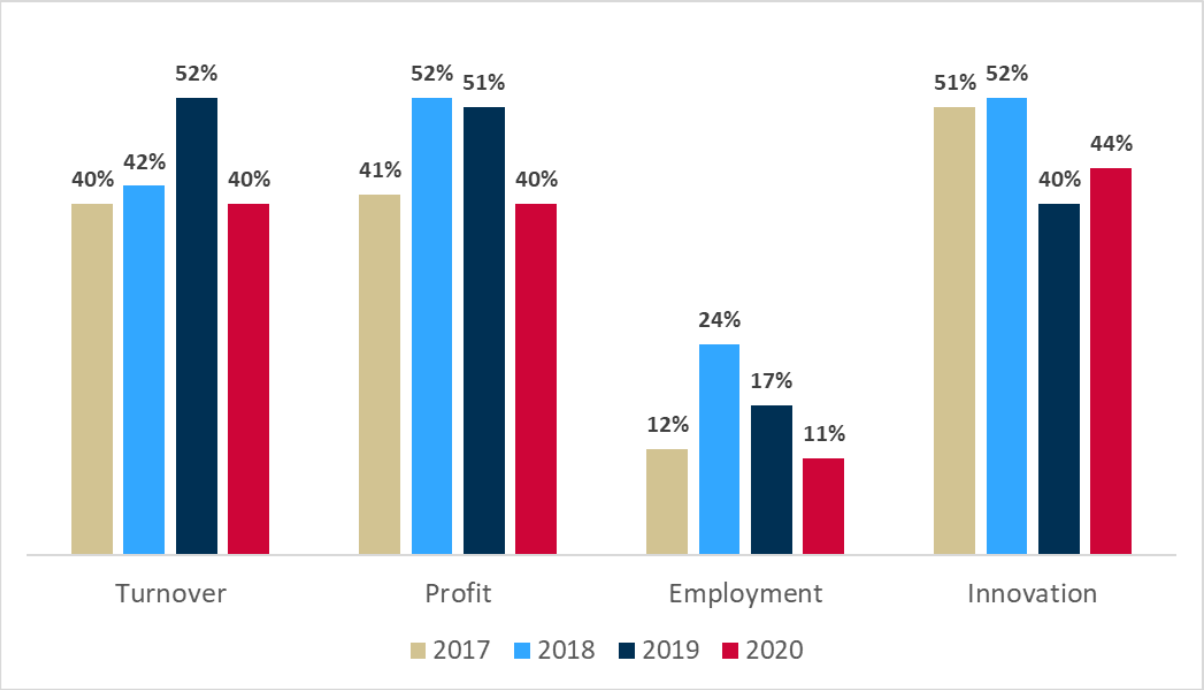
Proportion of SMEs using cloud computing services, by category (% of SMEs)



The use of digital technologies is highlighted by the growing number of SMEs reporting e-commerce transactions. The proportion of SMEs reporting 76% to 100% of their sales being online was three-in-ten (29%) in 2020. This represents an increase of twelve percentage points from the equivalent figure in 2016 (17%).

The findings highlight that despite an increase in the number of SMEs reporting positive outcomes with respect to innovation, from the use of broadband technologies (by four percentage points from 2019 to 2020), there has been a decline in all performance outcomes over the 2017-2020 period. This points to the growing challenges faced by business in generating such outcomes, as well as the uncertain economic context in recent years.

Performance of SMEs with superfast broadband (% indicating positive outcomes)



The data gathering phase of the *Survey* in 2020 was undertaken during the global COVID-19 pandemic. Further questions were asked on how access to broadband services allowed SMEs to respond. The results here suggest that SMEs were most likely to report that their broadband services allowed them to respond to COVID-19 by enhanced use of video conferencing, with seven out of ten SMEs agreeing or strongly agreeing with the statement (71%). Further, just over three-in-five SMEs noted that access to their broadband services enabled them to build confidence in future business practices (62%), and a similar proportion reported greater remote working by staff (61%).

Role of broadband enabled services in business responses to COVID-19

	% All SMEs "Agree" or "Strongly agree"
Enhanced use of video conferencing	71%
Building confidence in future remote business practices	62%
Greater remote working by staff	61%
Increased use of cloud computing services	47%
Minimising the decline of sales	41%
Helping the business to return to previous levels of sales activity	39%
Moving into new product/ service markets	35%

Four groups of SMEs are identified in the report, based on their level of digital maturity. The *Survey* shows that the proportion of businesses that are in the highest groups of digital maturity – Digitally Embedded and Active Exploiters – have fallen back, with corresponding growth in the proportion of businesses that are less digitally mature. This may point towards ongoing challenges for businesses, as well as the opportunities to improve productivity.

Digital maturity groups in Wales (% of SMEs in 2020)

Digitally Disengaged	Passive Exploiters	Active Exploiters	Digitally Embedded
19%	38%	31%	12%
Businesses tending to be standard broadband users, with a high proportion of employees with below average ICT skills. The majority do not use digital technologies and report no sales from online transactions.	Businesses tending to have standard broadband, but more likely to have staff with above average ICT skills. Make use of basic cloud-based applications, but their use of online platforms to generate e-sales is low.	Businesses likely to have access to superfast broadband and a high proportion of staff with above average ICT skills. Use a wide range of digital platforms and technologies. Nearly half report online channel as the main source of sales.	Adopters of superfast broadband with a very high proportion of employees with above average ICT skills. Use a high number of digital applications and secure most of their sales from online transactions.

Although the overall picture is one of businesses increasingly adopting and using digital technologies in Wales, the report shows that this is not a static canvas. There remain SMEs that are characterised by being relatively digitally disengaged and evidence that there may be economic penalties connected with persistent disengagement. Moreover, business productivity in Wales still lags that in other regions of the UK. Our evidence base suggests that these lags might have been far worse in the absence of government support for SMEs to engage with superfast broadband. The economic challenges facing Wales' SMEs, however, are more acute than they were at the beginning of the Programme.

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This annual Report is an integral part of the Superfast Broadband Business Exploitation (SFBE) programme, part-funded by the European Regional Development Fund (ERDF) through the Welsh Government.

Superfast Business Wales is a free business support service that helps eligible small and medium sized Welsh businesses make the most of online technology. Offering free masterclasses, one-to-one advice and website review, their support could help your business save money, boost sales and profits and improve productivity.

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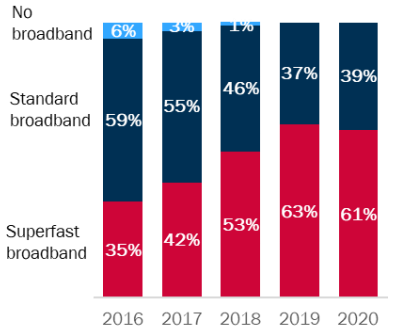
Digital dashboard for Wales 2020

ICT INFRASTRUCTURE

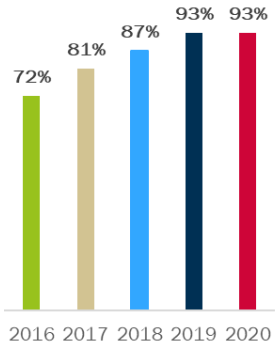
Adoption of broadband

Digital maturity survey, % of SMEs



Access to superfast broadband in Wales

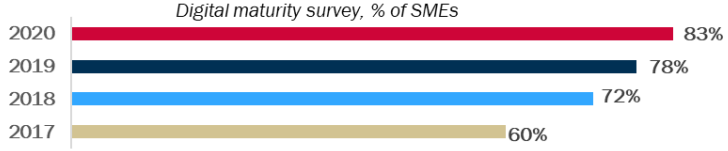
Ofcom, % of premises



ICT RESOURCES

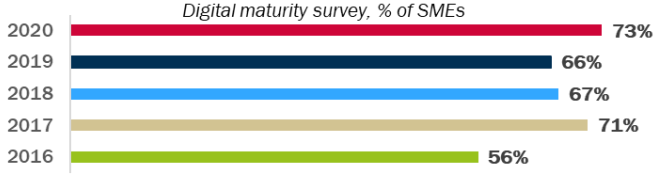
Use of advanced cloud computing services

Digital maturity survey, % of SMEs



Share of SMEs with over half of workforce with intermediate or above IT skills

Digital maturity survey, % of SMEs



Annual IT costs

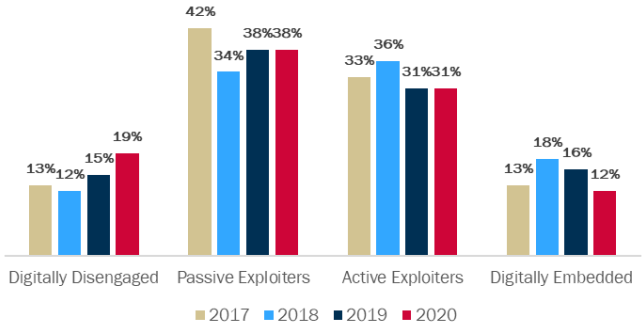
Digital maturity survey, £ per employee

Spending category	2016	2017	2018	2019	2020
Hardware	£684	£624	£473	£546	£506
Software	£662	£711	£494	£467	£594
Network	£180	£92	£119	£157	£135
Broadband subscription	£113	£132	£199	£232	£192

ICT USE

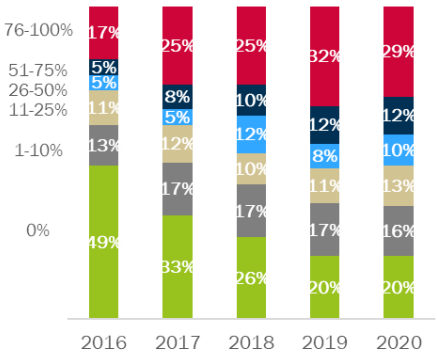
Digital maturity index

Digital maturity survey, breakdown of businesses by category



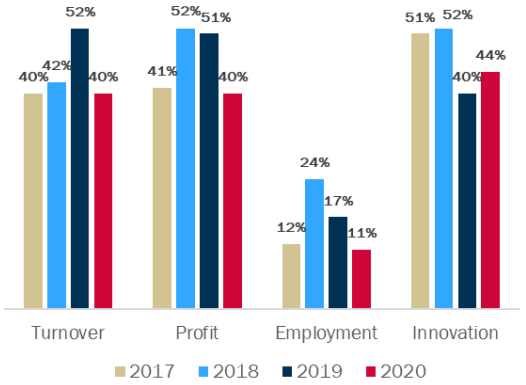
Share of e-sales in total sales

Digital maturity survey, % of SMEs



Performance of SMEs by type of broadband

Digital maturity survey, % of SMEs reporting positive outcomes from access to superfast broadband services



1. Introduction

1.1. The research

The Digital Maturity Survey for Wales (the *Survey*) is a regular survey of small and medium-sized Enterprises (SMEs) and their adoption and use of digital technologies in Wales. The *Survey* examines the transition towards digitalisation of business processes and the benefits that are enabled by superfast broadband. It forms part of a programme of research undertaken by Cardiff Business School that contributes to the Welsh Government's Superfast Broadband Business Exploitation (SFBE) programme, part-funded by European Regional Development Funds (ERDF). This report provides details of the final survey completed under the SFBE programme, focusing on the 2020 period.

Full details of Cardiff Business School's research activities, including the results of the previous surveys, can be found at http://www.cardiff.ac.uk/superfast-broadband-project.

1.2. The context for the research

The context for the research is the growing recognition of the importance of digitalisation to the Welsh economy and society more broadly. This has been reflected in its prioritisation in a number of Welsh Government strategies such as 'Taking Wales Forward'[1] and the 'Prosperity for All: Economic Action Plan'[2]. These strategies form part of efforts to ensure that businesses both have access to digital infrastructure, but also that they have the skills to use it. Such challenges have been reflected in the SFBE programme, with its provision of free workshops and one-to-one advice to SMEs across Wales.

Persistent economic disparities between businesses and parts of Wales, provide a further context to the research. Here, the research illustrates the benefits that can be gained from businesses adopting and using superfast broadband, and how uplifts in digital technology use by SMEs may help to address the productivity weaknesses of the Welsh economy. Indeed, without intervention there is a danger that uneven access to and use of broadband will reinforce these disparities.

[1] http://gov.wales/docs/strategies/160920-taking-wales-forward-en.pdf

[2] http://gov.wales/docs/det/publications/171213-economic-action-plan-en.pdf

In the 2020 period the regional (and global) economy has faced severe disruption associated with the COVID-19 pandemic. This resulted in periods of national and regional 'lockdown' in which economic activity declined, as many businesses either ceased trading or encouraged staff to work from home. These challenges have been reflected in Welsh Government's strategy 'Leading Wales out of the COVID-19 pandemic: a framework for recovery'[3] as well as the introduction of new business support and funding mechanisms[4].

1.3. Survey methodology

The 2020 *Survey* draws on a representative sample of SMEs in Wales. It was disseminated with the support of our research partners (Business Wales, Superfast Business Wales, the 22 local authorities, Federation of Small Businesses Wales [FSB Wales] and Institute of Directors Wales [IoD Wales]). In addition, the Cardiff Business School research team conducted its own dissemination, making use of Bureau van Dijk's FAME database. As a result of the pandemic the 2020 *Survey* did not include any face-to-face interviews. All results were collected and analysed using the Qualtrics survey platform. A detailed breakdown of the 485 survey responses achieved can be found in Table 1-1 below.

Table 1-1 Breakdown of survey responses

	Number of SMEs	Share of SMEs (%)[1]
Location: EU region		
West Wales and the Valleys	321	*66.2*
East Wales	164	*33.8*
Location: Sub-region[2]		
Mid Wales	80	*16.5*
North Wales	143	*29.5*
South East Wales	155	*32.0*
South West Wales	107	*22.0*
Location: Urban/Rural[3]		
Urban	217	*44.7*
Rural	268	*55.3*

[3] https://gov.wales/leading-wales-out-coronavirus-pandemic-html

[4] https://businesswales.gov.wales/coronavirus-advice/

	Number of SMEs	Share of SMEs (%)[1]
Firm Size[4]		
Micro	405	*83.5*
Small	58	*12.0*
Medium	22	*4.5*
Industry Sector[5]		
Construction	24	*4.9*
Manufacturing	60	*12.4*
Wholesale/retail, transport and storage	57	*11.8*
Accommodation and food services	53	*10.9*
Information and communication	57	*11.8*
Business and other services	234	*48.2*

Notes:

1. Percentages may not sum due to rounding.
2. Mid Wales sub-region includes the local authorities of Powys and Ceredigion; North Wales sub-region includes the local authorities of Isle of Anglesey, Conwy, Denbighshire, Flintshire, Gwynedd and Wrexham; South East Wales sub-region includes the local authorities of Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen, and Vale of Glamorgan; South West Wales sub-region includes the local authorities of Carmarthenshire, Neath Port Talbot, Pembrokeshire and Swansea.
3. Postcodes were utilised to classify respondents by the 2011 Census rural-urban classification (A1-F2), available at https://onsdigital.github.io/postcode-lookup/ (last accessed 30/09/20).
4. Micro businesses have 0 to 9 employees, small - 10 to 49 employees, medium - 50 to 249 employees.
5. Industry sectors refer to SIC 2007 categories and are listed in the table as F, C, G-H, I, J, and K-S, respectively.

1.4. New question additions to the 2020 Survey

The 2020 *Survey* follows a similar question structure to that established in previous years. To capture the effects of the pandemic a number of questions were asked about business responses and digital challenges faced. These questions were complemented with the addition of an open-ended question to enable businesses to provide comments on the impact of the pandemic on their activities. This resulted in a minor increase in the overall size of the *Survey*.

1.5. Digital maturity conceptual framework

The framework for the annual *Digital Maturity Survey* is set out in Figure 1-1. This was developed from an earlier review of existing studies of SME adoption of digital technologies and has been used in each of the surveys conducted by the SFBE programme. It is designed to reflect the processes by which SMEs' business performance is shaped by the adoption of broadband, the level of resources, and the use of broadband-enabled applications. The framework comprises three primary elements that underpin the Digital Maturity Index (DMI), described in Section 3 of this report.

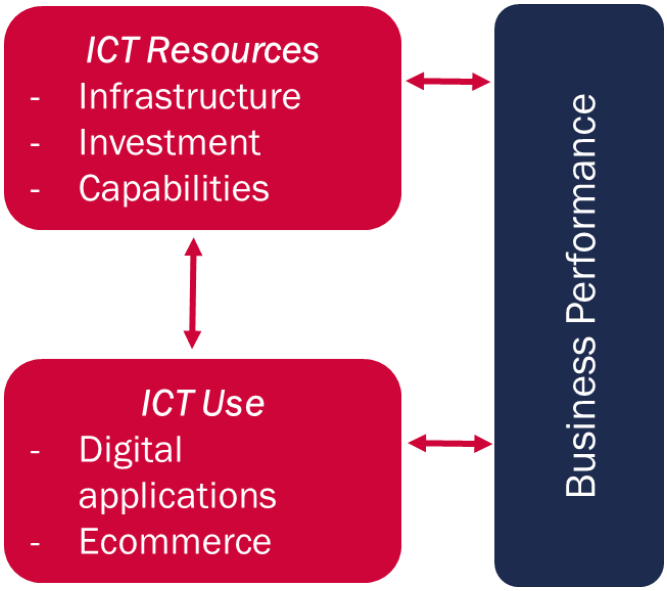
ICT Resources includes infrastructure (broadband adoption), investment in physical assets, software and services, skills training, and staff capabilities. These resources have been identified as an important source of competitive advantage for SMEs and underpin a business' ability to make productive use of digital technologies.

ICT Use refers to the ways in which SMEs make use of digital technologies in their business processes. The scope of digital technologies in use has been a significant growth area in recent years, with the digital maturity of SMEs explained by the growing adoption of superfast broadband, and enabled technologies such as cloud computing.

Business Performance captures the effects of having access to ICT resources and their use by the SMEs. Impact is measured in terms of changes in turnover, profitability, employment, and innovation activity in the business.

The framework highlights interactions between the three primary elements of digital maturity – ICT Resources, ICT Use and Business Performance. By capturing the dynamic nature of these elements, it acknowledges the potential for feedback to occur. For example, Business Performance might be both an antecedent and consequence of businesses adopting ICT Resources and ICT Use.

Figure 1-1 Digital maturity framework



1.6. Structure of report

The report begins with the Key survey findings from the Digital Maturity Survey for Wales 2020. This is followed by the Digital Maturity Index, which describes its construction and results. The report then sets out the Comparative analysis, presenting longitudinal findings. It concludes with the Digital Dashboard for Wales and implications for subsequent research in the Conclusions.

2. Key survey results

2.1. Introduction

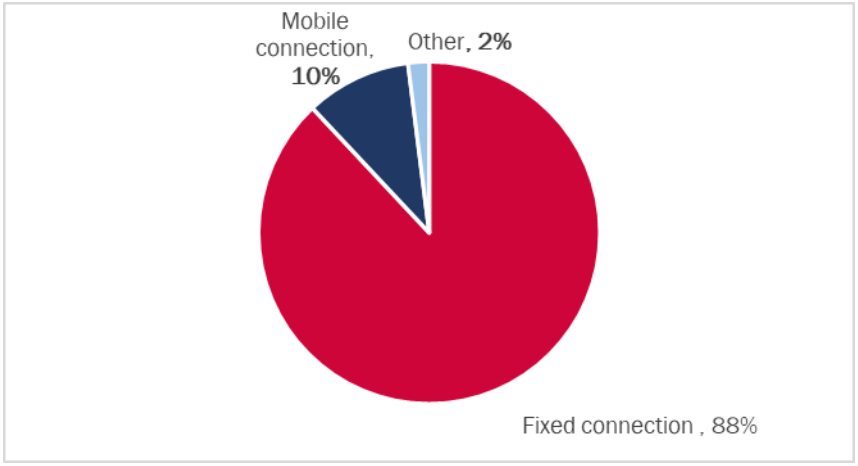
This section summarises the main descriptive findings from the 2020 *Survey*, showing where possible comparative data from the previous annual surveys carried out between 2016 to 2019. The analysis is presented in six parts following the structure of prior *Survey* reports but with the addition of analysis on broadband COVID-19 responses and challenges: 1. Adoption of broadband; 2. Use of broadband-enabled services; 3. ICT expenditure; 4. ICT skills; and 5. E-commerce; 6. Broadband and COVID-19.

The analysis is based on the 485 completed questionnaires gained from the *Survey* (see Section 1). To ensure the sample was representative of major industry sectors, size of enterprise by number of employees (micro 0 to 9 employees, small 10 to 49 employees, medium 50 to 249 employees), and location within Wales, a stratification method was used. The post stratification weights were then applied to the responses to reflect the breakdown of firm size, geography, and industrial structure of the Welsh economy.

2.2. Adoption of broadband

Connection technology to broadband. As in previous years, the most common connection method of SMEs to broadband in 2020 was via a fixed connection (88%, a decrease of two percentage points from 2019). Figure 2-1 highlights that one-in-ten businesses used a mobile connection in 2020 (3G, 4G or 5G), an increase of two percentage points from 2019. A further 2% reported using other methods, such as satellite or microwave, while having no access to broadband was reported by less than 0.5% of SMEs.

Figure 2-1 Primary connection to broadband (% of SMEs), 2020

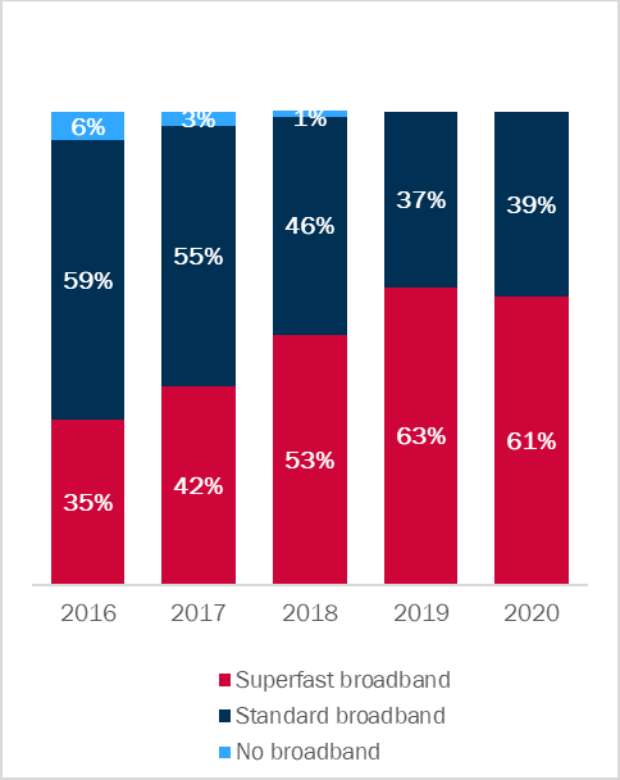


A mobile connection was more likely to be used by SMEs in rural locations (11%) than by their urban counterparts (9%) - although the margin was closer than in previous years - and by businesses in Mid Wales (12%) rather than in the rest of Wales. Micro-sized SMEs (10%) were more likely than small (6%) or medium-sized (2%) SMEs to primarily use a mobile connection. By sector, manufacturing businesses were most likely to connect by mobile.

Similarly, accessing broadband via a satellite or microwave link was most prevalent in rural based businesses (4%, as compared to 0.5% in urban locations), and in Mid and North Wales.

Adoption of broadband. Just over three-fifths of SMEs (61%) in Wales noted that they were using superfast broadband, defined as being able to download data at speeds of at least 30 megabits per second (Mbps). Figure 2-2 indicates this was a slight decline from 2019 (63%), but still an increase of 26 percentage points from 2016 (35%).

Figure 2-2 Adoption of broadband, by type (% of SMEs)

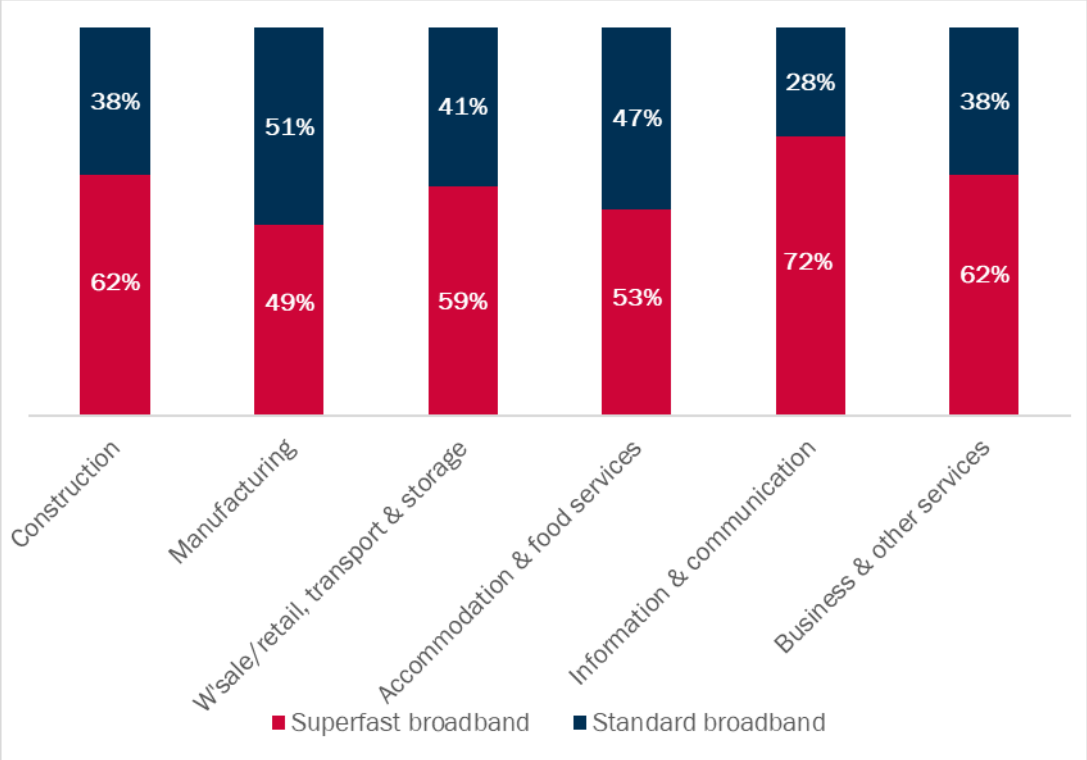


By sub-region, superfast broadband adoption was highest among SMEs in South East Wales (75%) and North Wales (60%), with South West Wales and Mid Wales at 46% and 38% respectively.

Superfast broadband adoption was more likely in medium (70%) and small-sized SMEs (72%), whereas just over three-fifths of micro businesses (60%) had superfast broadband in 2020.

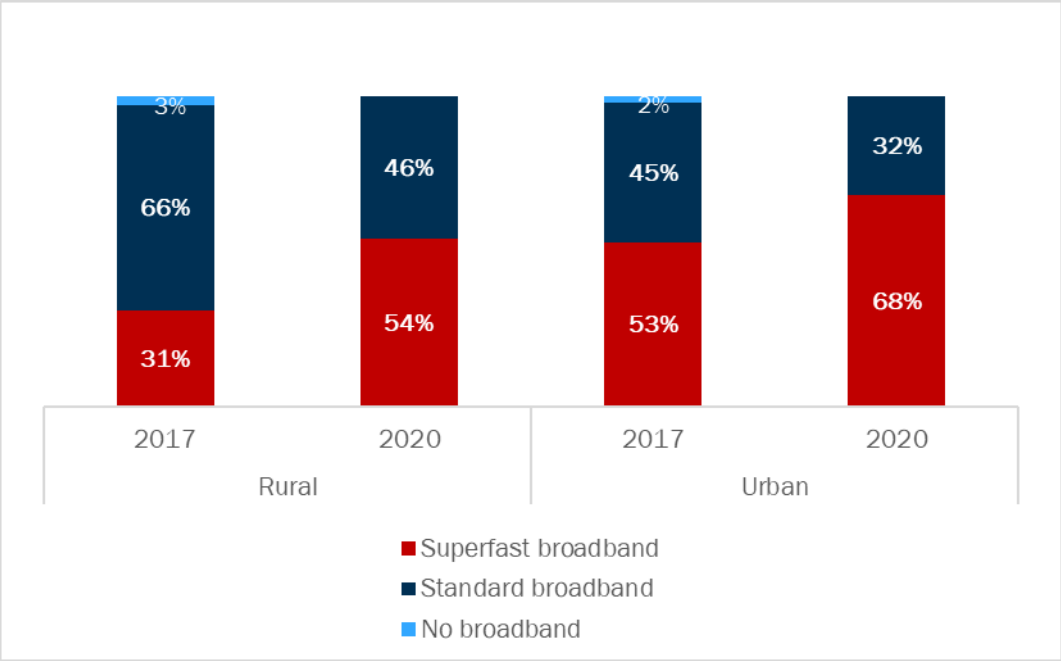
Adoption of superfast broadband was highest in the Information and communication sector (72%), while Figure 2-3 also shows relatively high adoption in Business and other services, and Construction (both 62%). The Accommodation and food services sector showed a 7-percentage point increase in superfast broadband adoption to 53% from 2019 to 2020.

Figure 2-3 Adoption of broadband, by type, by industry sector (% of SMEs) 2020



There is evidence that the divide between rural and urban areas in the adoption of superfast broadband has decreased over recent years. Figure 2-4 shows that from 2017 to 2020 the proportion of rural businesses adopting superfast broadband increased by twenty-three percentage points, from 31% in 2017, to 54% in 2020. Over the same period the percentage of urban businesses with superfast broadband increased by fifteen percentage points to 68%.

Figure 2-4 Adoption of broadband, by type, by location (% of SMEs)



Average achieved download speeds. In South East Wales three-fifths of SMEs (60%) in 2020 reported an average download speed of greater than 30Mbps. Figure 2-5[5] shows that this compares to a half of businesses in North Wales (48%) and South West Wales (49%), but just a third in Mid Wales (33%).

Nearly a fifth of businesses in Mid Wales (19%) reported average download speeds of less than 2 Mbps. As in previous years, SMEs in North Wales were the least likely of any sub-region to report average download speeds of less than 2 Mbps (1%).

[5] The median (i.e. 'middle' value of observations) download speed in Mid Wales is 18.0 Mbps; in North Wales 28.8 Mbps; in South East Wales 37.4 Mbps; and South West Wales, 28.2 Mbps.

Figure 2-5 Average achieved download speeds, by sub-region (% of SMEs), 2020

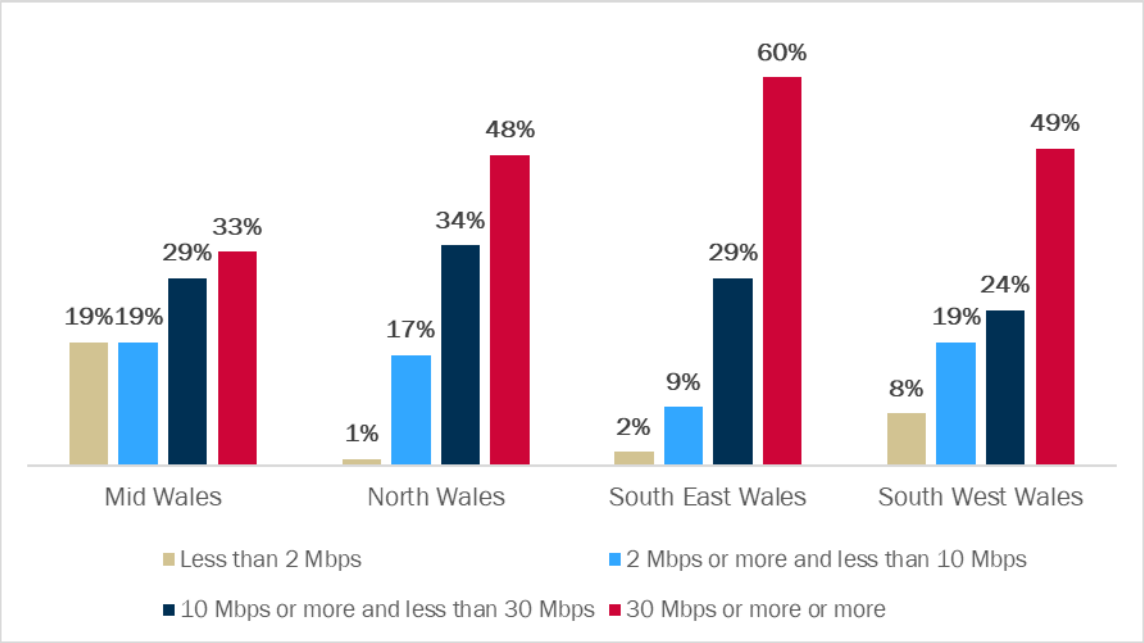
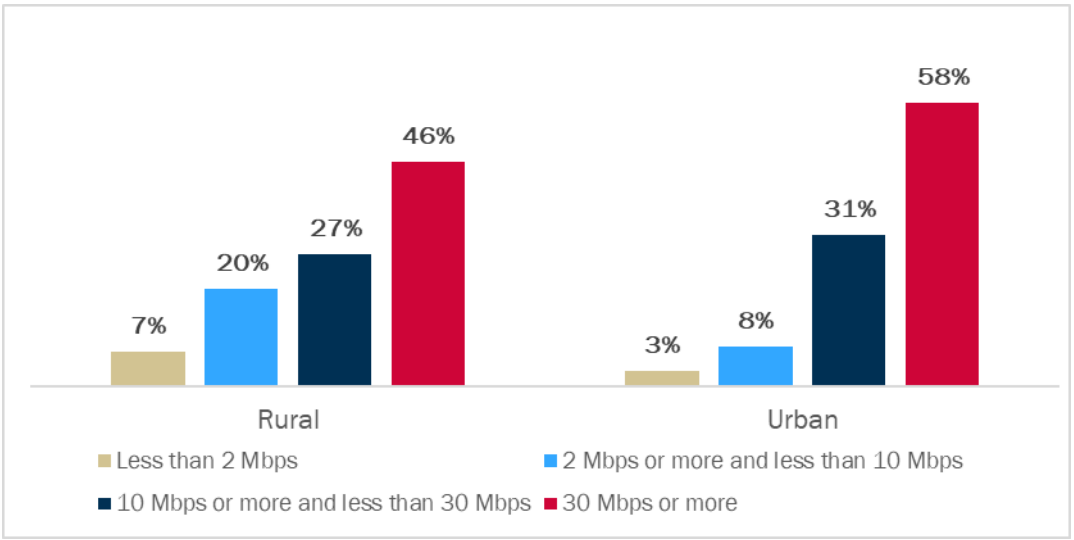


Figure 2-6[6] shows that 7% of rural businesses achieved average download speeds of less than 2 Mbps in 2020. This compares to 3% of urban-based businesses. The rural situation does, however, represent an improvement from 2018 where the equivalent figure was 14%.

Figure 2-6 Average achieved download speeds, by location (% of SMEs), 2020

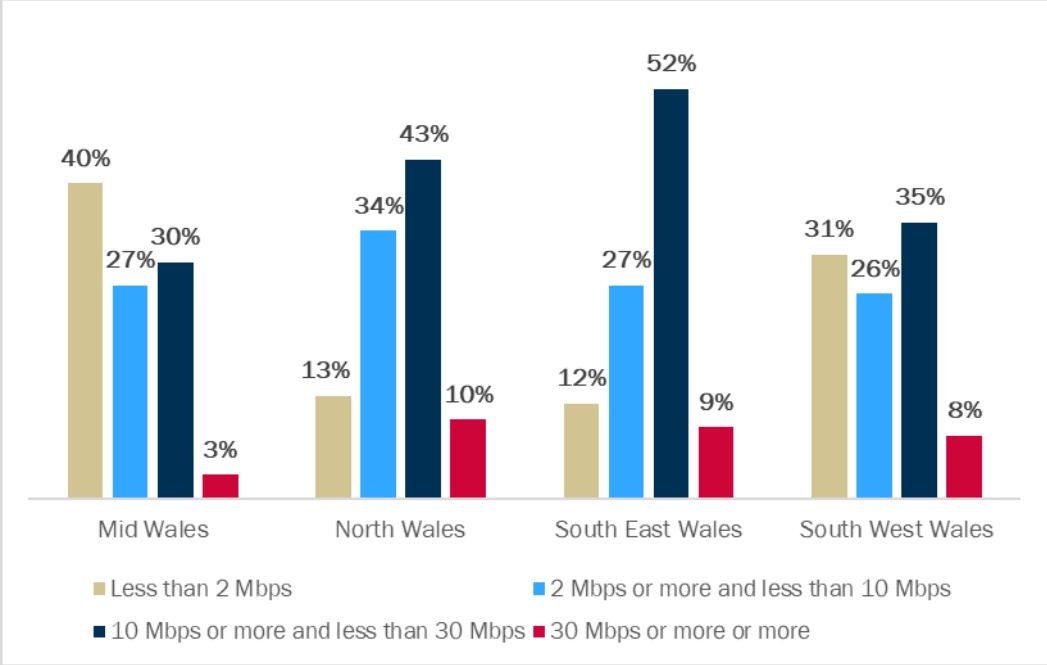


[6] The median (i.e. 'middle' value of observations) download speed in rural locations is 13.9 Mbps, in urban locations 37.7 Mbps.

Almost a half of rural businesses (46%) reported being able to achieve download speeds of 30 Mbps or more in 2020. This was an increase of two percentage points on the 2019 figure. Nearly three-fifths of urban businesses (58%) reported average download speeds of 30 Mbps or more in 2020, eight percentage points down from 2019.

Average achieved upload speeds. The proportion of SMEs who reported achieving average upoad speeds of less than 2 Mbps continued to decrease in each sub-region of Wales from 2019 to 2020. Figure 2-7[7] shows 40% of Mid Wales SMEs reported being in this slowest upload category in 2020, representing a three percentage point decrease from 43% in 2019. There were decreases of seven percentage points in both North Wales and South West Wales in the proportion in this slowest category (to 13% and 31% respectively).

Figure 2-7 Average achieved upload speeds, by sub-region (% of SMEs), 2020



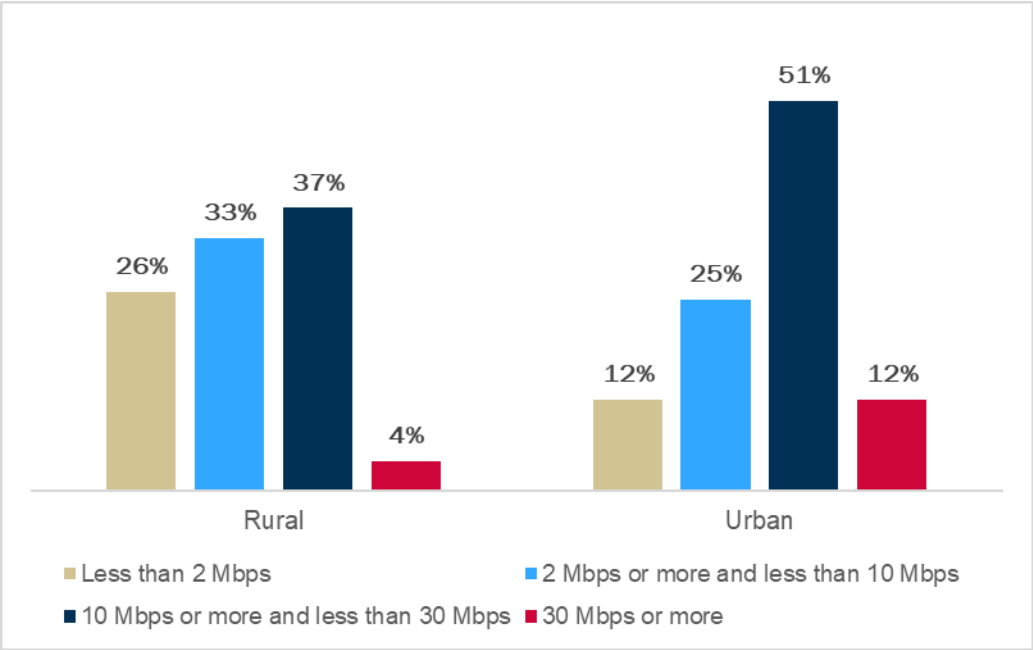
In 2020, as in previous years, SMEs based in urban areas were more likely to achieve average upload speeds of 10 Mbps or more than their rural counterparts. Figure 2-8[8] shows nearly two-thirds of urban based SMEs (63%) and just over two-fifths (41%) of rural SMEs achieving this.

[7] The median (i.e. 'middle' value of observations) upload speed in Mid Wales is 7.0 Mbps; in North Wales 10.0 Mbps; in South East Wales 15.0 Mbps; and South West Wales, 7.3 Mbps.

[8] The median (i.e. 'middle' value of observations) upload speed in rural locations is 8.5 Mbps, and in urban locations 15.0 Mbps.

The percentage of SMEs in rural areas achieving upload speeds of less than 2 Mbps fell by nine percentage points from 2019 to 2020 to 26%. For urban SMEs the comparative figure was down three percentage points to 12%.

Figure 2-8 Average achieved upload speeds, by location (% of SMEs), 2020

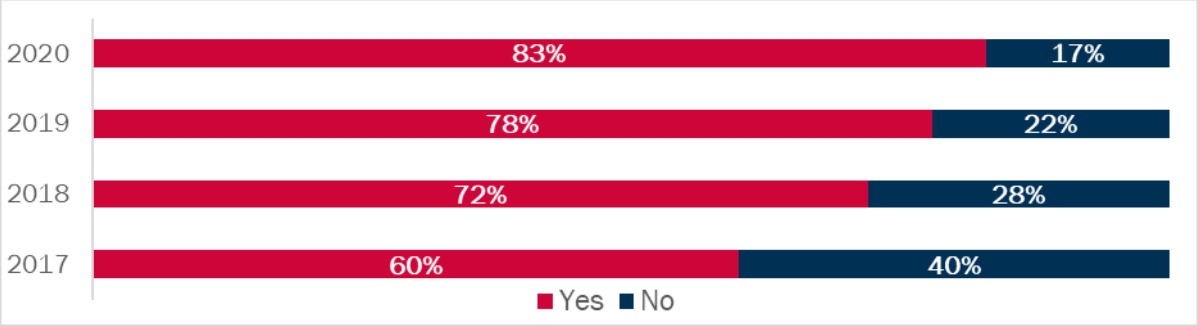


2.3. Use of broadband-enabled services

Use of cloud computing services. The use of basic, foundational cloud computing services (digital tools such as email, office software and file sharing/ storage) are separated in the *Survey* analysis from more advanced cloud computing services. 'Advanced' services are defined as: accounting and bookkeeping; data back-up; Voice over Internet Protocol; electronic payment; video conferencing; customer relationship management; project management software; computing power to run business software; human resource management software; and enterprise resource planning.

Continuing the upward trend found in previous years, the proportion of SMEs using at least one advanced cloud computing service, shown in Figure 2-9, increased by five percentage points to 83% from 2019 to 2020.

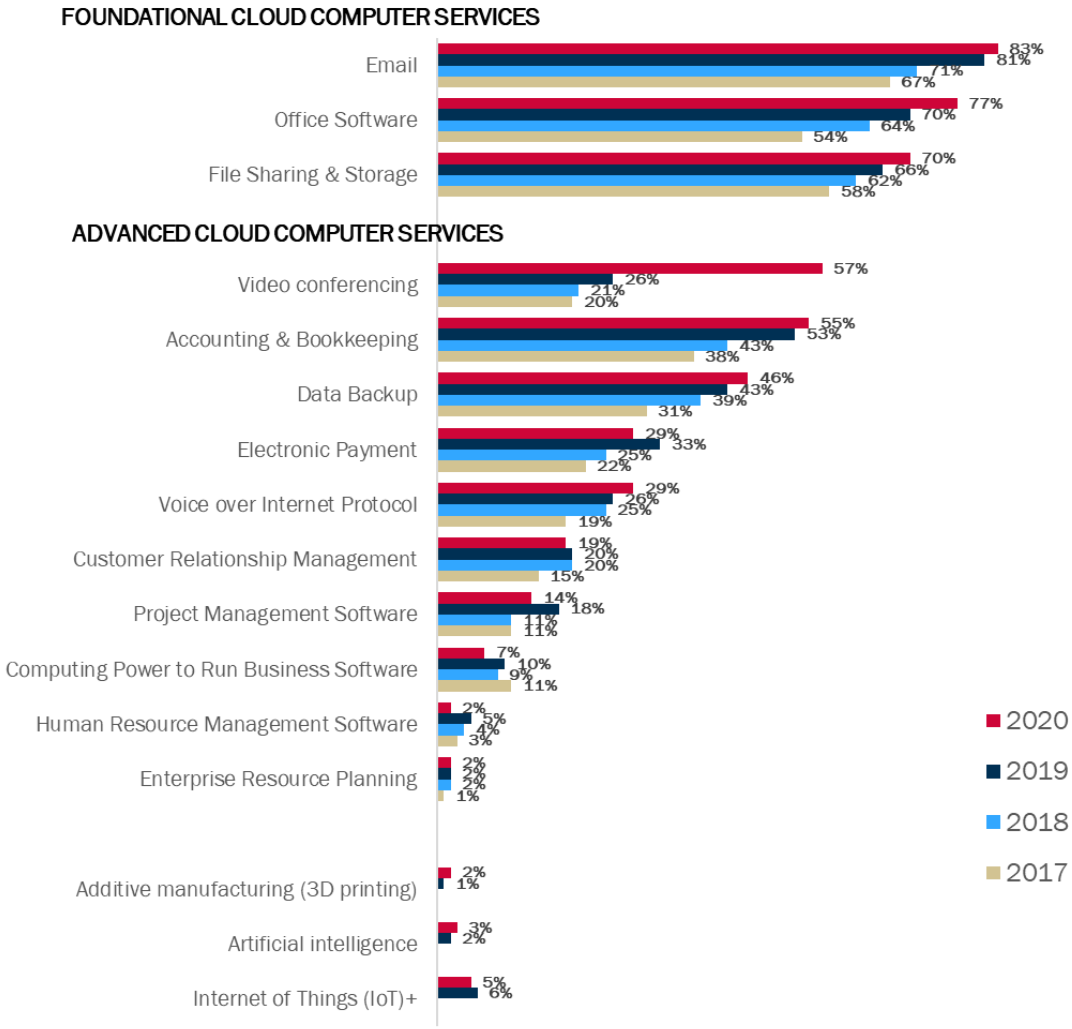
Figure 2-9 Use of advanced cloud computing services (% of SMEs)



Comparing data from 2017 to 2020, Figure 2-10 shows there were increases in the usage of the majority of advanced cloud computing services. Usage of video conferencing increased by 37 percentage points between 2017 and 2020, with much of the upsurge in the last year (a 31-percentage point increase from 2019 to 2020) as SMEs reacted to radically different working conditions due to COVID-19, including restrictions on face-to-face meetings. Usage of cloud computing accounting/ bookkeeping services increased by 17 percentage points from 2017 to 2020, to 55% of SMEs.

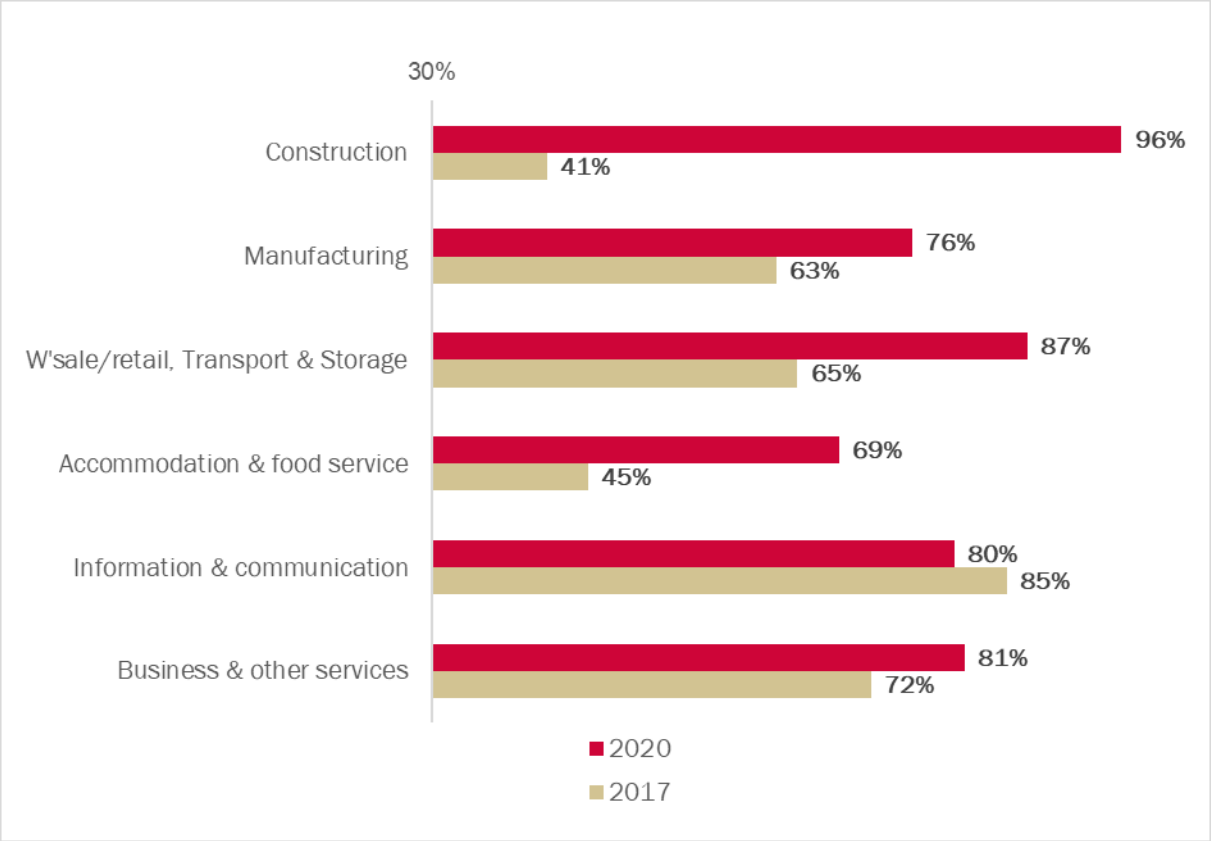
Starting in the 2019 *Survey*, SMEs were additionally asked about their usage of three other cloud computing services: internet of things (IoT); artificial Intelligence (AI); and additive manufacturing (e.g. 3D printing). There were only single percentage point changes in the proportion of SMEs reporting using them in 2020, with the most used again being IoT (5%).

Figure 2-10 Proportion of businesses using cloud computing services, by category (% of SMEs)



SMEs in the Construction (96%) and Wholesale, retail, transport, and storage sectors (87%) were most likely to use at least one advanced cloud service in 2020. Figure 2-11 shows that the Construction sector had also experienced the largest increase of usage in advanced cloud services between 2017 and 2020. Accommodation and food services businesses were the least likely to report utilising cloud services (69% in 2020).

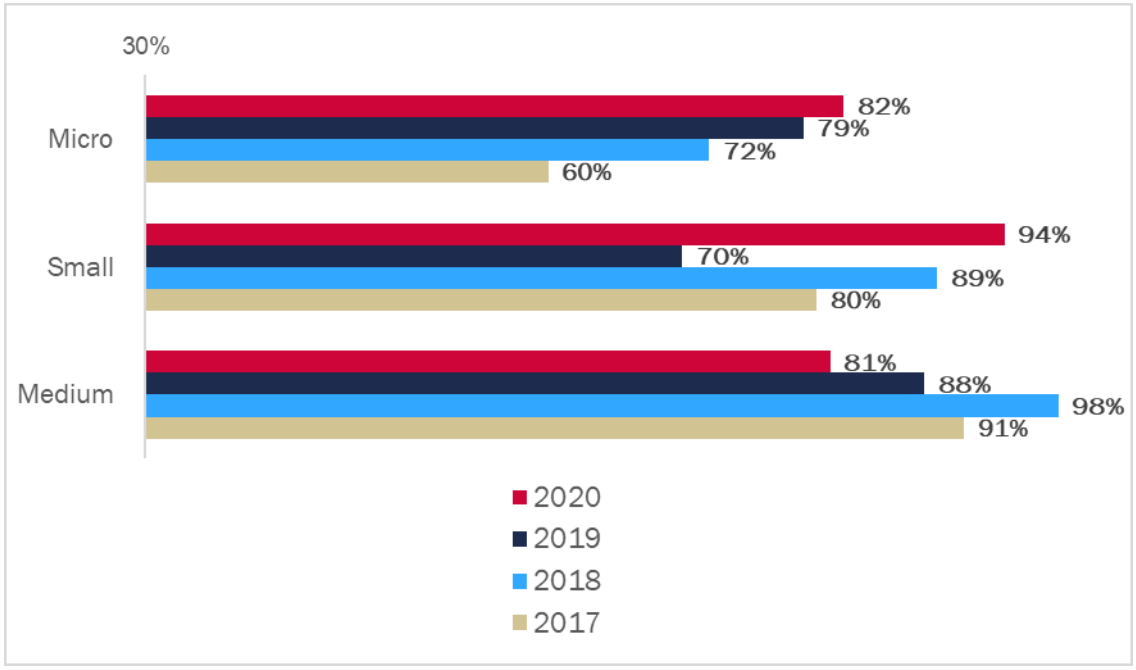
Figure 2-11 Proportion of businesses using advanced cloud computing services, by industry (% of SMEs)



Small-sized SMEs were most likely to report using advanced cloud services in 2020 (94%). Figure 2-12 shows that four-fifths of micro and medium sized SMEs reported using advanced cloud services (82% and 81% respectively).

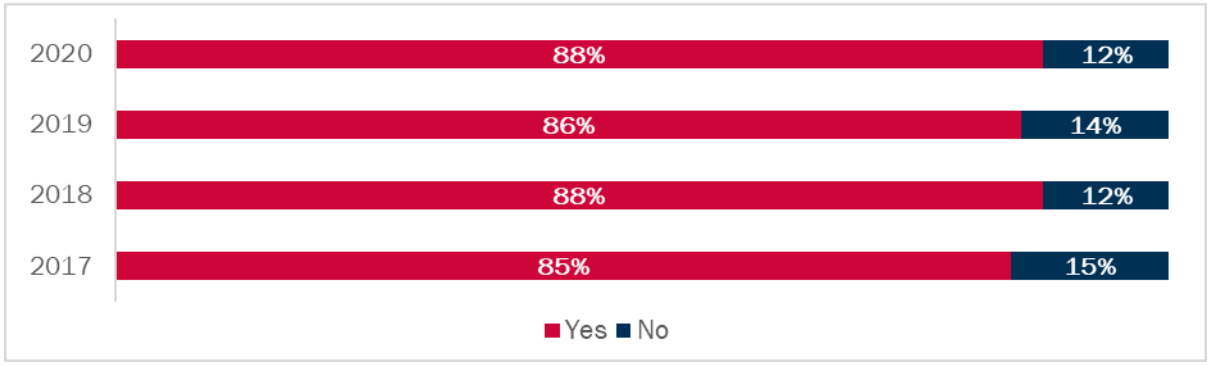
By sub-region, usage of advanced cloud services in 2020 was highest in South East Wales (88%, no change from 2019), followed by South West Wales (up 4 percentage points from 2019 to 80%). The corresponding figure in both Mid Wales and North Wales was 77%, up nine and thirteen percentage points respectively from 2019. SMEs in urban areas continued to be more likely than rural SMEs to utilise advanced cloud services (88% as opposed to 77%).

Figure 2-12 Proportion of businesses using advanced cloud computing services, by size of business (% of SMEs) 2020



Use of website. Figure 2-13 shows that 88% of the SMEs taking part in the 2020 *Survey* reported having a website of their own. The proportion of businesses having a website has remained relatively stable since 2017.

Figure 2-13 Use of website (% of SMEs)

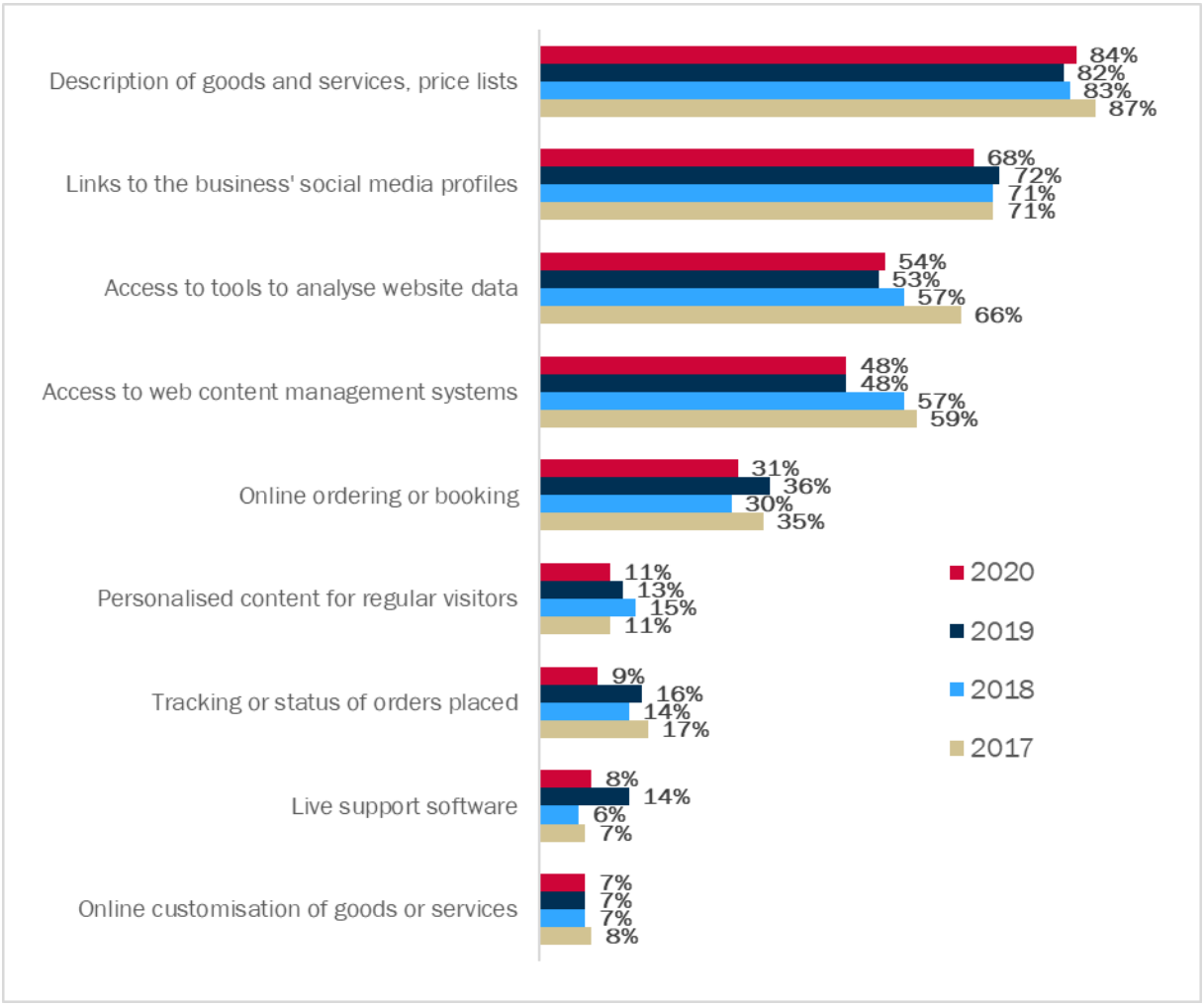


SMEs in the Information and communication sector were the most likely to have a website (94%), while those in the Manufacturing sector were least likely – with a comparatively low 82% reporting positively in 2020.

By location, 88% of urban and 87% of rural based businesses noted they had a website, while Mid Wales SMEs were least likely (79%) and North Wales and South East Wales most likely to have a website (both 90%). Medium and small-sized SMEs were more likely than micro SMEs to have a website.

Comparing data from the Survey years 2017 to 2020, the website functions that SMEs were most likely to utilise remained fairly consistent. Figure 2-14 shows that, in 2020, businesses were most likely to report having the website functions of 'description of goods and services, price lists' (84%) and 'links to the business' social media profiles' (68%). These two functions were also the most popular in 2017.

Figure 2-14 Proportion of businesses with website, by website function (% of SMEs)



Use of social media. There was an eight-percentage point increase in SMEs using social media from 2017 to 2020. Figure 2-15 shows over four-fifths of SMEs reported using social media in 2020 (84%). This represents an increase of one percentage point from 2019.

Figure 2-15 Use of social media (% of SMEs)

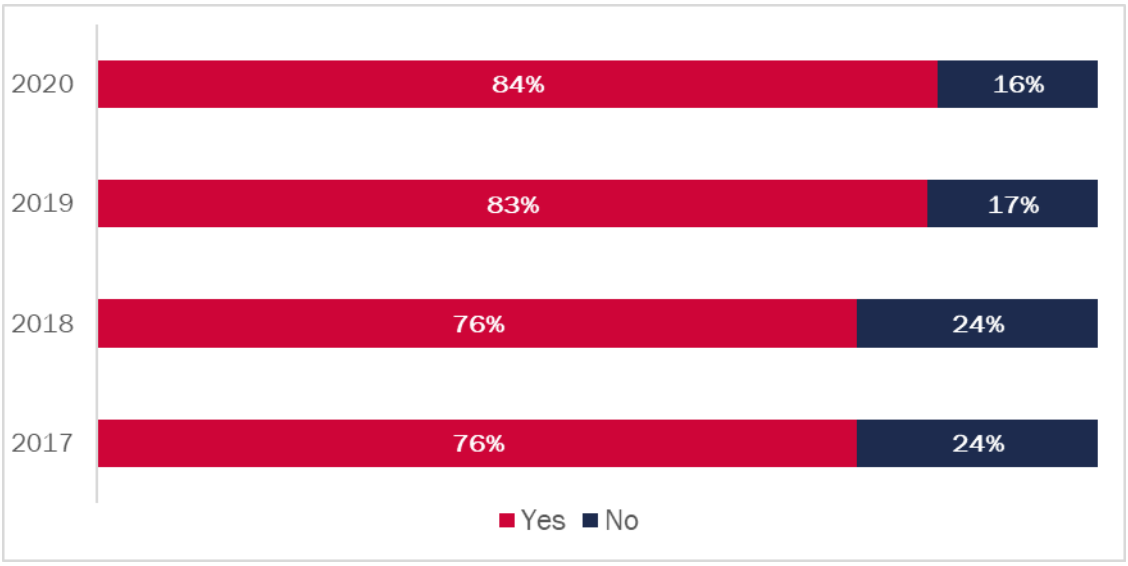
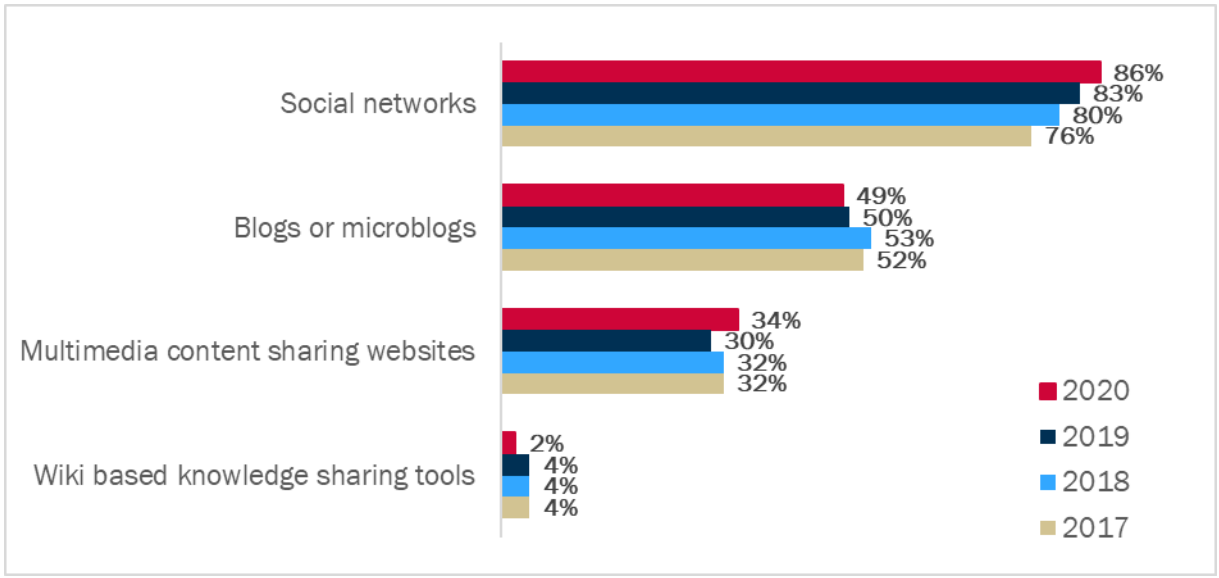


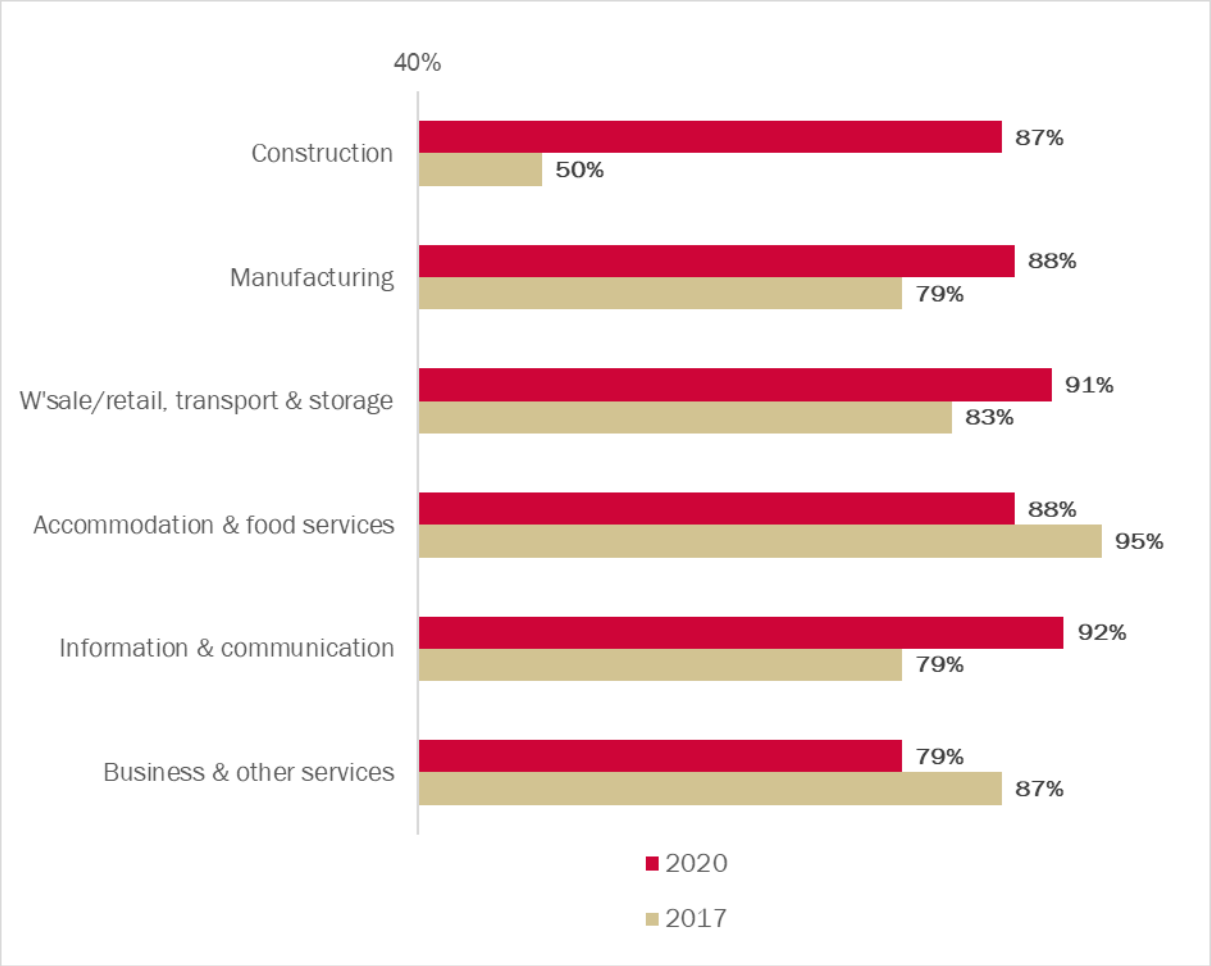
Figure 2-16 shows that usage of social network platforms by SMEs increased by three percentage points from 83% in 2019, to 86% in 2020. Around a half of SMEs were using a blog or microblog (at 50%, relatively static from 2017), while one-in-three were using multimedia content sharing websites (34%).

Figure 2-16 Proportion of businesses using social media, by platform (% of SMEs)



Businesses in the Information and communication sector were the most active users of social media in 2020, with 92% of respondents replying positively. Figure 2-17 shows that from the 2017 to the 2020 *Survey*, there was an increase of 37 percentage points in the Construction sector SME usage of social media.

Figure 2-17 Proportion of businesses using social media, by industry sector (% of SMEs)

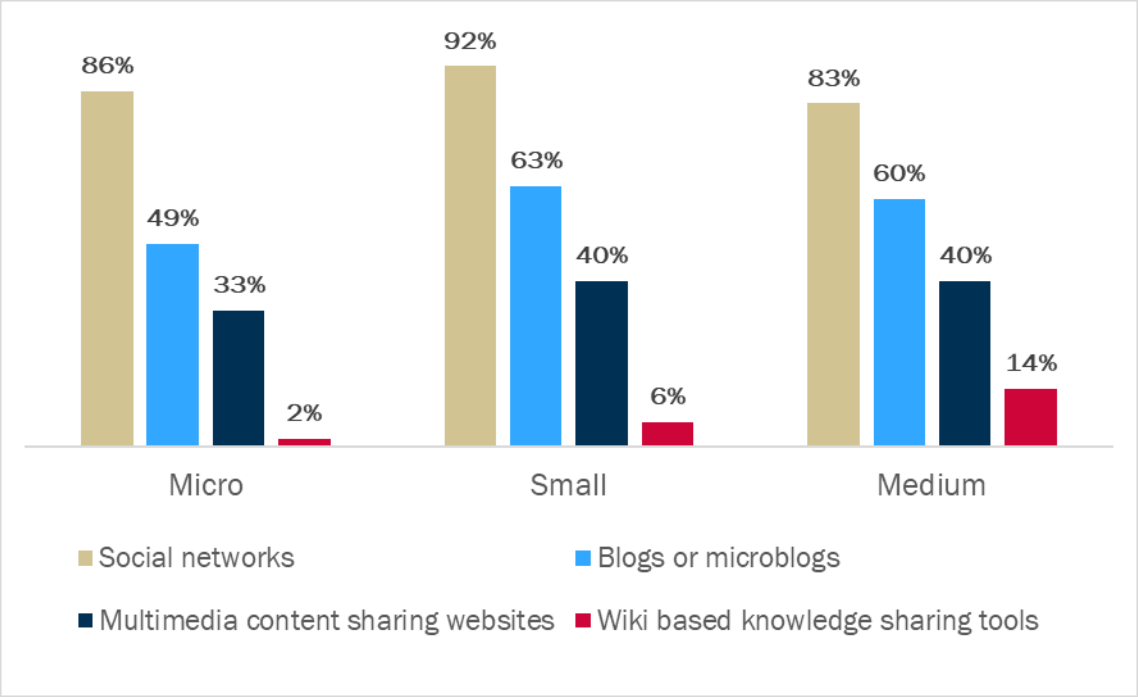


In 2020, the sub-region of South West Wales reported the highest use of social media (88%), followed by North Wales (85%), Mid Wales (84%) and South East Wales (82%).

The only difference between urban and rural based SMEs in their social media usage in 2020 was in their respective adoption of blogs, where urban businesses (54%) were more likely to be active than rural businesses (44%).

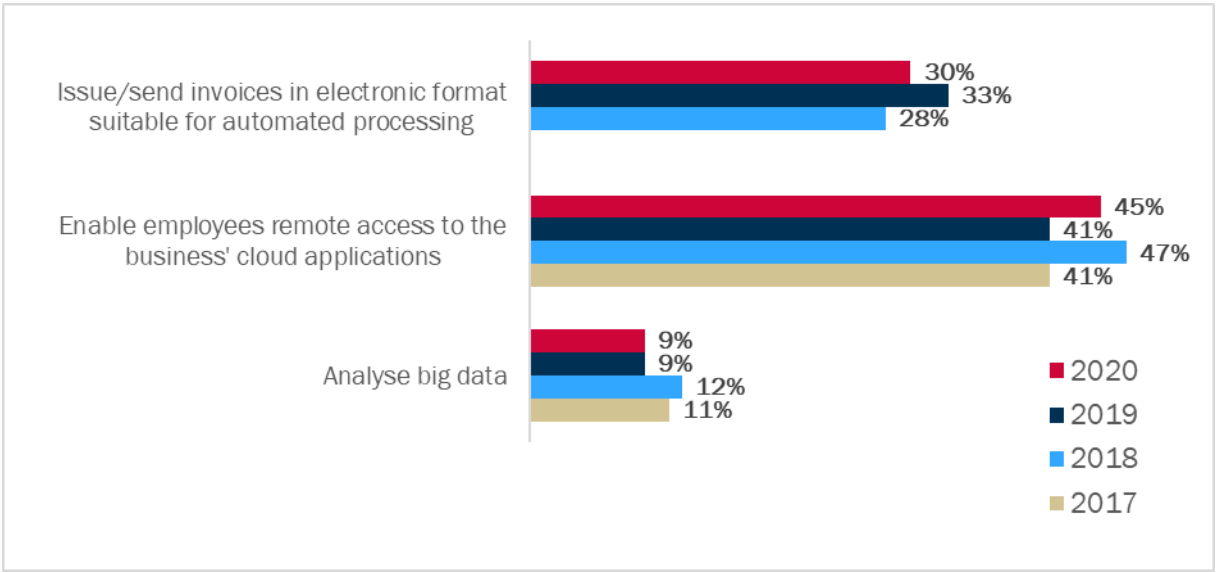
Small-sized SMEs were the most likely to have been active on social networks and blogs in 2020. Figure 2-18 shows that 92% of small SMEs used social network platforms, and 63% used blogs/microblogs in 2020.

Figure 2-18 Proportion of businesses using social media, by size of business and platform (% of SMEs), 2020



Other use of broadband. Three-in-ten businesses reported reported issuing invoices in an electronic format suitable for automated processing in 2020 (an increase of two percentage points from 2018). Figure 2-19 shows that, in 2020, 45% of businesses reported that they enabled employees remote access to the business' cloud applications, and nearly one-in-ten reported analysing big data (9%).

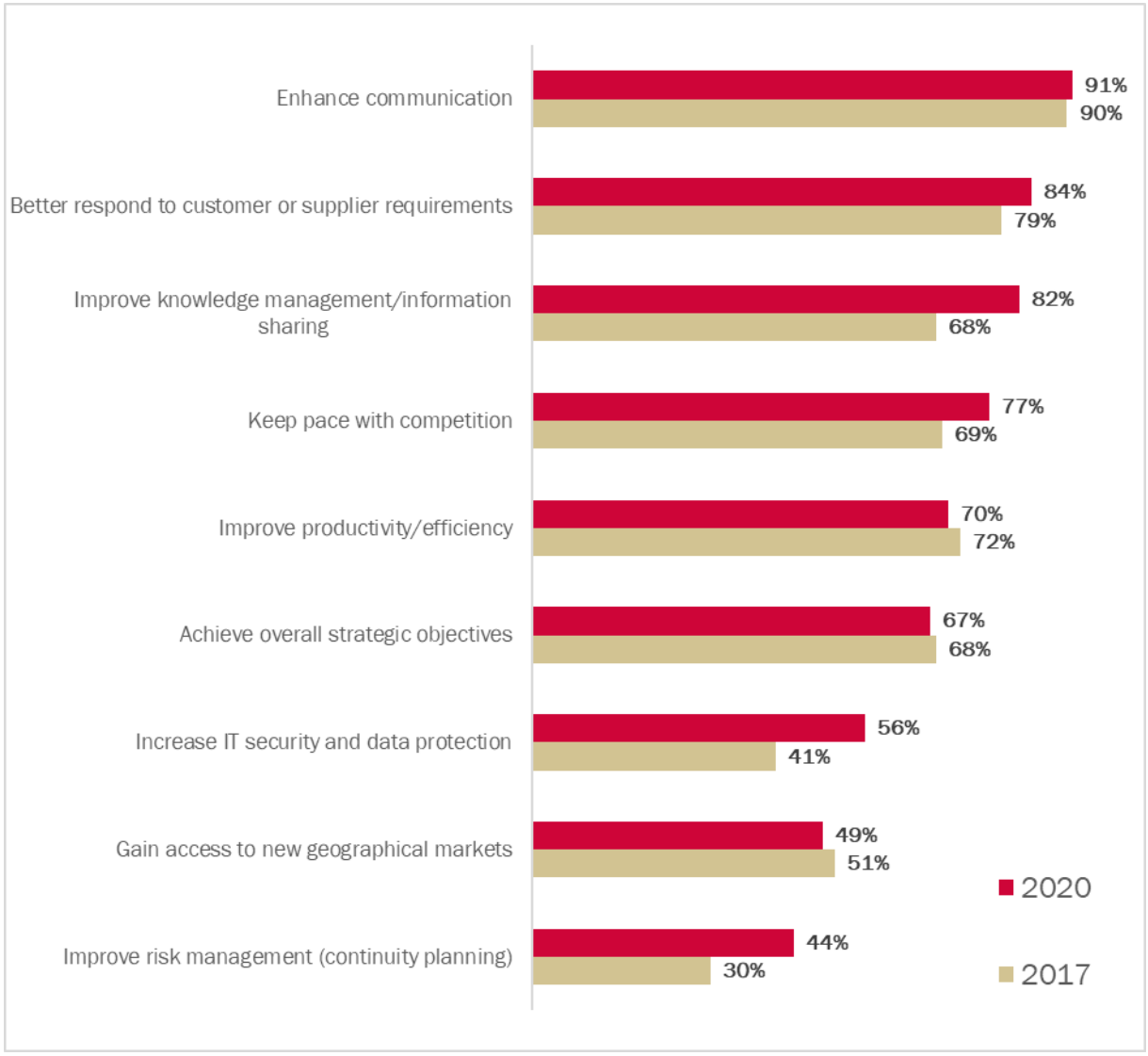
Figure 2-19 Use of broadband-enabled functions (% of SMEs)



Benefits of using broadband-enabled services. Figure 2-20 shows that SMEs were most likely to perceive the benefits of using broadband enabled services as enhancing communication (91%), allowing them to better respond to customer or supplier requirements (84%),) and improve knowledge management/ information sharing (at 82% up fourteen percentage points from 2017 to 2020).

There was a fifteen percentage point increase in the proportion of SMEs perceiving a benefit of an increase of IT security and data protection from using broadband-enabled services - with 41% responding positively in 2017, and 56% in 2020.

Figure 2-20 Benefits of broadband-enabled services (% of SMEs)

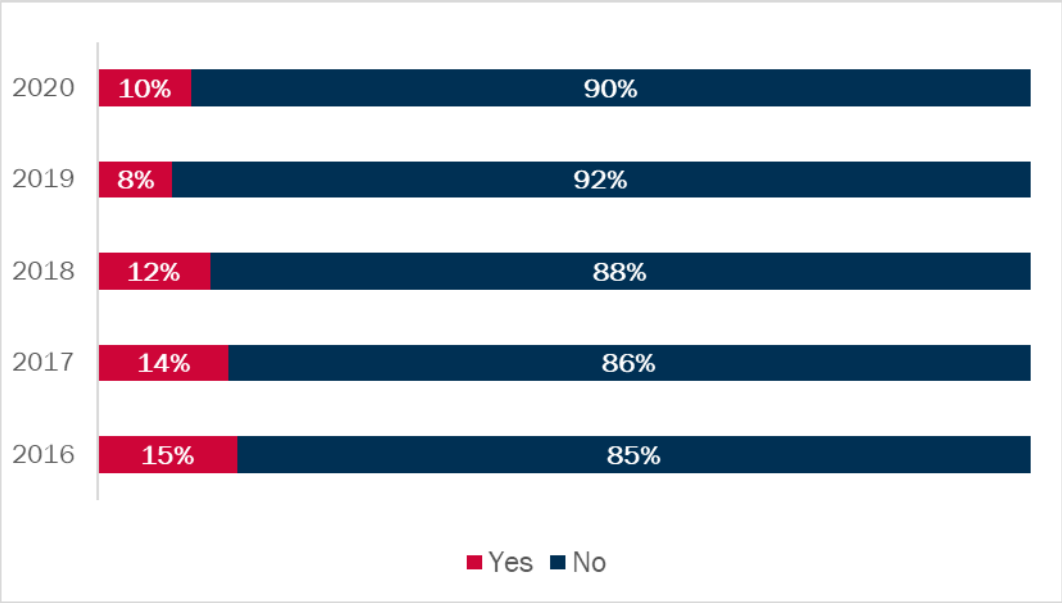


2.4. ICT expenditure

ICT infrastructure investment. Figure 2-21 shows that one-in-ten SMEs (10%) reported that they had a dedicated ICT budget in 2020, an increase of two percentage points from 2019.

Micro-sized SMEs were least likely to report having a dedicated ICT budget (10% as compared to 34% of medium-sized businesses). Businesses in Information and technology, and Construction sectors were most likely to have a dedicated ICT budget, while rural or urban location made no difference to SMEs responding positively (both 10%).

Figure 2-21 Proportion of businesses with dedicated ICT budget (% of SMEs)



Investment in ICT infrastructure related items was collected in the *Survey* with SMEs asked to specify their annual spend, averaged over the last three years, on hardware, software, network, broadband subscription, and ICT related training. Figure 2-22 shows that hardware spend decreased 14% to £3,364 per SME when comparing 2019 and 2020 data. Over the same period, software spending increased 19% to £4,073.

Figure 2-22 also shows that the decrease in ICT related staff training spend per SME seen in past years continued from 2019 to 2020, while both network and broadband subscription spending decreased from 2019 to 2020.

Figure 2-22 Average spend on ICT infrastructure and training per SME (£ per year)

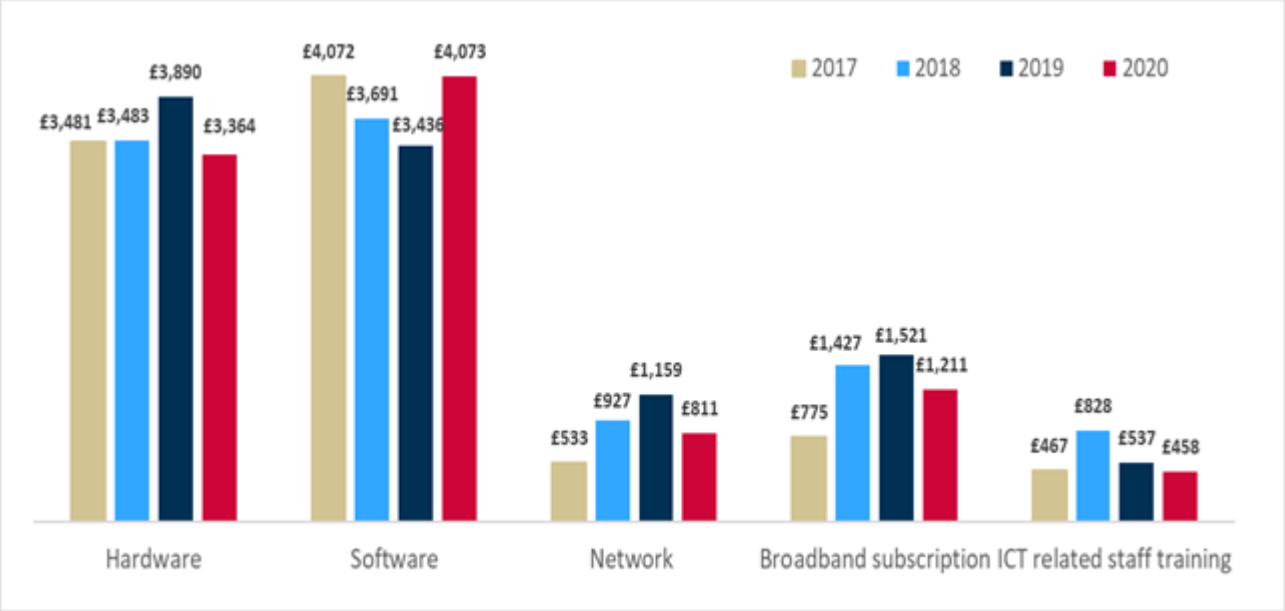
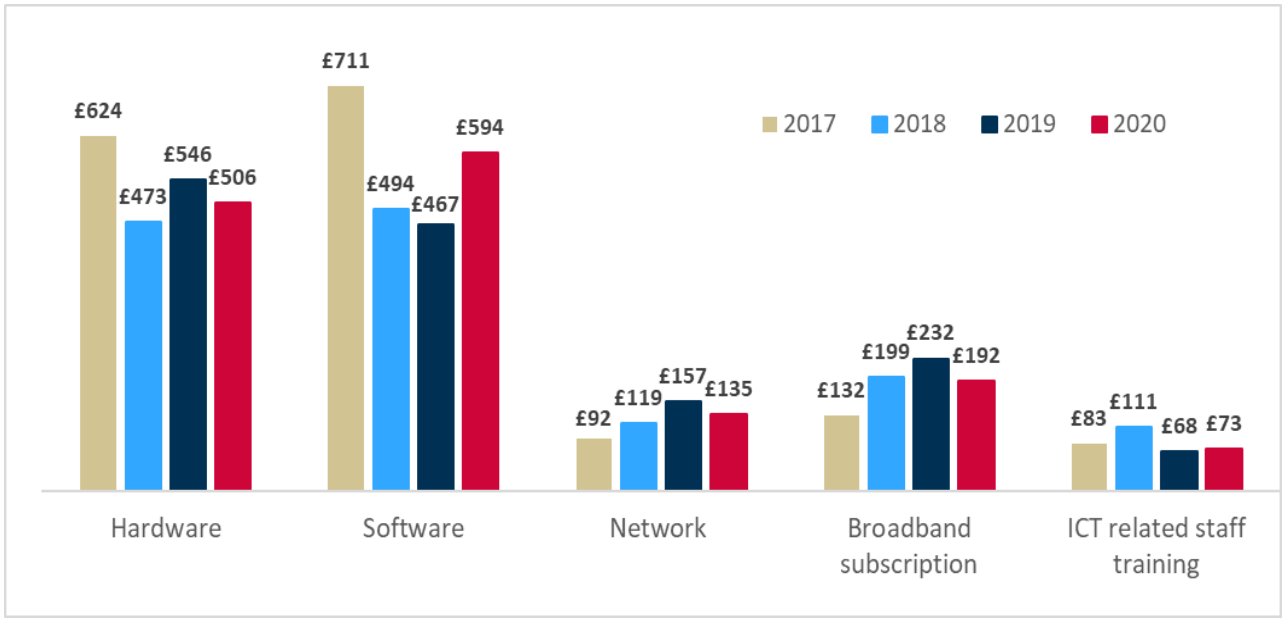


Figure 2-23 shows annual ICT infrastructure and training investment per full-time worker. An average of £506 per full time equivalent employee was spent annually on hardware related items in 2020, a decrease of 7% from 2019. However, spend on software increased by 27%, to £594 per full-time worker, during the same period.

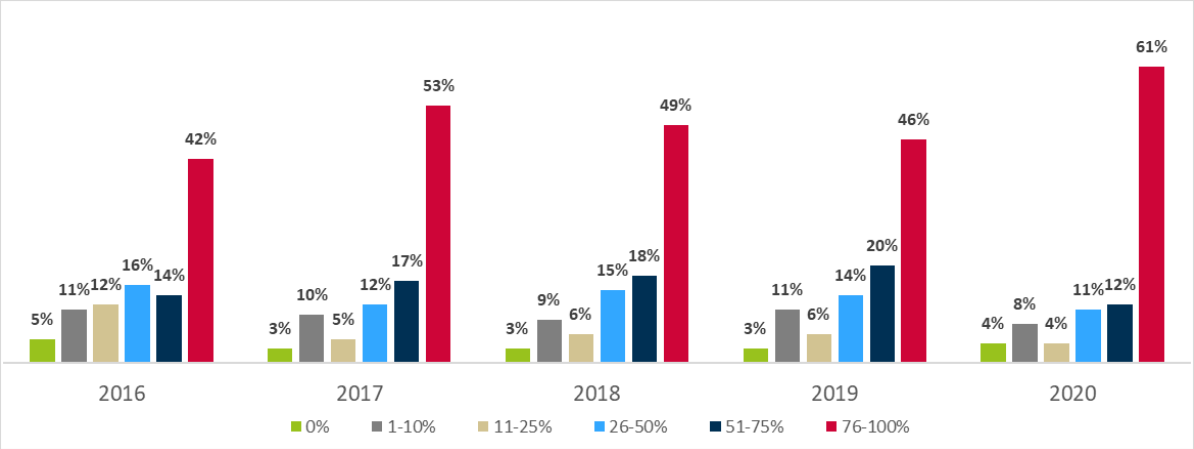
Figure 2-23 Average spend on ICT infrastructure and training per employee (£ per year)



2.5. ICT skills

Internal ICT capabilities. In 2020, 73% of SMEs had at least half of their employees with intermediate or above ICT skills[9]. This represented an increase of seven percentage points from 2019 (66%). Figure 2-24 shows that in 2016 the equivalent figure was just 56%, highlighting the level of "upskilling" in the Welsh economy in ICT knowledge in recent years.

Figure 2-24 Proportion of employees with intermediate or above ICT skills (% of SMEs)

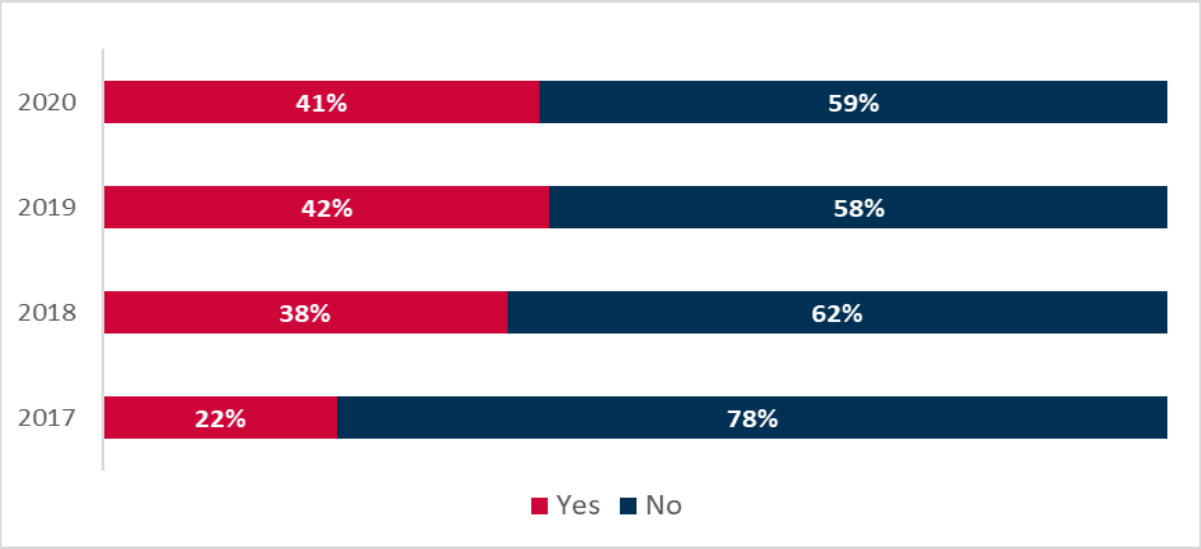


By sector in 2020, the highest concentration of businesses with at least half of their staff with intermediate or above ICT skills were Information and communication (87%) and Business and other services (76%). SMEs in Wholesale/retail, transport and storage had the lowest concentration at just 50%. Just over seven-in-ten rural (72%) and urban (73%) SMEs reported having at least half of their employees with intermediate or above IT skills. By sub-region, the highest and lowest for this metric were South West Wales (76%) and Mid Wales (68%) respectively.

Two-fifths of SMEs employed Internal ICT specialists in 2020 (at 42%, one percentage point up from the 2019 figure). Figure 2-25 highlights that this was an increase of nineteen percentage points from the Survey findings in 2017.

[9] Intermediate computer skills include the working knowledge of the operations of the internet and email, computers, word processing, graphics and multimedia, and spreadsheets and databases.

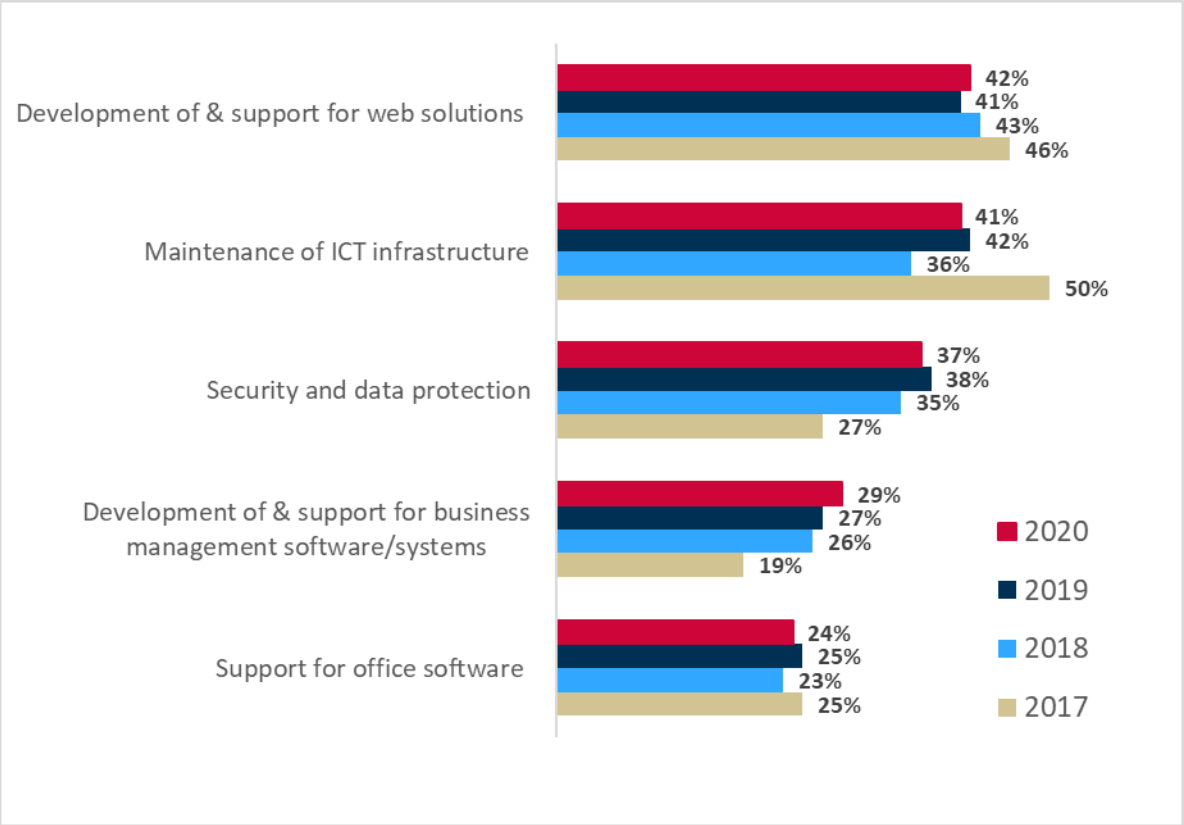
Figure 2-25 Proportion of businesses that employ internal ICT specialists (% of SMEs)



The larger the SME, the more likely they were to report employing ICT specialists internally (79% of medium-sized SMEs, 65% of small sized, and 40% of micro in 2020). By location, urban based SMEs in 2020 were more likely than rural based SMEs to employ internal ICT specialists (44% and 38% respectively), and businesses in South West Wales (47%) most likely and North Wales (34%) least likely. By sector, in 2020, businesses operating in the Information and communication sector were the most likely to employ internal ICT specialists (55%), while businesses in the Manufacturing sector were least likely 30%.

External ICT support capabilities. In 2020 external ICT support was most likely to be utilised by businesses for development of, and support for, web solutions (42%), and for maintenance of ICT infrastructure (41%). Interestingly, Figure 2-26 shows that, from 2017 to 2020 there was a ten percentage point increase in SMEs using external ICT support for security and data protection (27% in 2017, increasing to 37% in 2020), and a similar percentage point increase in external ICT support for development of business management systems (from 19% in 2017 to 29% in 2020).

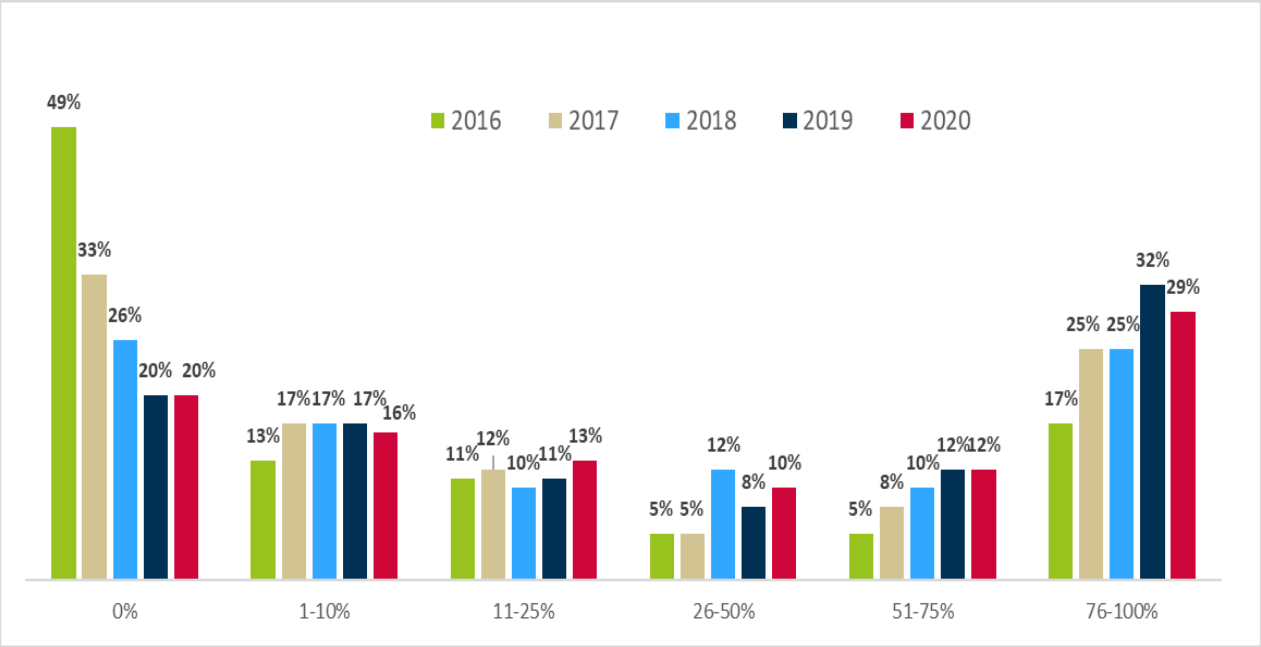
Figure 2-26 Proportion of businesses that use external ICT support, by task (% of SMEs)



2.6. E-commerce

Sales serviced online. Figure 2-27 shows the proportion of SMEs reporting 76% to 100% of their sales being online was three-in-ten (29%) in 2020. This represented an increase of twelve percentage points from the equivalent figure in 2016 (17%). The proportion of businesses that did not sell online reduced from one-half (49%) in 2016 to one-in-five (20%) in 2020.

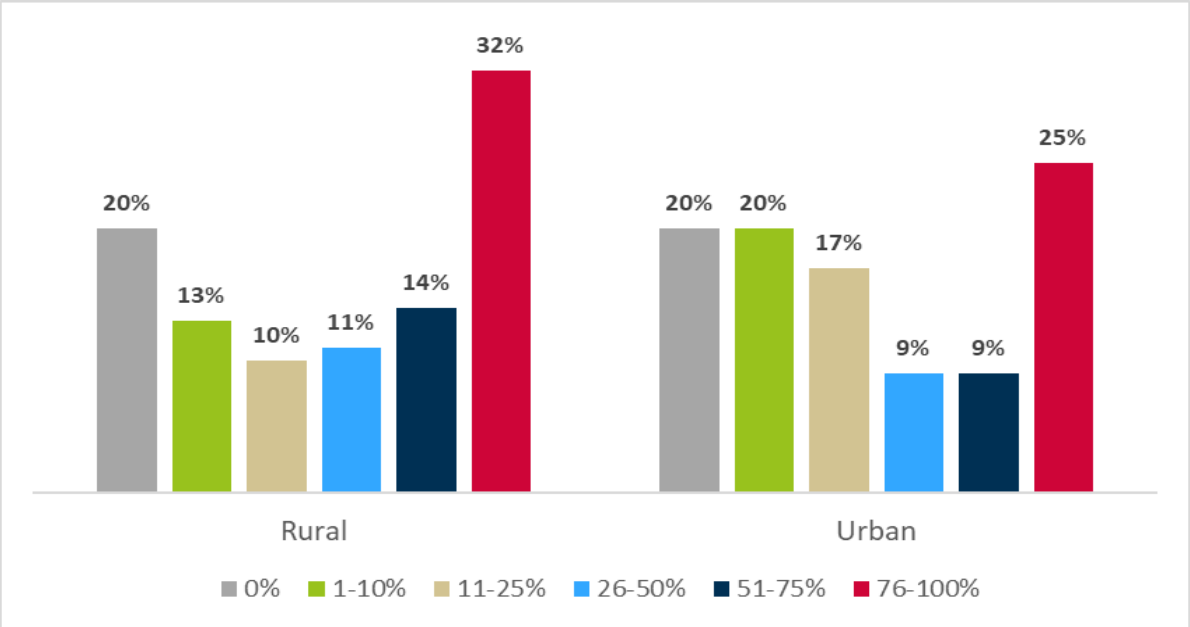
Figure 2-27 Proportion of total sales conducted online (% of SMEs)



SMEs in the sectors of Information and communication, and Accommodation and food services were most likely to derive a higher proportion of sales online, while the Manufacturing and Construction sectors were the least likely to sell online. Rather than an unwillingness to trade online, the customised nature of services offered in these sectors, may be one of the explanatory factors in this.

Figure 2-28 shows that rural based SMEs were the most likely to service between 76% and 100% of their sales online in 2020. Nearly a third of businesses were in this category (at 32%, remaining static from 2019). The comparative percentage for urban based businesses was 25%.

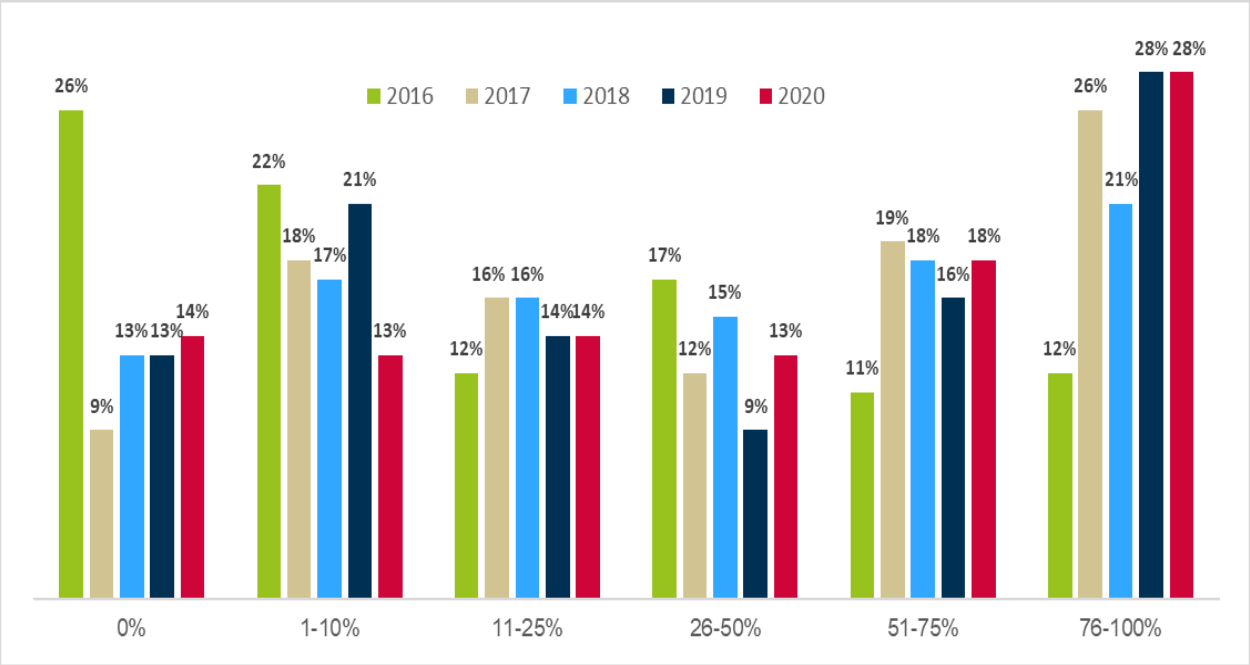
Figure 2-28 Proportion of total sales conducted online, by location (% of SMEs), 2020



Purchases transacted online. Figure 2-29 shows that in 2016 just over one-in-four SMEs did not make any purchases online (26%). This figure had fallen by twelve percentage points to one-in-seven (14%) in 2020.

Nearly three-in-ten businesses transacted 76% or more of their total purchases (in value terms) online in 2020. This represented a sixteen percentage point increase from 2016 (12%).

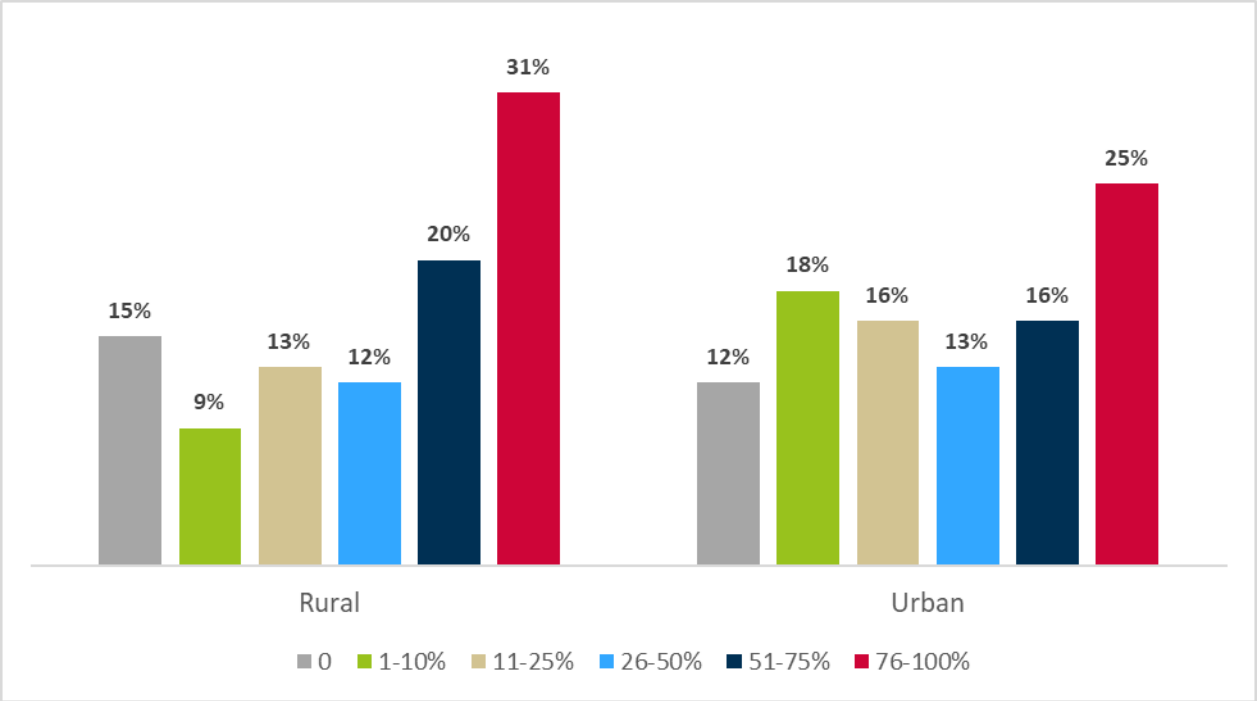
Figure 2-29 Proportion of total purchases transacted online (% of SMEs)



By sub-region, 52% of Mid Wales businesses and 48% of South East Wales businesses transacted at least half of their purchases online in 2020. The equivalent figures for South West Wales and North Wales were 45% and 43% respectively. SMEs in the Information and Communication, and Business and other services sectors were most likely to purchase online.

Figure 2-30 indicates that 51% of rural businesses transacted more than half of their total purchases online, in comparison to 41% of urban businesses.

Figure 2-30 Proportion of total purchases transacted online, by location (% of SMEs), 2020

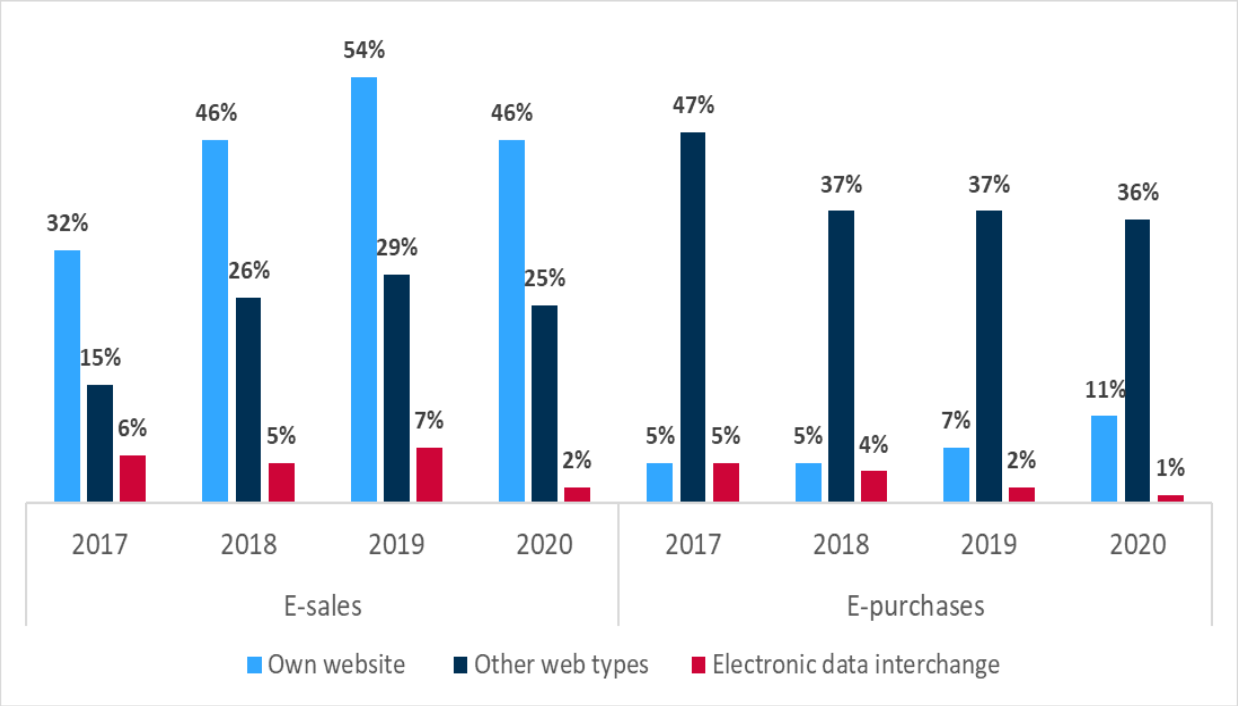


Channels of e-commerce activities. The left hand side of Figure 2-31 shows the proportion of businesses reporting e-sales activities through their own website increased from 2017 to 2019, by 22 percentage points, to 54%. In 2020, SMEs own website was still the most likely way of conducting e-sales, but the percentage had decreased to 46%. A quarter of SMEs used other web types, such as online stores, apps or other websites in 2020 (25%). This represented a ten percentage point increase from 2017.

E-purchases, shown on the right hand side of Figure 2-31 were most likely to have been transacted through other web types (36%) in 2020.

Usage of Electronic Data Interchange (EDI) for e-sales decreased by five percentage points from 2019 to 2020, to 2%, while usage of EDI for e-purchases fell one percentage point during the same time period to 1%.

Figure 2-31 E-commerce activities, by channel (% of SMEs)



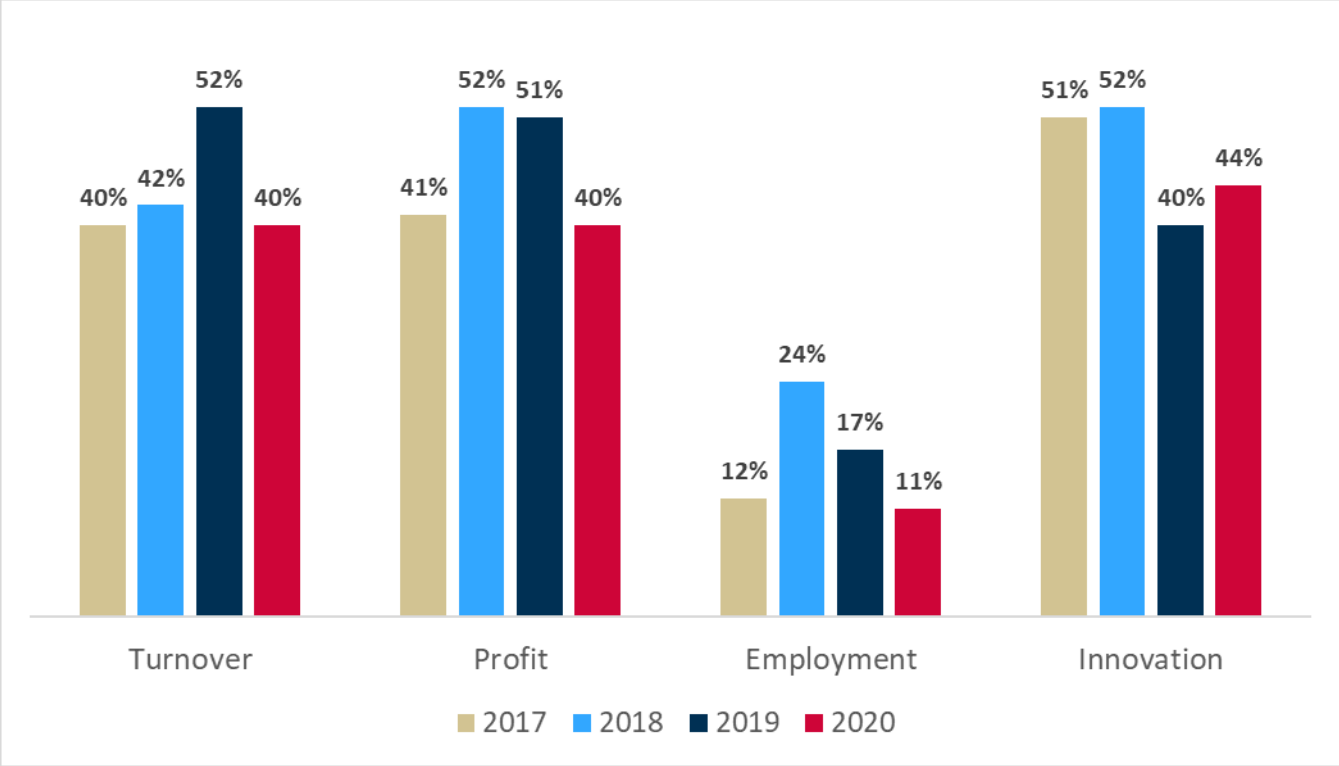
Performance of SMEs with superfast broadband. Figure 2-32 shows the proportion of SMEs indicating that they had positive outcomes in terms of turnover, profit, employment, and innovation, from adopting and using superfast broadband.

Two-fifths of SMEs in 2020 (40%) reported that turnover had increased due to exploiting access to superfast broadband speeds. The same proportion indicated that profits had increased as an outcome of their usage of superfast broadband speeds. These figures were below those noted in 2019 for turnover and profit, and possibly due to the fact that superfast speeds are, in some places, becoming more mainstream and potentially less likely to be identified as a prominent factor accounting for such outcomes. For many SMEs the financial data being referred to in the DMS predates the worst of the Covid-19 impact. However, Wales faced poorer economic conditions during the second half of 2019 which could have impacted performance indicators. Moreover, we cannot discount here that for some SMEs latest financial year figures might have embraced the period following the outbreak, and with the Welsh SME sector known to have been badly hit particularly in sectors such as tourism, food services and construction[10].

[10] See for example, Economic Intelligence Wales (2020) https://developmentbank.wales/sites/default/files/2020-09/EIW%20Quarterly%20report%20Q4%20ENG_FINAL.pdf

Just over one-in-ten SMEs (11%) noted they were able to increase employment due to access to superfast speeds in 2020. The percentage of SMEs reporting positive outcomes in innovation was 44% in 2020, an increase of four percentage points from 2019.

Figure 2-32 Performance of SMEs with superfast broadband (% of businesses reporting positive outcomes)



2.7. Broadband and COVID-19

The data gathering phase of the *Survey* in 2020 was undertaken during the global COVID-19 pandemic. Further questions were asked on how access to broadband services allowed SMEs to respond to the pandemic, and whether the virus had exposed any challenges in their adoption or use of digital technologies.

Respondents were most likely to report that their broadband services allowed them to respond to COVID-19 by enhanced use of video conferencing, with seven out of ten SMEs agreeing or strongly agreeing with the statement (71%). Table 2-1 also shows that just over three-in-five SMEs noted that access to their broadband services enabled them to build confidence in future business practices (62%), and a similar proportion reported greater remote working by staff (61%).

SMEs were least likely to report broadband services allowing them to respond to COVID-19 by moving into new product or service markets (35%).

Table 2-1 Responses to COVID-19 enabled by access to broadband services

Response	% All SMEs "Agree" or "Strongly agree"
Enhanced use of video conferencing	71%
Building confidence in future remote business practices	62%
Greater remote working by staff	61%
Increased use of cloud computing services	47%
Minimising the decline of sales	41%
Helping the business to return to previous levels of sales activity	39%
Moving into new product/ service markets	35%

Table 2-2 highlights the differences in responses to COVID-19, enabled by broadband services, between rural and urban based SMEs. Generally, businesses located in urban areas reported higher levels of broadband enabled responses than their rural counterparts, with the difference between the two location types most prevalent in enabling greater remote working by staff (rural 51%, urban 70%) and building confidence in future remote business practices (rural 53%, urban 69%).

Rural SMEs were more likely than urban SMEs to report the broadband services enabled response of moving into new product or service activities (38% and 33% respectively).

Table 2-2 Responses to COVID-19 enabled by access to broadband services, by location, Rural and Urban

Response	Rural SMEs	Urban SMEs
Greater remote working by staff	51%	70%
Enhanced use of video conferencing	68%	74%
Increased use of cloud computing services	43%	50%
Helping the business to return to previous levels of sales activity	36%	41%
Building confidence in future remote business practices	53%	69%
Moving into new product/ service markets	38%	33%
Minimising the decline of sales	42%	41%

By sub-region, Table 2-3 shows that responses to COVID-19, enabled by broadband services, tended to be lower in Mid Wales than in other areas. The proportion of SMEs in Mid Wales reporting that their broadband services enabled them to increase use of cloud computing services (30%) was twenty-four percentage points less than that reported in South East Wales (54%). This may in part be explained by rural SMEs having a higher likelihood of staff working from home prior to the pandemic.

Also of concern for Mid Wales was that just a quarter of SMEs in the sub-region (25%) noted that access to broadband services would help them to return to previous levels of sales activity. The equivalent figure in North Wales was 43%.

Table 2-3 Responses to COVID-19 enabled by access to broadband services, by sub-region

Response	North Wales	Mid Wales	South East Wales	South West Wales
Greater remote working by staff	51%	53%	69%	59%
Enhanced use of video conferencing	65%	63%	77%	70%
Increased use of cloud computing services	39%	30%	54%	49%
Helping the business to return to previous levels of sales activity	43%	25%	40%	39%
Building confidence in future remote business practices	55%	47%	68%	61%
Moving into new product/ service markets	40%	25%	35%	37%
Minimising the decline of sales	47%	30%	41%	43%

Medium and small sized SMEs (by number of employees), were more likely than micro sized SMEs to report that their broadband services enabled responses to COVID-19. The exception here was in the moving into new product or service markets where over a third of micro SMEs reported positively (35%) as compared to three-in-ten small SMEs (30%) and one-in-five medium sized SMEs (21%). This may indicate that micro businesses are relatively nimble, and able to drive through changes more rapidly.

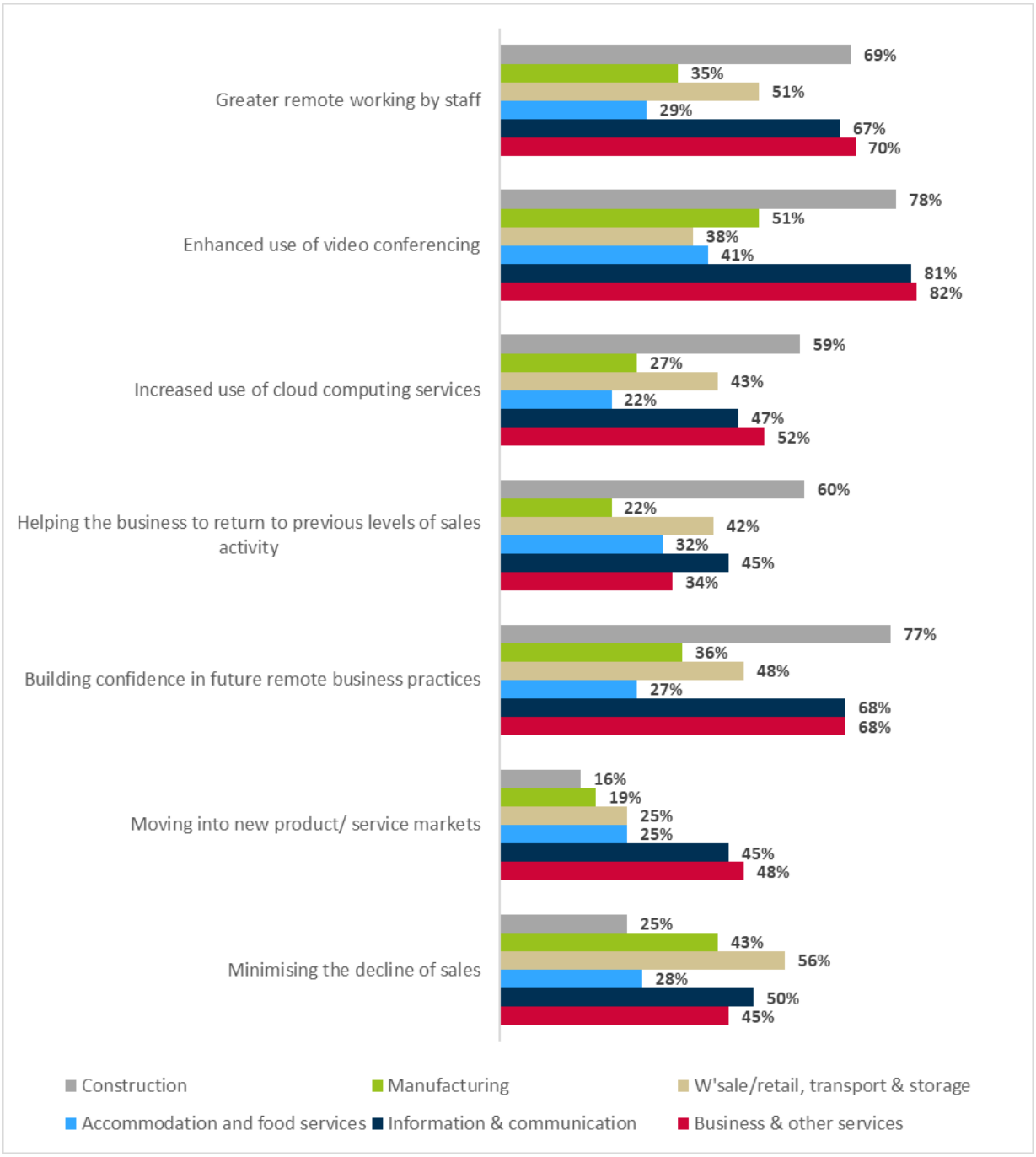
By sector, Figure 2-23 shows that Accommodation and food SMEs reported broadband services enabled relatively low responses to COVID-19 compared to other sectors. This is largely to be expected as many activities in this sector were halted completely for durations during the pandemic, and/or were difficult to replicate from home. Just under three-in-ten businesses in the Accommodation and food sector reported broadband services enabling them to respond to COVID-19 through increased remote working (29%), as compared to seven-in-ten Business and other services sector SMEs (70%).

Figure 2-23 also illustrates that the Wholesale/retail, transport and storage sectors were most likely to report access to broadband services helping to minimise the decline in sales (56%, as compared to the next highest in the Information and communication sector 50%, and Business and other services sector 45%).

The responses from the Construction sector indicated that the industry faired relatively badly in being able to respond to COVID-19 through utilising broadband services to minimise the decline in sales (25%) or move into new product or service markets (16%).

The manufacturing sector reported the lowest proportion of SMEs agreeing that access to broadband enabled services would aid them to respond to COVID-19 in helping the business to return to previous levels of sales activity (22%).

Figure 2-33 Responses to COVID-19 enabled by broadband services, by sector



The Survey also asked SMEs whether COVID-19 had exposed any challenges in adopting or using digital technologies in their business. Table 2-4 shows that the biggest challenge reported was the need to further develop the digital skills of staff (45% of SMEs).

Table 2-4 Challenges COVID-19 has exposed in SME use of broadband technologies

Challenge	% All SMEs responding YES
Further development of staff digital skills	45%
Purchase of additional software subscriptions	42%
Insufficient speed of broadband	40%
Additional IT requirements	36%

By rural and urban location, Table 2-5 shows that rural based SMEs (44%) were more likely than urban (37%) to report insufficient speed of broadband as a challenge, exposed by COVID-19. Other challenges identified relate to the skills and IT (in both urban and rural areas). These results imply that the increased usage of digital technologies during the Pandemic may have led many SME to reconsider their broadband (package) requirements. They also highlight the remaining challenge of connecting the small proportion of remaining premises to superfast broadband in Wales[11].

[11] Figure 5.1 of the Digital dashboard (p. 68) suggests that 93% of all premises in Wales are now connected to superfast broadband.

Table 2-5 Challenges COVID-19 has exposed in SME use of broadband technologies, by location, Rural and Urban

Challenge	Rural SMEs	Urban SMEs
Insufficient speed of broadband	44%	37%
Additional IT equipment requirements	30%	41%
Purchase of additional software subscriptions	39%	45%
Further development of staff digital skills	39%	50%

Table 2-6 shows that SMEs in Mid Wales were most likely to report challenges exposed by COVID-19 in adopting or using broadband in three of the four categories: insufficient speed of broadband (52%); additional IT equipment requirements (49%); and purchase of additional software subscriptions (56%).

South East Wales respondents were most likely to report a challenge in the further development of staff digital skills (47%, as compared to 41% in North Wales).

Table 2-6 Challenges COVID-19 has exposed in SME use of broadband technologies, by location, sub-regions

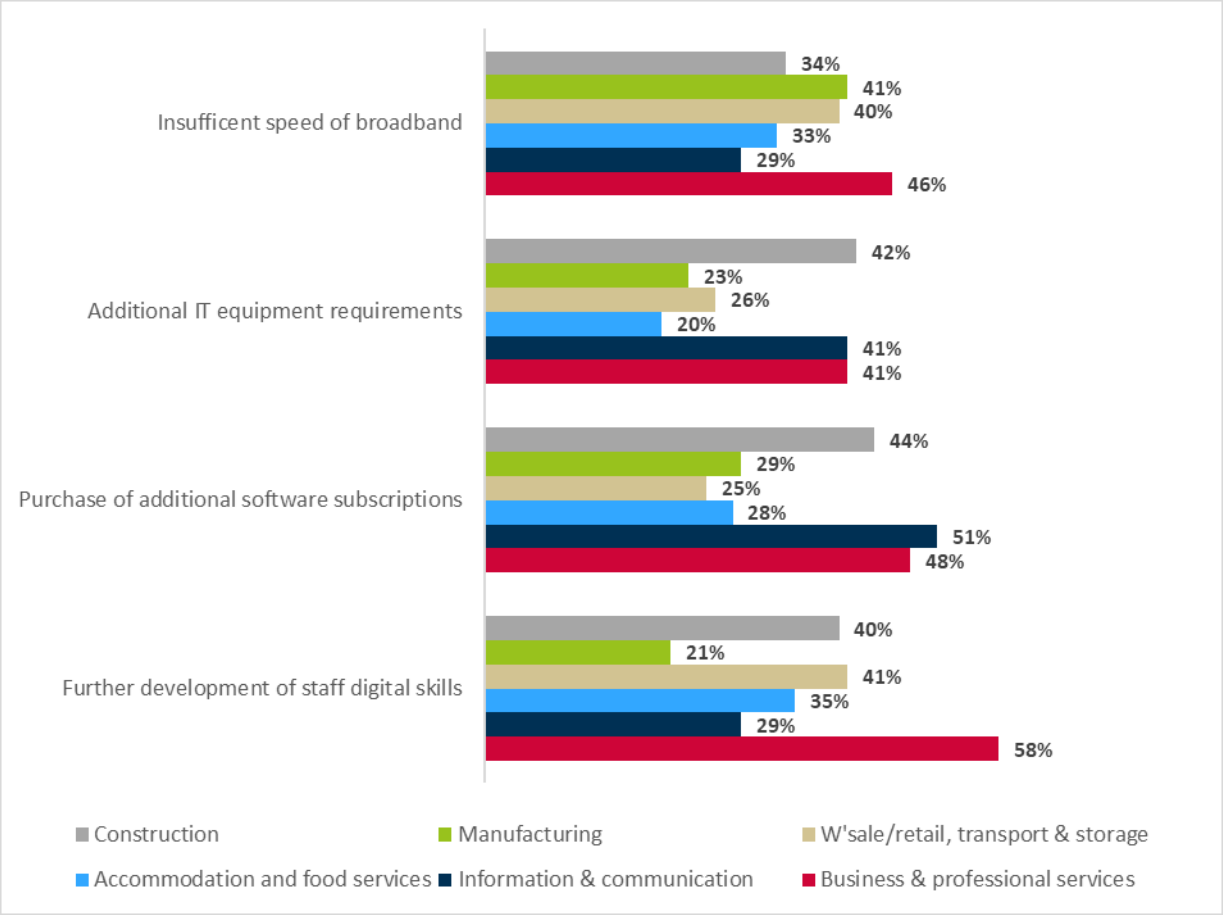
Challenge	North Wales	Mid Wales	South East Wales	South West Wales
Insufficient speed of broadband	38%	52%	37%	43%
Additional IT equipment requirements	29%	49%	39%	31%
Purchase of additional software subscriptions	37%	56%	41%	43%
Further development of staff digital skills	41%	43%	47%	45%

Micro-sized SMEs (41%) were more likely than small (31%) or medium-sized (7%) to note that COVID-19 had exposed insufficient speed of broadband as a challenge in adopting or using digital technologies in their business.

By sector, Figure 2-34 shows that the Business and other services sector was most likely to report the challenges exposed by COVID-19 in adopting or using broadband technologies as insufficient speed of broadband (46% of SMEs in the sector) and further development of staff digital skills (58%). Over two-fifths of SMEs in the Construction sector indicated a challenge in additional IT equipment requirements (42%), as compared to just one-fifth (20%) of Accommodation and food services SMEs.

Figure 2-34 also shows that SMEs in the Information and communications sector were most likely to report a challenge exposed by COVID-19 in the purchase of additional software subscriptions (51%).

Figure 2-34 Challenges COVID-19 has exposed in SME use of broadband technologies, by sector



Respondents to the *Survey* in 2020 were further invited to submit any comments on how digital technologies had enabled their business' response to the coronavirus pandemic. A number of SMEs, particularly in more rural areas of Mid and South West Wales, reported that a lack of superfast broadband access and/or no mobile signal, along with issues with the reliability of broadband service meant that they were not as competitive as other parts of the country. Broadband speed for staff working from home was raised as a concern, as was the cost of setting up such activity.

Despite this, many other SMEs reported that the use of digital technologies was invaluable and had basically enabled them to carry on trading through the challenging COVID-19 period- through holding meetings online and remaining in communication with clients and customers via digital channels/ social media. Digital technologies were seen as indispensable.

A number of businesses had been forced to temporarily shut down during the *Survey* period- especially those in the Accommodation and food services sector- with staff furloughed. Some of these reported utilising the time to engage with digital technologies to help improve their future potential productivity - by learning new business skills, improving their social media communications, or looking at diversifying.

Businesses overall noted a move to online sales, with some having to rely on this as their only source of income. There were examples of SMEs realising that they had insufficient knowledge of how to utilise online sales and communications and they consequently felt at a disadvantage to more digitally mature competitors. The lack of new orders was remarked upon by respondents, who then faced a challenge of utilising digital technologies to widen their marketing, outside their usual geographic range. Others reported that a number of their business clients were struggling and had been reviewing what their digital technology needs were going forward.

Some SMEs had closed their offices permanently to save costs, moving to a working from home model, noting that without digital technologies this would not have been possible. Questions around ensuring data security with the expansion of working from home were raised by a minority here.

Generally, SMEs reported an increased proficiency in the use of digital skills as a result of responding to challenges brought upon by COVID-19 - especially in regard to utilising video conferencing applications. Superfast Business Wales webinars and one-to-one help in moving businesses online was also described as invaluable by some respondents.

3. Digital Maturity Index

3.1. Introduction

This section shows how the survey data on a combination of the various digital technologies adopted by SMEs could be used to form a quantitative indicator, DMI, which measures the scale of the digital maturity level of each SME. Specifically, the DMI reflects the digital maturity level of SMEs by scoring the items from survey questions with a maximum score of 100. All the Yes/No items were coded as 1/0, with items that refer to ranges coded from 1 upwards in ascending order. Binary items were multiplied by a constant of 2 to calibrate the scale to a maximum of 2.

The DMI captures the five dimensions of digital maturity, as summarised in Table 3-1.

Table 3-1 Definiton and measurement of digital maturity dimensions

Digital maturity dimension	Definition	Measurement items
ICT infrastructure	Broadband adoption	• Access to broadband • Download speed • Upload speed
ICT investment	Business budget for ICT-related expenses	• Annual spending on hardware, software, network, broadband subscription • ICT-related staff training
ICT capabilities	Access to human ICT-related resources	• ICT human skills, both internal and external to the business. • ICT skills of internal staff are measured as the proportion of workforce with intermediate and above ICT skills • Access to additional ICT skills is measured according to whether SMEs employ ICT specialists and/or use external ICT support
Digital applications	Use of digital technologies	• Cloud applications for a variety of business functions • Website and its functionality • Social media and other broadband-enabled applications
E-commerce	Engage in online transactions	• Proportion of total sales serviced online • Proportion of purchases transacted online • Breadth of online channels for making e-sales and e-purchases

3.2. Digital maturity scores and groups

The DMI was derived based on the SMEs that answered the DMS 2020. The histogram in Figure 3-1 shows the frequency of occurrence of digital maturity scores by interval. 69% of SMEs scored between 30 and 60, while fewer businesses fell below or above this range. The maximum achieved score was 81, which suggests that none of the SMEs in the sample were fully digitally mature. Based on these insights, four groups of firms in terms of broad digital maturity characteristics were identified (

Table 3-2) and defined (Table 3-3).

Of the sample of 485 SMEs that participated in the *Survey*, the resulting four groups were labelled by the level of their digital maturity as Digitally Disengaged, Passive Exploiters, Active Exploiters, and Digitally Embedded, respectively. The four groups could be described as follows: Active Exploiters and Passive Exploiters covered 31% and 38% of SMEs in the sample respectively, while Digitally Disengaged included the least digitally mature 19%, and Digitally Embedded included the most digitally mature 12% of SMEs.

Figure 3-1 Histogram of digital maturity scores

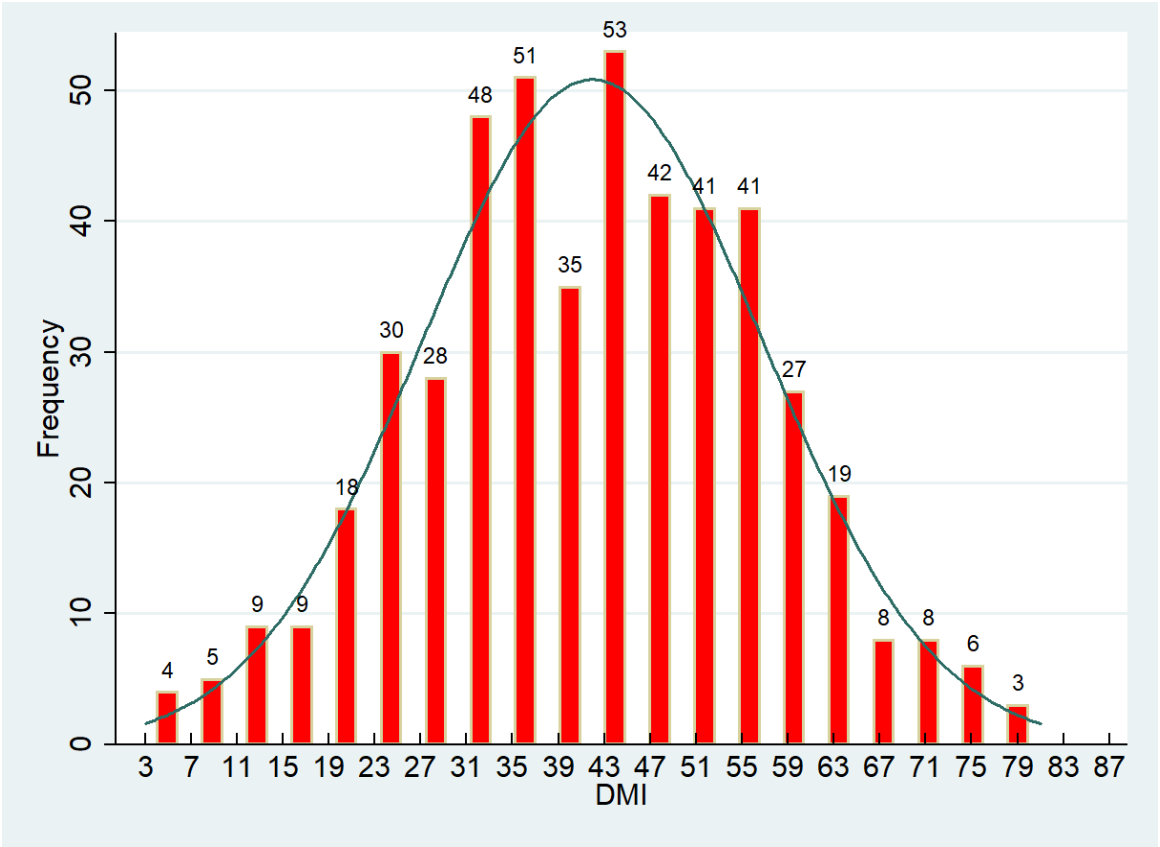


Table 3-2 Profiling of SMEs by their digital maturity score

Digital maturity group	Score range	Group size	Percent
Digitally Disengaged	3-29	94	19
Passive Exploiters	30-44	183	38
Active Exploiters	45-59	151	31
Digitally Embedded	60-81	57	12

Table 3-3 Main characteristics of four digital maturity groups

Digital maturity group	Main characteristics
Digitally Disengaged	• Tend to have adopted standard broadband • A high proportion of employees with below average ICT skills • majority do not use digital technologies • report no sales from online transactions
Passive Exploiters	• Adopted standard broadband • Likely to have staff with above average ICT skills • Make use of basic cloud-based applications • Use of online platforms to generate e-sales is low
Active Exploiters	• Likely to have adopted superfast broadband • A high proportion of staff with above average ICT skills • A wide range of digital platforms and technologies • Nearly half of businesses report online channel as the main source of sales.
Digitally Embedded	• Adopters of superfast broadband • A very high proportion of employees with above average ICT skills • A high number of digital applications • Secure the majority of their sales from online transactions

Table 3-4 shows the average digital maturity scores for each group based on the individual five component scores that make up the DMI. Digital application is the component that accounts for the largest proportion of digital maturity score in each group. The extent of using digital applications and e-commerce makes the major differences among less and more digitally mature businesses, while the differences in using ICT infrastructure, investment and capability are not as significant in explaining the digital mature differences among groups.

Table 3-4 Average scores per group per digital maturity dimension

	ICT infrastructure	ICT investment	ICT capability	Digital applications	E-commerce	Average digital maturity score
Digitally Disengaged	6	1	3	10	2	21
Passive Exploiters	7	2	6	18	5	37
Active Exploiters	8	3	7	27	8	52
Digitally Embedded	9	3	7	37	11	67
Total	7	2	6	22	6	42

3.3. Digital maturity and business performance

The 2020 *Survey* further examines whether and to what extent business performance differs by its digital maturity level. Businesses reported whether access to broadband services affect their performance in terms of turnover, profitability, employment, and innovation activity (introduction of new products, processes or services) and further specified the percentage it had been affected. Overall, higher levels of digital maturity were associated with increases in business performance.

Figure 3-2 depicts how business adoption of broadband affects turnover, profitability, employment and innovation by digital maturity group. Digitally Embedded firms significantly outperformed other digital maturity groups, with more than 61% of the businesses in this group reporting increases in turnover, profitability and innovation activity as a result of having access to broadband. Some 33% of the Digitally Embedded SMEs reported an increase effect of broadband adoption on employment. Among all digital maturity groups, increases in innovation are reported as most significant when compared to the other performance indicators.

Among all the SME's performance indicators (turnover, profitability, employment and innovation), increases in those indicators are all positively associated with the level of digital technology use. Businesses that reported growth in their performance were further asked to indicate the level of increase, Figure 3-3 shows the increases by digital maturity group. More businesses in the less digitally mature group report lower levels of business performance (e.g. up to 5%) increase. This contrasts with the Digitally Embedded group, where a greater proportion of businesses reported increases of more than 50%.

Figure 3-2 Effect of broadband adoption on turnover, profitability, employment, innovation

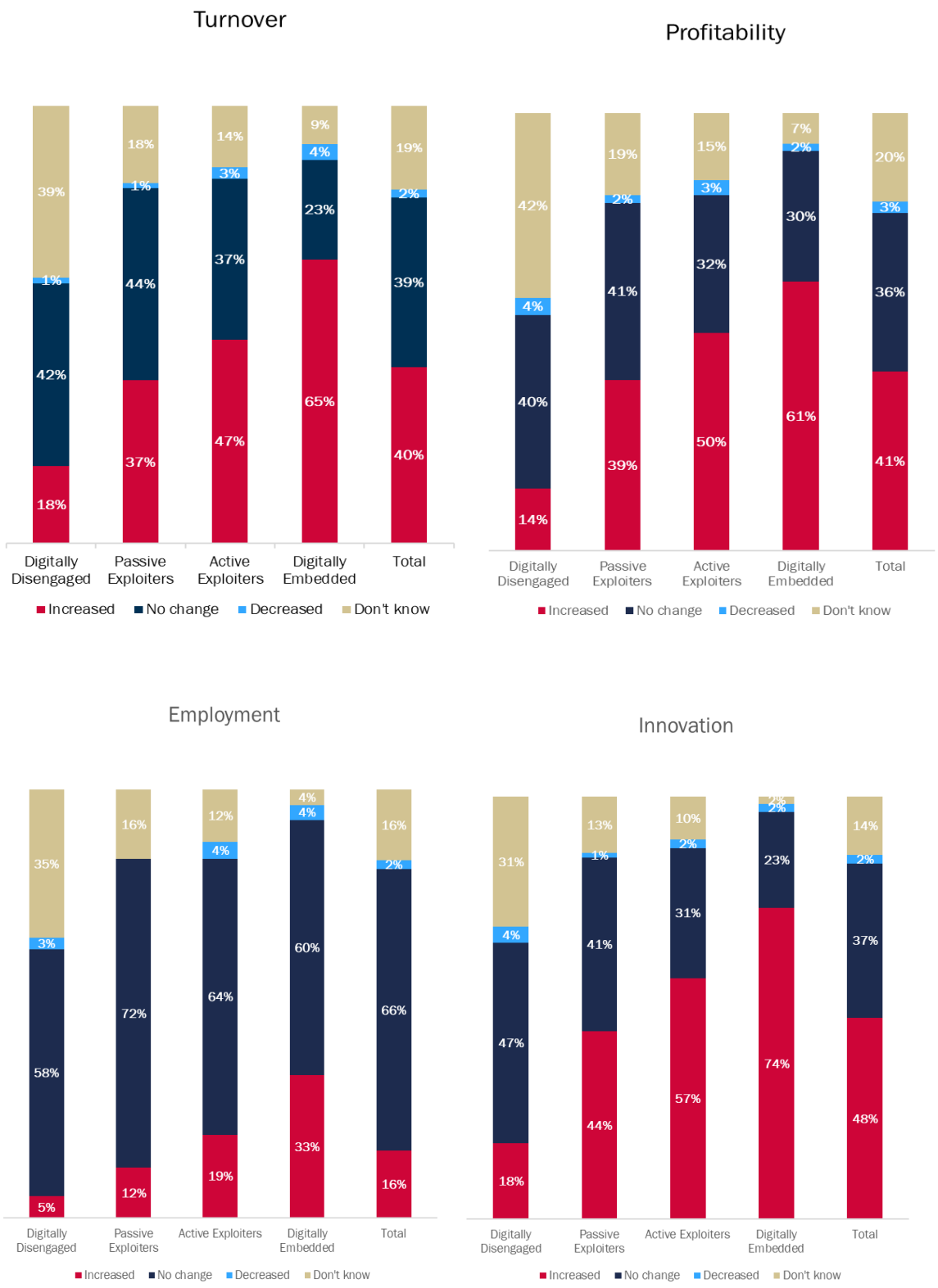
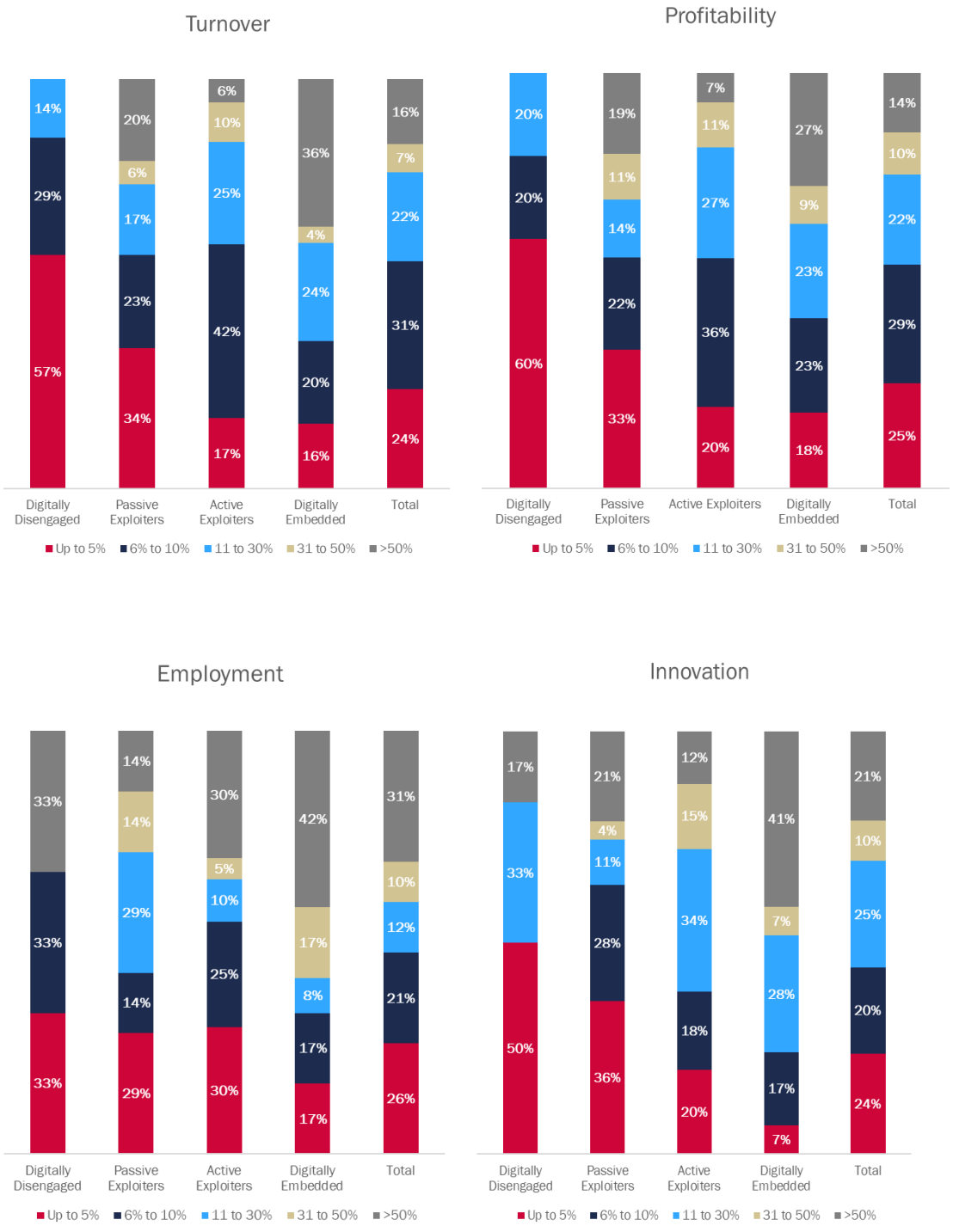


Figure 3-3 Effect of broadband adoption on increase in turnover, profitability, employment, innovation as a result of access to broadband



The majority of SMEs in each digital maturity group agreed that access to broadband enabled services helped to improve their knowledge management, respond to customers and enhance communication, as can be seen from Table 3-5. Some 58% of the SMEs in the Digitally Disengaged group saw broadband enabled services help them to better respond to customer or supplier requirements, but only 51% of businesses in this group agreed that such services increase their competitiveness A quarter of the Digitally Disengaged businesses consider adoption of broadband enabled services as a tool to improve risk management. In contrast, 88% SMEs in the Digitally Embedded group reported achieving their overall strategic benefits from adoption of broadband.

On average, 41% of the SMEs recognised broadband enabled services as beneficial to their risk management. Some 48% of the businesses agreed that broadband adoption helped to gain access to new geographical markets and 49% agree broadband adoption increases IT security and data protection for the businesses. Whereas a major proportion of businesses in the sample (60%) reported that broadband adoption benefited the businesses in terms of achieving their overall strategic benefits.

Table 3-5 Effect of broadband-enabled services on perceived business benefits (% that agree)

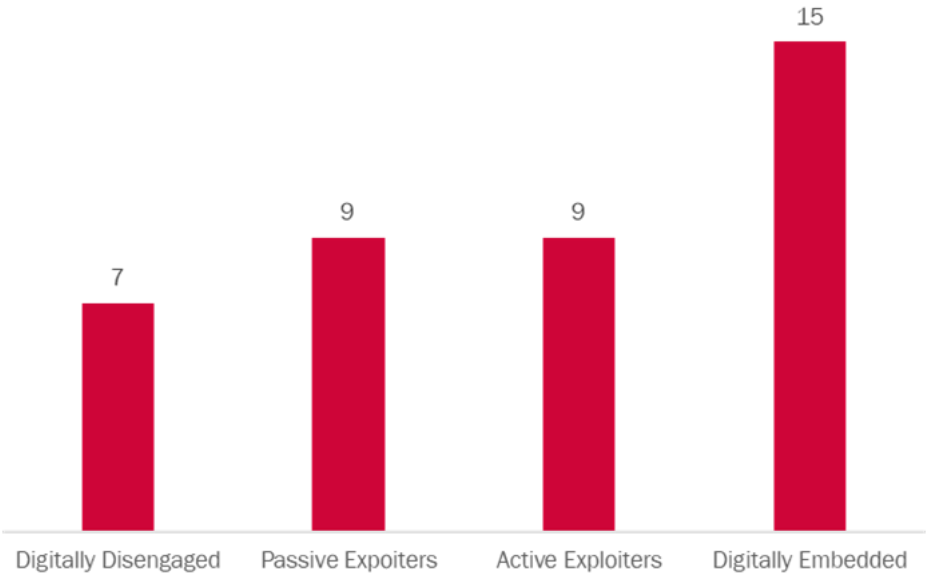
	Digitally Disengaged	Passive Exploiters	Active Exploiters	Digitally Embedded	Average
Better respond to customer or supplier requirements	58%	76%	91%	89%	80%
Keep pace with competition	51%	68%	88%	93%	75%
Improve knowledge management/information sharing	60%	72%	86%	93%	78%
Enhance communication	81%	87%	92%	95%	89%
Improve productivity/efficiency	48%	66%	81%	86%	71%
Gain access to new geographical markets	42%	39%	52%	75%	48%
Increase IT security and data protection	36%	43%	50%	77%	49%
Better risk management (continuity planning)	25%	33%	47%	70%	41%
Achieve overall strategic objectives	35%	52%	70%	88%	60%

3.4. Business characteristics and digital maturity

Business characteristics of the SMEs in the sample of DMS 2020 were analysed to see how the size, location and industry of the business are associated with its digital maturity level. Larger businesses in terms of employment, businesses located in South East Wales, and a few industries such as ICT tend to be more digitally mature than others.

Figure 3-4 shows the average number of people employed by businesses in the four digital maturity groups. Digital Embedded businesses have an average of 15 people employed per business, which is the highest among the four digital maturity groups. The average number of people employed by Digitally Disengaged business is seven, with a large percentage of the micro-businesses likely to be concentrated in this group. Overall, larger firms (by number of people employed) are likely to be more digitally mature.

Figure 3-4 Average number of people employed by digital maturity group



The South East Wales region has the highest percentage of SMEs in the Digitally Embedded group. SMEs in South East Wales and Mid Wales have a higher proportion of Digitally Embedded businesses and Active Exploiters than SMEs in North Wales and South West Wales.

Figure 3-5 Distribution of the digital maturity groups by Subregion

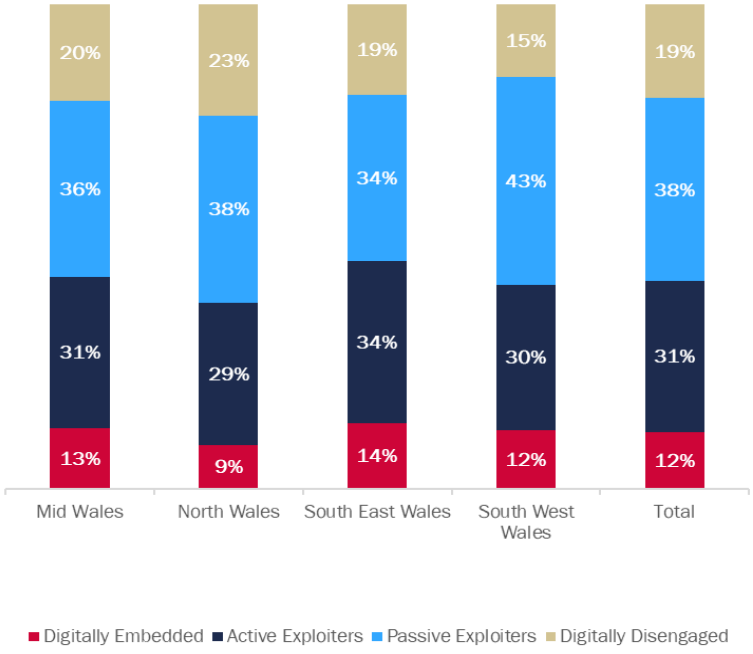
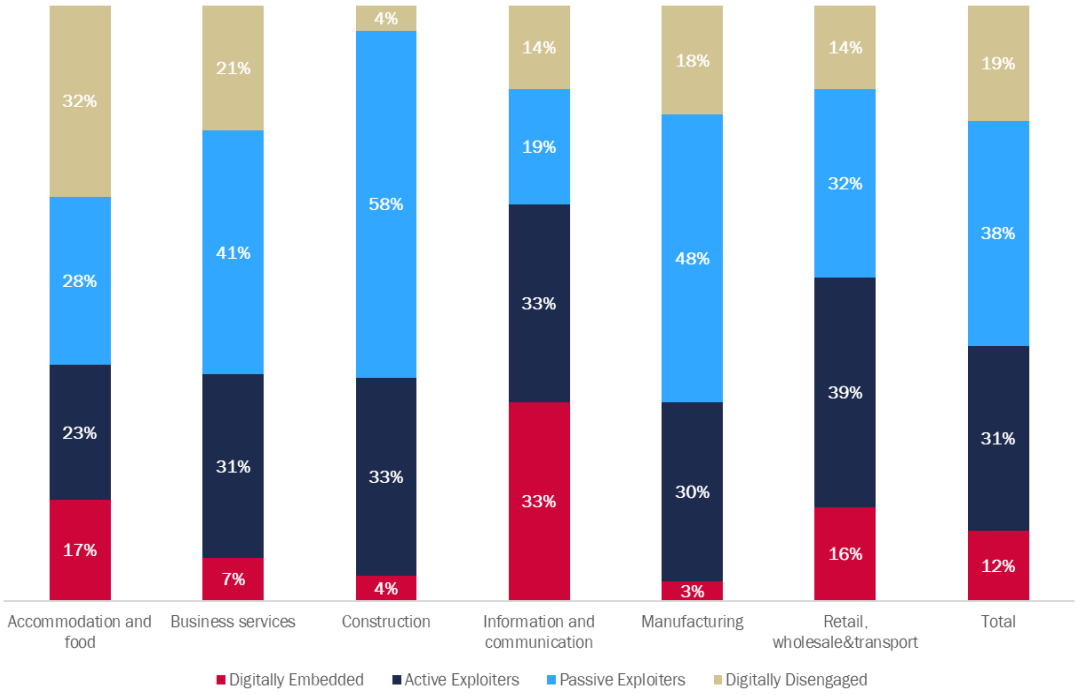


Figure 3-6 depicts the distribution of the digital maturity groups across industries. Manufacturing is the industry in the sample that have the least percentages (3% and 30%) of Digitally Embedded and Active Exploiters businesses while the Information and communication sector is the industry that have the most percentage of SMEs in the Digitally Embedded group (33%). Overall, the distribution of digital mature groups by industry may be affected by the nature of the services/products the specific industry provides, and the industry profitability (GVA/head) as more profitable businesses are likely to be more digitally mature (Figure 3-3), it may also be related to the sample SMEs' distribution across industries.

Figure 3-6 Distribution of the digital maturity groups by industry



** Each bar may not add up to exactly 100% due to rounding*

4. Comparative analysis

4.1. Introduction

The *Digital Maturity Survey* for Wales 2020 report represents the fifth of our series of annual surveys. With the *Survey* format remaining unchanged from 2017 onwards there is the opportunity to compare aggregated results, year-on-year, for a sub-sample of businesses that completed the questionnaire in multiple years.

A total of 61 SMEs have taken part in the Survey in 2017 and 2020, and it is from this sub-sample that the following aggregated comparison results are drawn. With a relatively small sample size such as this, a degree of caution has to be applied to the results. The findings can, however, provide some general, supplementary feedback on the changes in adoption and usage of standard and superfast broadband enabled technologies over the time period 2017 to 2020.

Indicators included in the comparative analysis include superfast broadband adoption, average download and upload speeds, e-commerce, use of advanced cloud computing services, and existence of ICT budget.

4.2. Firm-level comparative results

Adoption of superfast broadband. A little over half of the longitudinal sample (56%) had adopted superfast broadband in 2017. Table 4-1 highlights that this proportion had increased to four-fifths of the sample (79%) in 2020. One-in-twenty of the sub-sample (5%) reported not having adopted broadband in 2017, but by 2020 all the SMEs included in the analysis had adopted broadband.

Table 4-1 Broadband adoption for sub-sample, 2017-2020 (% of SMEs)

Broadband adoption status	2017	2020
No broadband	5%	0%
Standard broadband	39%	21%
Superfast broadband	56%	79%
All	100%	100%

Average download speeds. Table 4-2 shows that the proportion of businesses in the sub-sample reporting download speeds of less than 2 Mbps reduced from one-in-twelve (8%) in 2017 to one-in-fifty (2%) in 2020.

The proportion of SMEs in the longitudinal sample reporting average achieved download speeds, of 10 Mbps or greater, increased by seventeen percentage points from 77% in 2017 to 94% in 2020.

Table 4-2 Average download speeds for sub-sample, 2017-2020 (% of SMEs)

Average download speeds	2017	2020
Less than 2 Mbps	8%	2%
2 Mbps or more and less than 10 Mbps	15%	4%
10 Mbps or more and less than 30 Mbps	28%	20%
30 Mbps or more	49%	74%
All	100%	100%

Average upload speeds. In 2017, just over a third of the longitudinal sub-sample (34%) reported average achieved upload speeds of less than 2 Mbps. In 2020, just 8% of the sample fell into this lowest speed category. Table 4-3 also highlights that SMEs who had achieved average upload speeds of at least 10 Mbps increased nineteen percentage points from 2017 to 2020 (to 68%).

Table 4-3 Average upload speeds for sub-sample, 2017-2020 (% of SMEs)

Average download speeds	2017	2020
Less than 2 Mbps	34%	8%
2 Mbps or more and less than 10 Mbps	17%	24%
10 Mbps or more and less than 30 Mbps	39%	51%
30 Mbps or more	10%	17%
All	100%	100%

E-commerce. Table 4-4 illustrates that the percentage of SMEs in the longitudinal sample reporting that none of their sales were serviced online remained relatively static from 2017 (20%) to 2020 (21%). There was a three-percentage point increase in the proportion of the sub-sample servicing over half of their sales online in the time periods analysed (41% in 2017, and 44% in 2020).

Table 4-4 Proportion of total sales serviced online for sub-sample, 2017 - 2020 (% of SMEs)

Proportion of sales online	2017	2020
0%	20%	21%
1-10%	15%	8%
11-25%	7%	17%
26-50%	17%	10%
51-75%	6%	4%
76-100%	35%	40%
All	100%	100%

The percentage of SMEs in the sub-sample not making any purchases online remained at just over one-in-ten (11%) from 2017 to 2020. Table 4-5 shows there was an increase of twelve percentages points in the proportion of businesses transacting over three-quarters of their purchases online, from 2017 (32%) to 2020 (44%).

Table 4-5 Proportion of total purchases transacted online for sub-sample, 2017-2020 (% of SMEs)

Proportion of purchases online	2017	2020
0%	11%	11%
1-10%	20%	10%
11-25%	11%	10%
26-50%	11%	10%
51-75%	15%	15%
76-100%	32%	44%
All	100%	100%

Use of advanced cloud computing services. Table 4-6 shows the proportion of the SME sub-sample using advanced cloud computing services increased by fifteen percentage points, from 72% in 2017, to 87% in 2020.

Advanced cloud computing services included accounting and bookkeeping; data back-up; Voice over Internet Protocol; electronic payment; video conferencing; customer relationship management; project management software; computing power to run business software; human resource management software; and enterprise resource planning.

Table 4-6 Proportion of sub-sample using advanced cloud computing services, 2017 & 2020 (% of SMEs)

	2017	2020
Use Advanced cloud computing services	72%	87%
Do not use Advanced cloud computing	28%	13%
All	100%	100%

Table 4-7 Table 4-7 shows the proportion of the longitudinal sample that reported having a dedicated ICT budget decreased by seven percentage points from 2017 (25%) to 2020 (18%).

Table 4-7 Proportion of sub-sample having a dedicated ICT budget, 2017 to 2019 (% of SMEs)

	2017	2020
Have a dedicated IT budget	25%	18%
Do not have a dedicated IT budget	75%	82%
All	100%	100%

Summary. The main results from the above analysis on the longitudinal sub-sample are presented in Table 4-8. These strongly indicate that the adoption of broadband enabled technologies has advanced from 2017 onwards, along with the usage to which they have been put. The relatively small sample size used necessitates a degree of caution to be applied to the findings, but the analysis does provide further evidence of SME progress to higher levels of broadband maturity in Wales.

Table 4-8 Summary of firm-level comparative results, 2017 to 2020 (n = 61)

	Percentage point change 2017 to 2020
Superfast broadband adoption	+23
Download speed average > 10 Mbps	+17
Upload speed average > 10 Mbps	+19
Business uses Advanced cloud computing services	+15
Business has an ICT budget	-7
E-commerce: Sales online >50%	+3
E-commerce: Purchases online >50%	+12

5. Conclusions

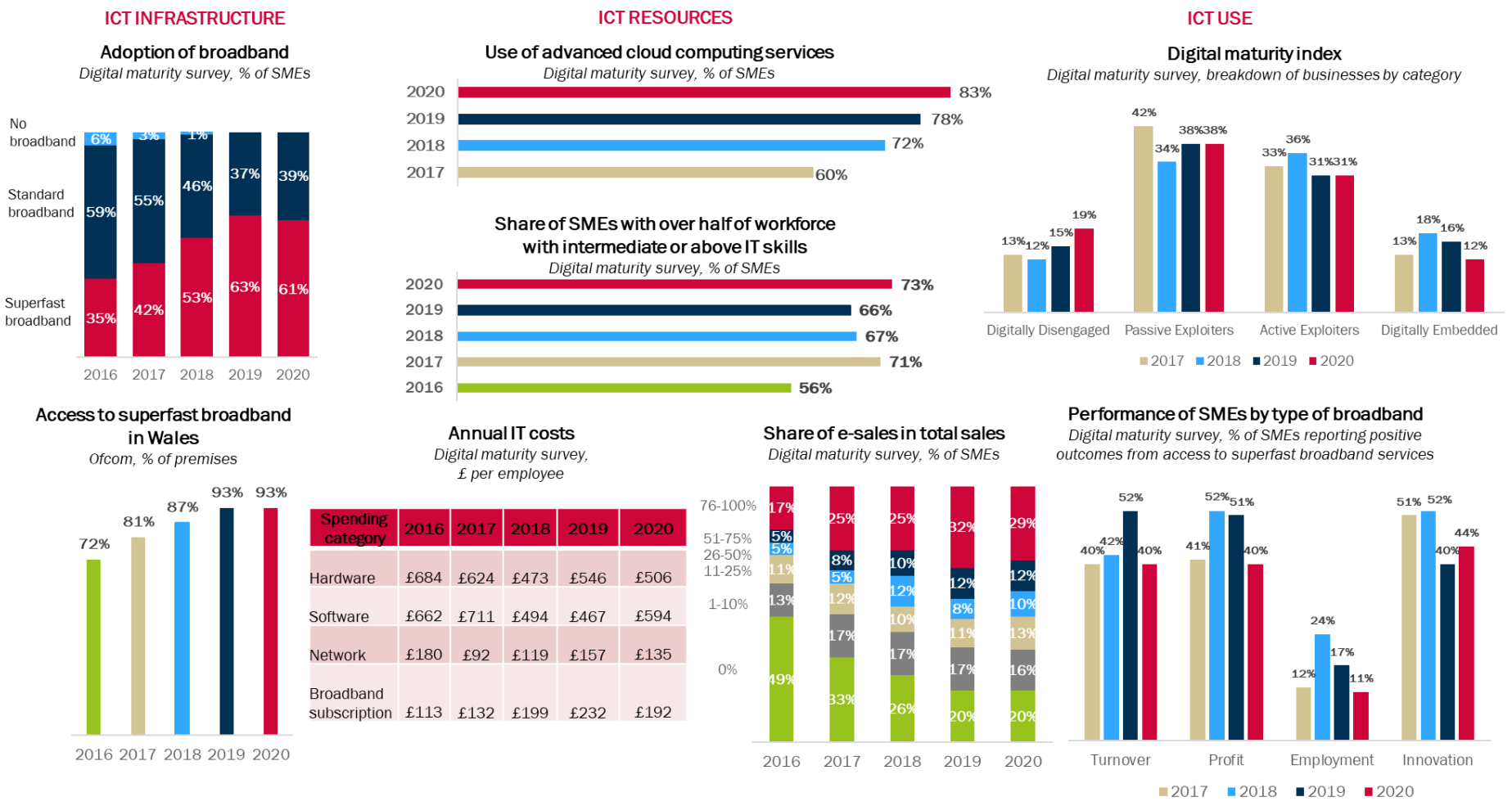
5.1. Introduction

The aim of the Digital Dashboard for Wales is to draw out a snapshot of the results of the Digital Maturity Survey results over the period of the project. The current Digital Dashboard show results covering a five-year period (2016-2020 inclusive), and highlights the dynamic nature of digital maturity. These results are primarily drawn from the DMS, but also include other (secondary) sources, which provide supplementary contextual indicators.

5.2. The Digital Dashboard for Wales

The Digital Dashboard for Wales provides an overview of digital maturity in three main areas: ICT Infrastructure, ICT Resources, and ICT Use. Under each area comparisons are drawn against results from earlier years (see Figure 5-1). This highlights the digital transition that has been underway in Welsh businesses in recent years. Here, the Digital Dashboard shows that this is resulting in incremental changes not only in how businesses are accessing broadband connectivity, but also how they are using it, and how this is leading to performance benefits.

Figure 5-1 Digital dashboard for Wales 2020



5.3. Implications

This is the fifth iteration of the DMS and the last under the auspices of the Welsh Government's Superfast Broadband Business Exploitation (SFBE) programme, part-funded by European Regional Development Funds (ERDF).

The fifth *Survey* has come at a time when SMEs have faced real challenges in terms of business continuation and with evidence in our report of more intensified use of digital resources, and indeed indications that some firms are facing up to having inadequate digital resources to face new challenges. The timing of the pandemic, coming as it does towards the end of the funded project, is unfortunate. However, the team will be seeking to continue elements of the Survey in 2021 and we welcome continued collaboration with our research partners as we move forward with this research agenda.

We strongly believe the Digital Maturity Survey has become an important intelligence resource. The Survey content will need to evolve in coming periods. This is important with questions still remaining on how far business use of superfast broadband will evolve into 2021 as hopefully the effects of the pandemic start to wane.

Over the last five years at least 1,700 SMEs have engaged with our work either through completing the *Survey* or being willing participants in case studies, seminars and bespoke research work. A real encouragement for the team has been the fact that even during this period of intense business disruption, that SMEs have continued to engage with our *Survey*, and that many of the key indicators and charts reveal a 'positive' direction of travel particularly in themes such as more intensive business use of digital channels and more use of the cloud. Then we are confident that SMEs in particular would have been in a much weaker position currently had it not been for the opportunities presented by Superfast access.

This is not a static canvas. There remain SMEs that are characterised by being relatively digitally disengaged and with our developing evidence base revealing economic penalties connected with persistent disengagement. Moreover, the broadest context for Wales-level interventions in the digital domain are little changed over the last five years. Business productivity in Wales still lags that in other regions of the UK but with our evidence base suggesting these lags might have been far worse in the absence of government support for SMEs to engage with superfast broadband. The economic challenges facing our SMEs are more acute than they were at the beginning of the Programme.

In the first quarter of 2021 we will advise our research partners on how this element of Survey work will be continued and evolved. Critically the scale of future Survey activity is resource dependent.

We hope that many of our SME partners and research stakeholders might join with us on December 2nd and 3rd 2020 (Register at https://bit.ly/35yvfdm) as we seek to summarise the findings of the research to date and discuss further elements related to the economic impact of the programme of intervention.

6. Annex

6.1. Overview of 2020 sample

The following tables show the samples of business population in Wales in comparison to the 2020 survey sample. The data was used to carry out stratification and weighting methods.

Table A-1. Business Population: Wales 2019 by industry and size (% of all SMEs)

	Micro	Small	Medium	All SMEs
Construction	27.8	0.5	0.1	28.4
Manufacturing	5.4	0.5	0.2	6.1
Wholesale/retail, transport & storage	23.1	1.2	0.1	24.4
Accommodation & food services	4.1	1.0	0.1	5.2
Information & communication	7.7	0.1	0.0	7.8
Business & other services	27.0	0.9	0.2	28.1
All industries	95.1	4.2	0.7	100.0

Source: Annual Business Population Estimates, ONS.
https://www.gov.uk/government/statistics/announcements/business-population-estimates-2019

Table A-2. Sample: Digital Maturity Survey 2020, by industry and size (% of all SMEs)

	Micro	Small	Medium	All SMEs
Construction	3.1	1.2	0.6	4.9
Manufacturing	9.3	2.3	0.8	12.4
Wholesale/retail, transport & storage	9.9	0.6	1.2	11.8
Accommodation & food services	9.9	0.8	0.2	10.9
Information & communication	10.1	1.2	0.4	11.8
Business & other services	41.2	5.8	1.2	48.2
All industries	83.5	12.0	4.5	100.0

Source: Digital Maturity Survey 2020, WERU.

The next tables provide details on the sample achieved by the 2020 survey. They include a breakdown of the sample by sector, location, firm size.

Table A-3. Sector

	Number of SMEs	Share of SMEs
A: Agriculture	17	3.5
C: Manufacturing	43	8.9
F: Construction	24	4.9
G: Wholesale & retail trade; repair of motor vehicles	49	10.1
H: Transport & storage	8	1.6
I: Accommodation & food service activities	53	10.9
J: Information & communication	57	11.8
K: Financial & insurance activities	10	2.1
L: Real estate activities	7	1.4
M: Professional, scientific & technical activities	89	18.4
N: Administrative & support service activities	36	7.4
P: Education	13	2.7
Q: Human health & social work activities	20	4.1
R: Arts, entertainment & recreation	30	6.2
S: Other service activities	29	6.0
Grand Total	485	100.0

Source: Digital Maturity Survey 2020, WERU.

Table A-4. Location, by local authority area

	Number of SMEs	Share of SMEs
Anglesey	12	2.5
Blaenau Gwent	3	0.6
Bridgend	21	4.3
Caerphilly	8	1.6
Cardiff	45	9.3
Carmarthenshire	29	6.0
Ceredigion	31	6.4
Conwy	52	10.7
Denbighshire	13	2.7
Flintshire	11	2.3
Gwynedd	43	8.9
Merthyr Tydfil	2	0.4
Monmouthshire	20	4.1
Neath Port Talbot	21	4.3
Newport	10	2.1
Pembrokeshire	34	7.0
Powys	52	10.7
RCT	19	3.9
Swansea	22	4.5
Torfaen	11	2.3
Vale of Glamorgan	14	2.9

	Number of SMEs	Share of SMEs
Wrexham	12	2.5
Grand Total	485	100.0

Source: Digital Maturity Survey 2020, WERU.

Table A-5. Employee size

	Number of SMEs	Share of SMEs
Micro (0 to 9 employees)	405	83.5
Small (10 to 49 employees)	58	12.0
Medium (50 to 249 employees)	22	4.5
Grand Total	485	100.0

Source: Digital Maturity Survey 2020, WERU.

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