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DIGITAL ECONOMY BUSINESS SURVEY 2017

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Ipsos MORI Scotland

HIE
Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean

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1. INTRODUCTION

Digital Economy Business Survey

The Scottish Government's Digital Strategy sets out the government's vision of developing internationally competitive, and digitally mature businesses across all sectors. Highlands and Islands Enterprise (HIE) alongside Scottish Enterprise are cited as key to delivering this vision – in particular they are tasked with identifying the strengths and opportunities, future job prospects and skills needed to make sure businesses and social enterprises in Scotland are at the forefront of the digital economy.

In 2017, the Scottish Government, in partnership with HIE, Scottish Enterprise and Skills Development Scotland, commissioned the Digital Economy Business Survey (DEBS). This aimed to build upon the findings of the 2014 baseline DEBS study[1] [2], and to provide an understanding of the level of digitalisation of Scotland's businesses, allowing for benchmarking and progress to be measured over time. The survey offered insight into the areas where businesses may require extra support to improve their adoption and exploitation of digital technology. It also allowed for coverage of new topic areas that have come to the fore since the last survey in 2014.

The areas covered in the survey include:

- Adoption and use of digital technologies (including use of a company website, social media, cloud computing, data analytics, and management software solutions);
- Internationalisation and e-commerce;
- Collaborative economy (NEW);
- Digital public services;
- Cyber resilience (NEW);
- and digital skills.

Highlands and Islands context

This report presents findings from businesses located in the Highlands and Islands region. Businesses in this region were disproportionately sampled in the research to allow statistically significant findings to be captured at the regional level.

Typically, some areas within the Highlands and Islands region are categorised by remoteness, peripherality and low population density which distinguishes them from Scotland overall in key respects with regard to broadband connectivity and digital infrastructure. These characteristics underscore the potential benefits of the adoption and exploitation of digital technologies, but also present specific challenges, for instance, with respect to HIE's aim of improving broadband connection across the region through the Digital Scotland Superfast Broadband[3] project. The project aims to provide superfast broadband (defined as a connection speed of greater than 30 Mbits/s) to many areas of the Highlands and Islands that were not going to be reached by the commercial broadband market. It links with Scottish Government's overall target of every home and business in Scotland having access to superfast broadband by 2021. At present, 78.2% of the Highlands and Islands have potential access to a superfast connection, compared with 93.1% of Scotland.[4]

[1] http://www.gov.scot/Topics/Economy/digital/digitaleconomy/businesssurvey-2014

[2] http://www.hie.co.uk/regional-information/economic-reports-and-research/archive/digital-scotland---highlands-and-islands-research.html

[3] Digital Scotland Superfast Broadband project https://www.scotlandsuperfast.com/

[4] https://labs.thinkbroadband.com/local/uk

The HIE Operating Plan 2017-2018[5] makes the link between digital connectivity and business competitiveness, and highlights the benefits of digital technologies to the sustainability of fragile communities and the remote delivery of public services.

Against this context, the Digital Economy Business Survey provides HIE and partners with an evidence base against which to measure the challenges and opportunities facing businesses and social enterprises in the region, and the type of support or intervention required to help them be at the forefront of digital technology.

Methodology

Survey sample

The survey sample was sourced from the Experian business database and was designed to match the business population in the Highlands and Islands in terms of sector and size (the wider sample was stratified by sector and size to reflect the population of Scottish businesses as a whole).

Quotas were set for recruitment and interviewing so that the achieved sample reflected the population of eligible organisations as defined by the Inter-Departmental Business Register. Eligible organisations were defined by SIC code, which were also used to identify areas of economic activity considered to be growth sectors (as set out in Scotland's Economic Strategy)[6].

Fieldwork

The survey fieldwork was conducted between 11th September and 23rd October 2017. Ipsos MORI interviewed a representative quota sample of 3,258 businesses in Scotland, including a boost of 1,000 interviews within the Highlands and Islands, resulting in 1,209 completed interviews in the region.

The interviews were targeted at the most relevant person in each business: for smaller business (less than 10 employees) interviews were carried out with the owner of the business; for larger businesses, interviews were carried out with the person responsible for making decisions about the IT systems in the business (Managing Director, IT Manager or equivalent). Sole traders were excluded from the survey.

Respondent profile

The achieved sample was broadly representative of the population, notwithstanding some differential non-response due to differences in availability and willingness to participate. Weighting was applied to correct the distribution of sectors and size categories to match the sample counts. To get a sense of the profile of the sample, a breakdown is provided in Appendix A by the following key variables: sector, growth sector, size band, location and fragile areas.

Presentation and interpretation of findings

The survey findings represent the views of a sample of businesses, and not the entire business population of the Highlands and Islands, so they are subject to sampling tolerances, meaning that not all differences will be statistically significant. Throughout the report, differences between sub-groups are commented upon only where we are sure these are statistically significant i.e. where we can be 95% certain that they have not occurred by chance.

Where percentages do not sum to 100%, this may be due to rounding, the exclusion of 'don't know' categories, or multiple answers. Aggregate percentages (e.g. "fully equipped/somewhat equipped") are

[5] http://www.hie.co.uk/about-hie/policies-and-publications/operating-plan.html

[6] https://beta.gov.scot/publications/scotlands-economic-strategy/

calculated from the absolute values. Therefore, aggregate percentages may differ from the sum of the individual scores due to rounding of percentage totals.

Throughout the report, an asterisk (*) denotes any value of less than half a percent and a dash (-) denotes zero. For questions where the number of businesses is less than 30, the number of times a response has been selected (N) rather than the percentage is given.

All aspects of the study were carried out to the international quality standard for market research, ISO 20252.

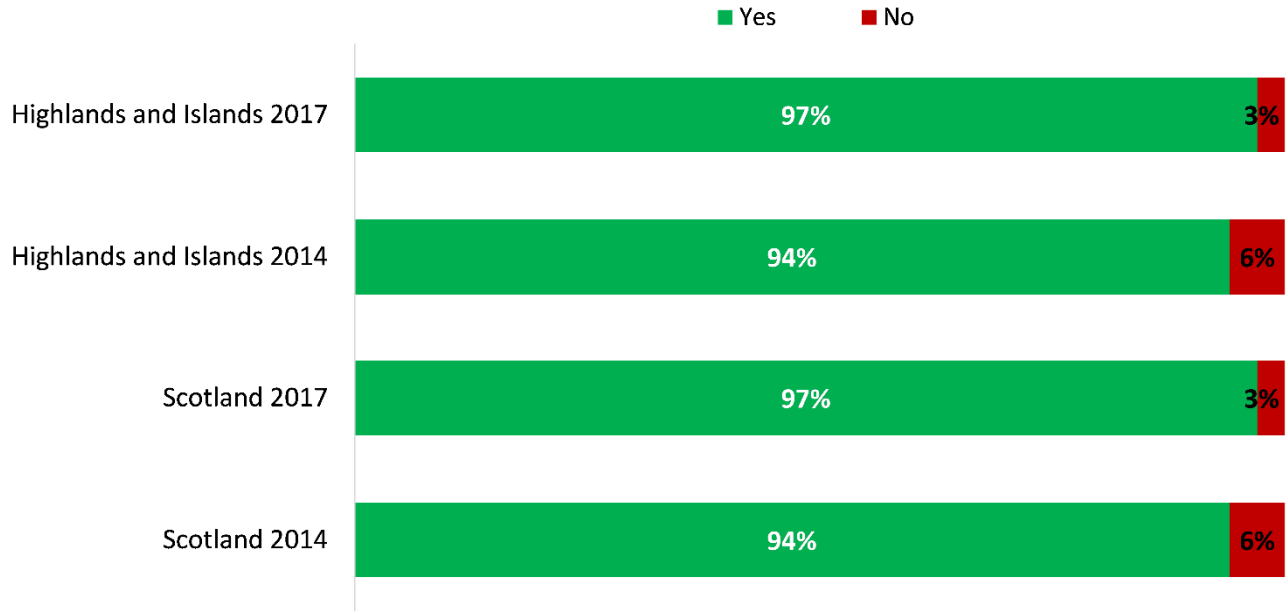
2. USE OF DIGITAL TECHNOLOGIES

Internet connection

Before examining use of digital technologies in detail, this section first summarises the level of internet connectivity among businesses in the Highlands and Islands. Almost all businesses (97%) had an internet connection, a slight increase from 94% in 2014. In both 2014 and 2017, levels of internet connectivity in the Highlands and Islands were equivalent to that of Scotland overall.

Figure 2.1 – Internet connection

Q: Does your organisation currently have an internet connection?



Base: All businesses: Highlands and Islands 2017 (1,209) and Scotland 2017 (3,258), Highlands and Islands 2014 (2,193) and Scotland 2014 (4,002)

There was no variation in the findings by growth sector, location and fragile area, however the findings did differ by size of business: those businesses without internet connection were all small, with fewer than 20 employees (Table 2.1).

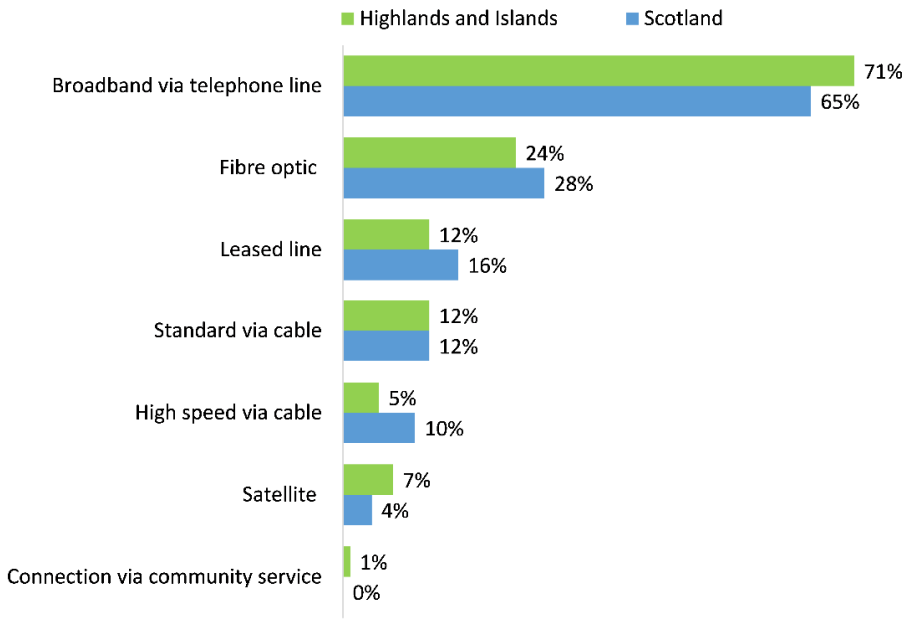
Table 2.1 – Internet connection by size band

	Internet Connection	
Business Size	**Yes %**	**No %**
2 - 4	96	4
5 - 9	98	2
10 - 19	99	0.8
20 – 49	100	-
50 -249	100	-
250+	100	-
Base: All businesses	*1176*	*33*

Among those who had an internet connection, seven in ten (71%) had broadband via telephone line, a quarter (24%) had fibre optic broadband and around one in ten (12%) had a leased line or standard connection via cable. These findings, however, suggest that there may be a degree of misunderstanding among businesses about their connection type. For example, cable connections are not available in the region, but one in ten businesses said they had a standard connection via cable. It should be acknowledged, therefore, that these results reflect businesses' own understanding of their connection type, but may not accurately reflect their actual connection type.

Figure 2.2 – Type of internet connection

Q: I'm now going to read out a list of types of broadband connection. Please can you tell me which types of connection your organisation currently has?



Base: All businesses: Highlands and Islands (1,209) and Scotland (3,258)

Businesses in the Highlands and Islands were more likely than those in Scotland as a whole to have broadband via telephone line (71% compared with 65%) and slightly more likely to have satellite (7% compared with 4%). Since 2014 there has been a decrease in the proportion of Highlands and Islands businesses with broadband via telephone line (down 12 percentage points) and an increase in the proportion with fibre optic broadband (up 20 percentage points). This boost in use of fibre optic

broadband may be as a consequence of the Digital Scotland Superfast Broadband project, involving roll-out of fibre optic across the Highlands and Islands.[7] However, it is worth noting that there was also an increase in fibre optic broadband across Scotland as a whole (by 17 percentage points since 2014) (Table 2.2).

Table 2.2 – Type of broadband connection

Type of broadband connection	Highlands and Islands 2017 %	Highlands and Islands 2014 %	Scotland 2017 %	Scotland 2014 %
Broadband via telephone line	71	83	65	79
Fibre optic	24	4	28	11
Leased line	12	13	16	16
Standard via cable	12	12	12	12
High speed cable	5	2	10	7
Satellite	7	4	4	2
Connection via community service	*	n/a	*	n/a
Base: All businesses with an internet connection	*1,177*	*2,082*	*3,160*	*3,827*
Note: Respondents could choose more than one type of connection, therefore columns will add to greater than 100%				

Some sectors were more likely to have specific types of broadband connections. Financial and business services and tourism were more likely to have fibre optic broadband (31% and 30% respectively with 24% overall) and food and drink businesses were more likely to have broadband via telephone line (79% compared with 71% overall).

[7] Digital Scotland Superfast Broadband project https://www.scotlandsuperfast.com/

Table 2.3 – Type of broadband connection by growth sector

Type of broadband connection	Creative Industries %	Tourism %	Financial and Business Services %	Food and Drink %	Life Sciences (n)[8]	Energy (n)
Broadband via telephone line	61	68	60	79	1	11
Fibre optic	30	30	31	10	1	3
Leased line	11	12	14	11	2	-
Standard via cable	4	10	7	15	1	2
High speed cable	7	3	8	4	-	1
Satellite	2	9	5	12	-	1
Connection via community service	-	1	-	-	-	-
Base: All businesses in each sector						
Note: Respondents could choose more than one type of connection, therefore columns will add to greater than 100%						

Internet connection speed

In terms of internet connection speed, the definitions used have changed somewhat since the last survey. In 2014, superfast in the UK was defined as speeds of at least 24 Mbit/s, while the EU's definition was of at least 30 Mbit/s. Over time the UK's definition has moved in line with that of the EU and as noted earlier, superfast broadband is defined as connection of at least 30 Mbit/s. This is also the definition used in the Scottish Government's a target of 100% superfast broadband by 2021.

The majority of businesses in the Highlands and Islands (70%) did not have superfast broadband. However, the proportion of businesses in the region with superfast broadband increased significantly since 2014 (from 6% to 30%), as did those in Scotland (from 12% to 44%). However, the Highlands and Islands still lags behind Scotland as a whole in terms of superfast broadband connections (Table 2.4). It should be noted that over half (55%) of businesses in the Highlands and Islands did not know what their internet connection speed was, in line with findings for Scotland (59%). In both areas, the proportion saying 'don't know' had increased from 2014 (from 46% in the Highlands and Islands and 49% in Scotland).

[8] As the base sizes for Energy and Life Sciences are less than 30, the number of responses (rather than percentages) are shown. As number of responses have been weighted, the base size shown for these sectors is the weighted, rather than unweighted, base.

Table 2.4 – Internet connection speed

Internet connection speed	Highlands and Islands 2017 %	Highlands and Islands 2014 %	Scotland 2017 %	Scotland 2014 %
Up to 23 Mbit/s	66	92	52	85
Between 24 and 29 Mbit/s	4	1	4	2
Between 30 Mbit/s and 1 Gbit/s	24	4	35	9
Over 1 Gbit/s	5	1	6	2
At least 24 Mbit/s	34	8	46	15
At least 30 Mbit/s (superfast)	30	6	44	12
Base: All those with internet access, excluding 'don't knows'	*534*	*1,124*	*1,333*	*1,951*

Larger businesses were more likely than average to have a superfast broadband connection: for example, 44% of those with 20-49 employees, 52% of those with 50-249 employees, and 61% of those with 250+ employees had superfast connections, compared with 30% overall. Otherwise, there was little variation by type of business.

Comparing connection speed with type of connection, we can see that those that say they have a high speed cable connection and with a fibre optic connection are the most likely to have superfast connections (74% and 68% respectively), while those with broadband via telephone and those with standard broadband via cable are least likely to (23% and 20% respectively) (Table 2.5). Although 68% of those with fibre optic broadband said they had a superfast connection, it might be expected that this proportion would be higher, as fibre optic connections are inherently fast. These findings again suggest that there may be a lack of knowledge among businesses about the detail of their connection type and speed.

Table 2.5 – Internet connection speed by type of connection

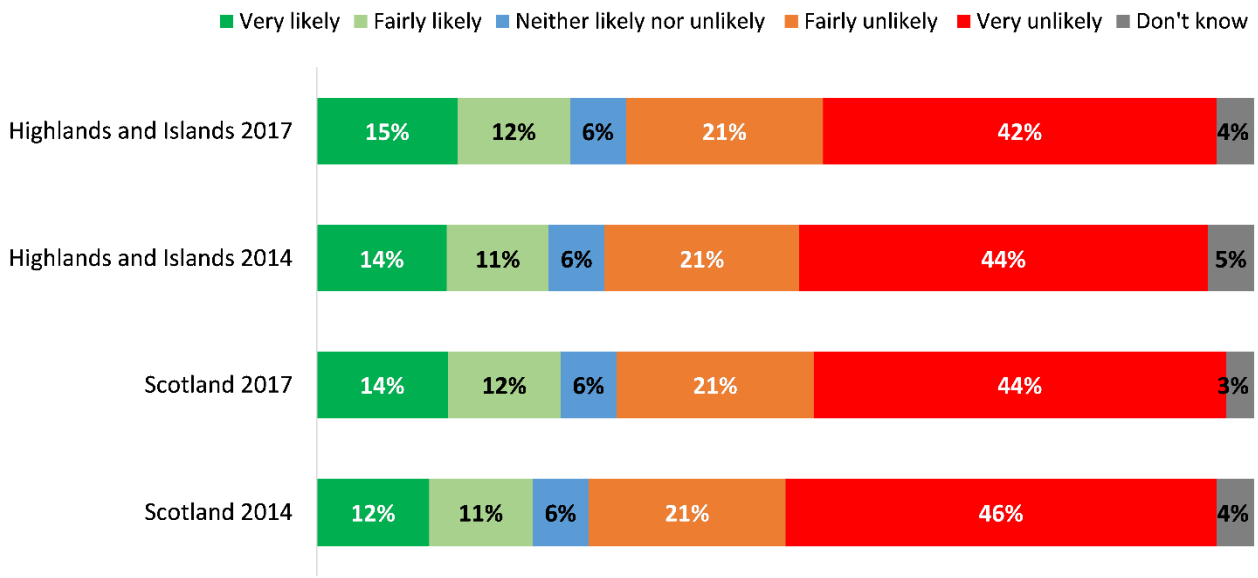
Internet connection speed	Broadband via telephone line	Fibre optic	Leased line	Standard via cable	High speed cable	Satellite
Up to 23 Mbit/s	74	23	59	78	24	69
Between 24 and 29 Mbit/s	3	8	1	1	3	4
Between 30 Mbit/s and 1 Gbit/s	17	55	24	12	53	16
Over 1 Gbit/s	4	10	12	7	13	11
At least 24 Mbit/s	25	75	39	20	76	31
At least 30 Mbit/s (superfast)	23	68	40	20	74	27
Base: All those with internet access, excluding 'don't knows'	*384*	*146*	*85*	*69*	*38*	*55*

Future improvements

Looking ahead to the next 12 months, almost two-thirds (63%) of businesses reported that they were unlikely to improve their organisation's internet connection, while 27% were likely to do so.

Figure 2.3 – Likelihood to improve internet connection in the next 12 months

Q: As far you are aware, how likely are you to improve your organisation's internet connection or service in the next 12 months – e.g. improving the speed of your connection or increasing your level of data allowance?

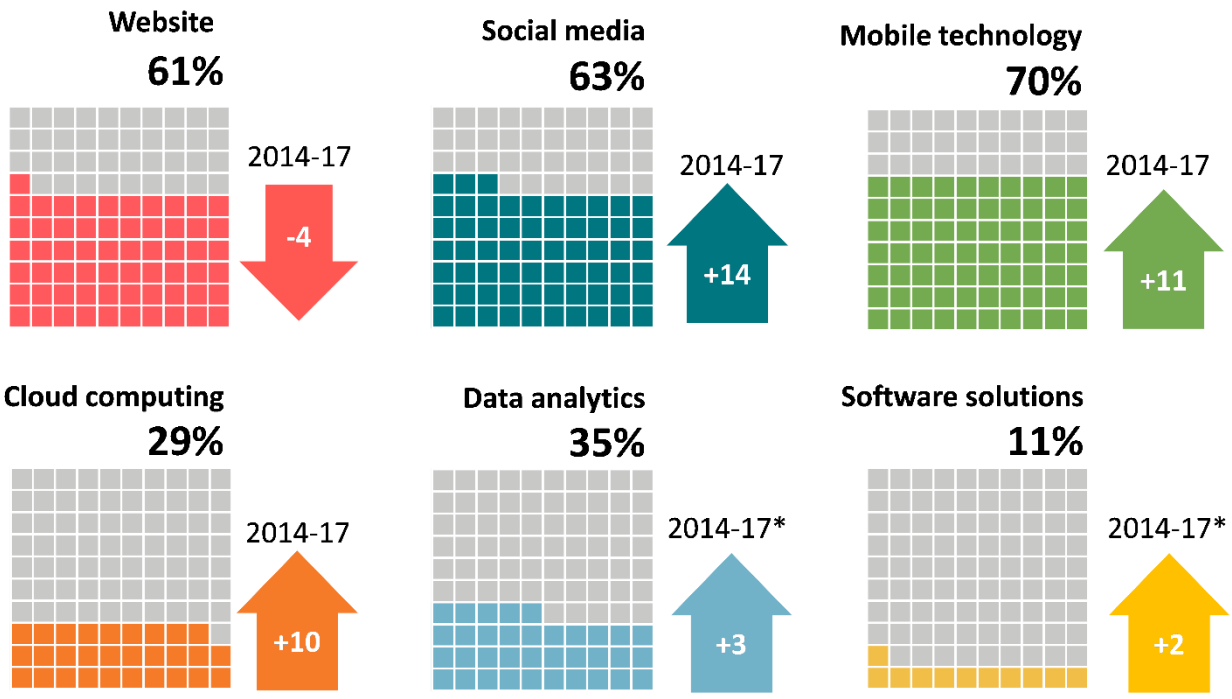


Base: All businesses who have an internet connection: Highlands and Islands 2017 (1,177) and Scotland 2017 (3,160); Highlands and Islands 2014 (2,082) and Scotland 2014 (3,827)

Overall engagement with digital technologies

The survey asked about the use of a number of digital technologies, namely, company website, mobile and internet technologies, social media, data analytics, cloud computing, and software solutions such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM). Figure 2.4 summarises the proportion of businesses that had used each technology and any change since 2014.

Figure 2.4 – Summary of engagement with digital technologies



Base: All businesses (1,209)

**for Data analytics and Software solutions, changes over time are not statistically significant*

Use of digital technology varied, ranging from 70% who used mobile internet and technologies to just 11% who used software solutions such as ERP and CRM software. When looking at the number of technologies used by each business, a small proportion of the overall sample (7%) had not used any of the digital technologies mentioned, while only 4% had used all six. Sixty-two per cent (62%) had used between two and four technologies (Table 2.6).

Table 2.6 – Number of digital technologies used

Number of technologies used	%
None	7
1	17
2	23
3	21
4	18
5	10
All (6)	4
Base: All businesses (1,209)	

A key variable noted in relation to the number of technologies used is business size. Notably, those with 250+ staff were significantly more likely than average to use 5-6 of the digital technologies mentioned (60% compared with 14% overall).

Furthermore, there is a relationship between use of digital technologies and private sector growth plans (used as a proxy indicator for performance relevant to private companies that constitute 91% of the

research sample). Businesses who had not used any of the digital technologies mentioned in the survey were more likely than those who had used 5-6 to expect to contract in the next 12 months (20% compared with 2%). Conversely, businesses that used 5-6 technologies were more likely than those who used none to anticipate growth (Table 2.7).

Table 2.7 – Growth plans for private sector business, by number of technologies used

	Number of technologies used			
	None	1-2	3-4	5-6
Private sector growth plans	%	%	%	%
Grow	7	33	55	70
Stay the same	71	58	38	26
Contract	20	6	5	2
Base: Private sector businesses	*84*	*451*	*407*	*149*

Barriers to using digital technology

The single most common reason for not using any digital technology was a perceived lack of relevance to the business, cited by three quarters (76%) of businesses who did not use any digital technology. Other reasons mentioned included that the business was too small (11%); a lack of understanding of how digital technologies work (6%); a sense that the business owner was elderly and soon to retire thus unlikely to adopt digital technologies (5%) and a preference for the current business model involving face-to-face interaction (4%). It is worth noting that no businesses in Highlands and Islands mentioned cost as a barrier to using digital technology.

There were no statistically significant differences by type of business underpinning the reasons why some businesses do not engage with digital technologies.

The level of use, and benefits of doing so, for each individual digital technology are outlined in the sections below.

Company website

Adoption and usage

Six in ten businesses in the Highlands and Islands (61%) had a company website, lower than for Scotland overall (72%). The proportion with a website was slightly lower than the baseline findings in 2014 (65%), while in Scotland the proportion remained at a similar level (73%) but was the only technology not to see an increase in this period. This decrease in website use in the region, and the lack growth of website use at a national level, may signal a move away from this more traditional format towards newer methods of digital engagement that make use of mobile connections and social networking tools, as well as use of alternative e-commerce platforms such as third party websites.

Those in the tourism and financial and business services sectors were more likely than average to have a company website (85% and 76% respectively compared with 61% overall). There was also significant variation by size of business, with larger businesses more likely than smaller businesses to have a website (96% of those with 250+ employees compared with 50% of those with 2-4). Further, social enterprises were more likely than private companies to have a company website (93% compared with 57%).

In terms of the functions hosted by a company website, the following facilities and services were commonly mentioned:

- a privacy policy statement, privacy seal or a website safety certificate (38%);
- remote access to the business email server or other documents and applications (36%);
- a service that allows customers to place orders or make payments over the internet (34%);
- a service that provides customers with online tracking of orders (9%);
- the function to customise or design online goods or services, or to personalise website content (6%);
- and e-tendering or procurement (4%).

Businesses in the Highlands and Islands were more likely than those in Scotland overall to have services allowing customers to place orders or make payments over the internet (34% compared with 25%). Otherwise, these findings were in line with Scotland as a whole.

Tourism (56%) and food and drink (39%) businesses were more likely than average (34%) to use their company website to allow customers to place orders or make payments over the internet. There were no further statistically significant variations by type of business.

Benefits

Of those who had a company website, almost all (94%) reported some benefits from its use. By far the most commonly cited benefit of having a company website was increased exposure for the organisation – mentioned by almost eight in ten businesses (79%). The next most frequently cited benefit (at 20%) was increased responsiveness to customers, followed by improved sales, turnover and profits (12%), new business partnerships and selling opportunities and increased efficiencies (6% respectively). These findings are consistent with Scotland as a whole, and also with baseline findings for the Highlands and Islands in 2014.

Figure 2.5 – Benefits of a company website

Q: What are the benefits of having a company website?

Base: All businesses who have a company website: Highlands and Islands (780) and Scotland (2,264)

Food and drink and tourism businesses were more likely than average to cite improved sales, turnover and profits as a result of having a website (19% each compared with 12% overall). There were no further statistically significant differences by type of business.

Social media

Adoption and usage

Just under two thirds of businesses (63%) in the Highlands and Islands used social media, which was similar to the proportion that had a company website. The figure for social media use among regional businesses increased since 2014 (from 49%), as it did among businesses in Scotland as a whole (from 53% to 66%). The top three types of social media used by Highlands and Islands' businesses were in line with those for Scotland as a whole and included: social networks such as Facebook or LinkedIn (60%); business blogs or microblogs such as Twitter or Yammer (23%); and multimedia sharing websites such as YouTube, Vimeo, Flickr or Instagram (20%).

The following variations were found in the use of social media among businesses:

- those in the tourism and creative industries sectors were more likely than average to use social media (89% and 76% compared with 63% overall);
- businesses with 20-49 staff were more likely than businesses with 2-4 staff to use social media (91% compared with 56%);
- those operating in international markets were more likely than those operating exclusively in domestic markets to use social media (83% compared with 57%).

Benefits

Eighty percent of those that used social media reported that it had benefitted their business. Perceived benefits were similar to those of a company website, with exposure and profile raising for the business the single most commonly mentioned (66%). Other benefits cited to a far lesser extent included increased responsiveness to customers (21%), improved sales, turnover and profits (11%), new business partnerships (7%), and better communication within the organisation (6%). These findings are consistent with Scotland overall and with the baseline findings for the Highlands and Islands in 2014.

The largest businesses (250+ employees) were more likely than the smallest businesses (2-4 employees) to cite benefits of social media use (93% compared with 83%). Moreover, social enterprises were more likely than private companies to mention that they had experienced benefits (94% compared with 84%).

There were no further statistically significant variations by type of business.

Mobile and internet technologies

Adoption and usage

Seventy percent of businesses used mobile and internet technologies, slightly less than the Scotland average (73%). This included just under two thirds (63%) who used portable devices like Smartphones or Tablets; a third (33%) who used a mobile broadband connection via portable device (e.g. tethering to mobile networks) and a quarter (25%) who used portable computers using mobile phone networks. Both the Highlands and Islands and Scotland saw an increase in mobile technologies between 2014 and 2018, by 11 and 9 percentage points respectively.

Table 2.8 – Use of mobile and internet technologies

Type of mobile and internet technology	Highlands and Islands 2017 %	Highlands and Islands 2014 %	Scotland 2017 %	Scotland 2014 %
Any	70	59	73	64
Mobile broadband connection via portable device, for example tethering to mobile 3G or 4G networks	33	24	38	33
Portable computers using mobile phone networks for example laptops with inbuilt 3G or 4G	25	24	30	28
Other portable devices like Smartphones or Tablets	63	52	68	58
None of these	30	41	26	36
Base: All businesses	*1,209*	*2,193*	*3,258*	*4,002*

Those in the financial and business services sector were more likely than average to use mobile broadband connection via portable devices (47% compared with 33% overall). Other types of business were more likely than average to use portable devices like Smartphones or Tablets, namely:

- businesses with 250+ employees (90% compared with 63% overall);
- those in the Inner Moray Firth (70%), Moray (70%) and Shetland (68% compared with 63% overall);
- those who operate in markets overseas (72% compared with 60% among those who operate in domestic markets only).

Further, businesses in non-fragile areas were more likely to use mobile broadband connection via a portable device than those in fragile areas (35% compared with 24%).

Benefits

Ninety percent of those who use mobile technologies mentioned that they had experienced some benefit from use. In particular over half (53%) reported that the use of mobile technologies had enabled employees to work remotely, a quarter (26%) that it had increased efficiencies and a fifth (19%) that it had increased responsiveness to customers.

These findings are broadly consistent with Scotland as a whole, but there have been some changes among regional businesses since 2014. The proportion saying mobile technologies enabled employees to work remotely has gone down (by seven percentage points) while the proportion citing increased efficiency has gone up (by eleven percentage points).

Increased efficiency as a result of mobile technologies was more notable among the largest businesses (250+ employees) than among small businesses (2-4 employees) (62% compared with 25%).

Cloud computing

Adoption and usage

Around two-thirds (65%) of businesses in the region had not subscribed to any cloud computing services, higher than the proportion for Scotland overall (57%). However, the proportion in the Highlands

and Islands reporting that they *had* subscribed to cloud computing services increased by ten percentage points between 2014 and 2017 (from 19% to 29%). A similar pattern was seen in Scotland, where use of cloud computing increased from 25% to 37% (Table 2.9).

Table 2.9 – Use of cloud computing

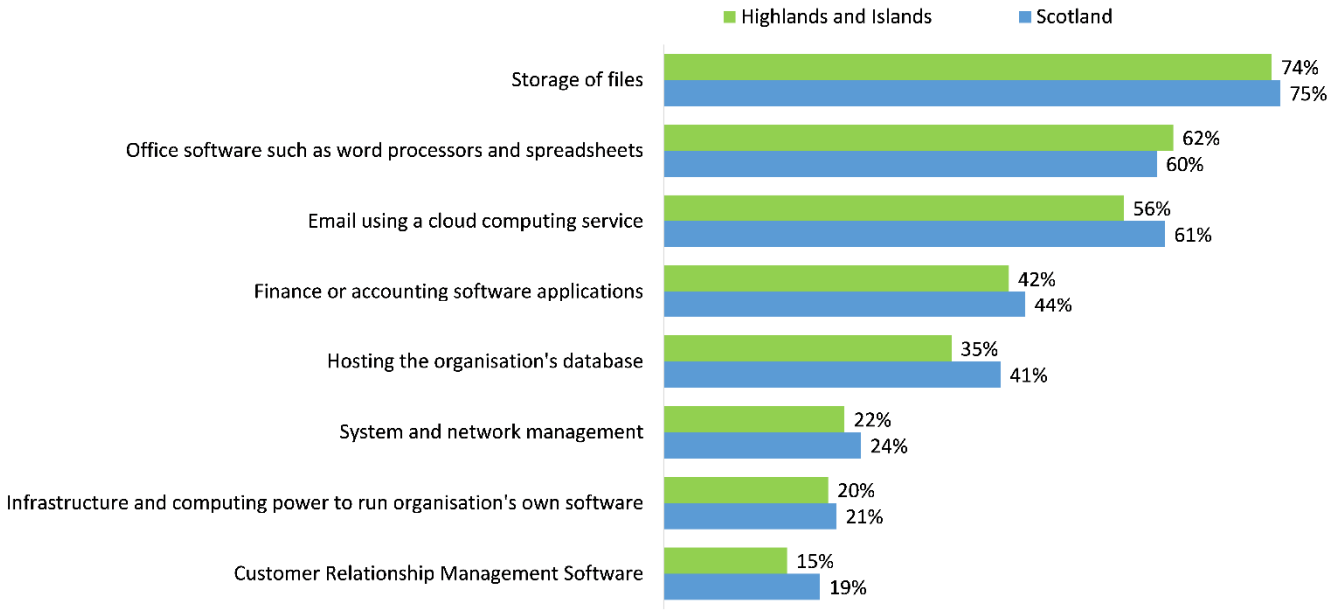
Use of cloud computing	Highlands and Islands 2017 %	Highlands and Islands 2014 %	Scotland 2017 %	Scotland 2014 %
Yes	29	19	37	25
No	65	79	57	72
Base: All businesses	*1,209*	*2,193*	*3,258*	*4,002*

Food and drink businesses (15%), those located in Orkney (22%), and those with 2-4 employees (23%) were less likely than average (29%) to subscribe to any cloud computing service.

Around three quarters (74%) of those that subscribe to cloud computing services did so for storage of files; 62% used it for office software such as word processors and spreadsheets; 56% for email; 42% for finance or accounting software applications, and 35% for hosting the organisation's databases.

Figure 2.6 – Types of cloud computing services

Q: Does your organisation subscribe to any of the following cloud computing services used over the internet?



Base: All businesses who use cloud computing: Highlands and Islands (357) and Scotland (1,117)

The findings are broadly consistent with those for Scotland overall. Between 2014 and 2017, use of most of the services increased in both the Highlands and Islands and Scotland, with the exception of email using a cloud computing service which decreased in both areas (by 19 and 12 percentage points respectively) (Table 2.10). There were no statistically significant differences by type of business.

Table 2.10 – Types of cloud computing services

Types of cloud computing services	Highlands and Islands 2017 %	Highlands and Islands 2014 %	Scotland 2017 %	Scotland 2014 %
Storage of files	74	74	75	28
Office software such as word processors and spreadsheets	62	54	60	51
Email using a cloud computing service	56	75	61	73
Finance or accounting software applications	42	33	44	29
Hosting the organisation's database	35	33	41	39
System and network management	22	18	24	17
Infrastructure and computing power to run the organisation's own software	20	15	21	15
Customer Relationship Management Software	15	8	19	15
Base: All businesses who use cloud computing	357	417	1,117	1,000

Benefits

Almost all (99%) of those who use cloud computing reported that it had benefitted their business. The most frequently cited benefit was accessing data remotely (46%), followed by improved security (18%); resilience (17%); increased efficiency (16%); increased flexibility for staff (9%); and storage, space and capacity (8%).

These findings are consistent with Scotland, and with baseline regional data for 2014. There were no statistically significant variations among those businesses citing benefits.

Data analytics

Adoption and usage

When asked how important a role data analytics played in the operation of their business, around three in five (61%) said it played no role. This is higher than the comparable national average (56%), but presents a slight decrease in the level recorded in the Highland and Islands in 2014 (64%). A similar pattern was seen in Scotland, where those saying it played no role decreased from 61%. A third (35%) said it did play a large (8%) or small (27%) role in their business.

Certain types of business were more likely than others to use data analytics, namely:

- creative industries and tourism businesses (55% and 51% compared with 35% overall);
- those with 250+ employees (82% compared with 35% overall and 28% of those with 2-4 employees);
- international businesses (55% compared with 30% of domestic-only businesses).

In contrast, other types of business were more likely to say that data analytics played no role, namely:

- food and drink businesses (77% compared with 61% overall);
- those with 2- 4 employees (70% compared with 10% among 250+ businesses);
- private companies (63% compared with 41% among social enterprises);
- those operating exclusively in domestic markets (66% compared with 43% among international businesses).

Benefits

Eighty percent of those that used data analytics reported that it had benefitted their business. The top benefits of data analytics were more accurate and targeted marketing (32%); increased responsiveness to customers (19%); improved data quality (15%); increased competitiveness (8%); increased productivity (8%) and improved sales, turnover and profits (6%).

These findings are consistent with Scotland, and are broadly in line with 2014. However, in the Highlands and Islands there has been a slight increase in the proportion citing more accurate and targeted marketing by virtue of using data analytics between 2014 and 2017 (from 26% to 32%).

There were no statistically significant variations by business type.

Business management software solutions

Adoption and usage

Business management software was the least used of the digital technologies explored in the survey: only 11% of businesses had used these forms of software, similar to in 2014 when only 9% did so. The proportion using business management software was higher in Scotland overall, at 18% (an increase from 13% in 2014).

In terms of specific types, 6% had used Customer Relationship Management (CRM) Software, 5% had used Supply Chain Management Software, and 2% had used Enterprise Resource Planning (ERP) Software. Findings are mostly consistent with those for Scotland, bar the CRM software findings which are slightly lower than the comparable national average (6% in the Highlands and Islands compared with 14% in Scotland).

There were no statistically significant variations by business type except in relation to business size. The largest businesses (250+ employees) were more likely than the smallest (2-4) to use all three types of business management software explored in the survey:

- ERP software – (12% compared with 1%);
- CRM software – (10% compared with 4%);
- Supply Chain Management Software – (28% compared with 3%).

The vast majority of businesses (85%) stated that they were unlikely to adopt any business management software solutions in the next 12 months.

Benefits

Ninety percent of businesses that use management software solutions reported that these had benefitted their business. Half (49%) of those using business management software reported that these had helped to increase efficiency. Other benefits were: helping to collect vital customer data (19%); increasing responsiveness to customers (19%); increasing productivity (10%) and improving communication with suppliers (9%). These findings are consistent with Scotland as a whole, and also with Highlands and Islands baseline data from 2014.

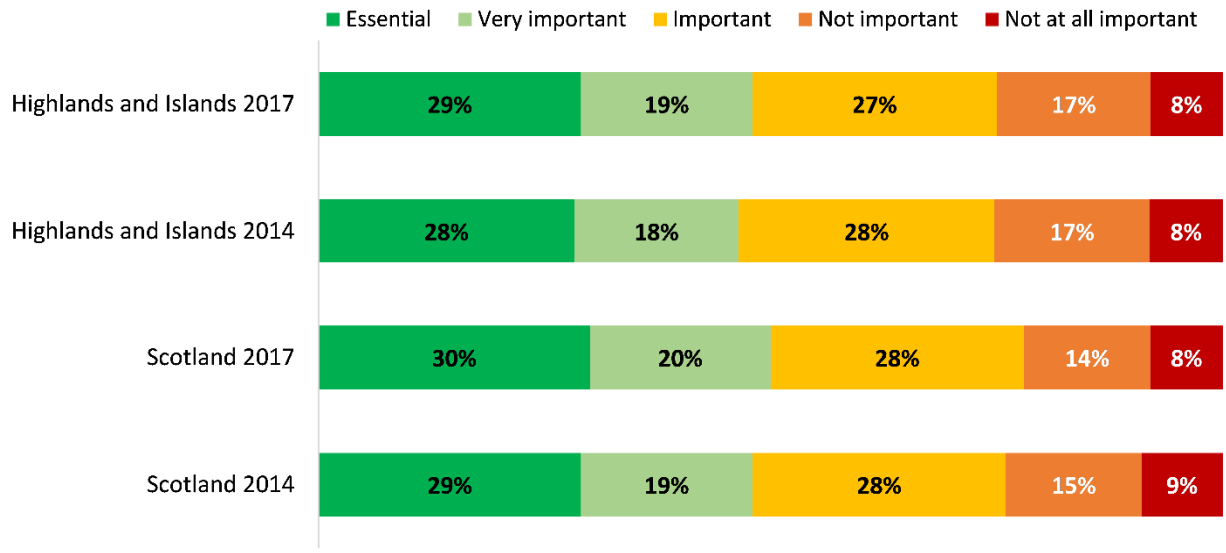
Overall importance of digital technologies

Three quarters (75%) of Highlands and Islands businesses deemed digital technologies to be essential (29%), very important (19%) or important (27%) to their current operation, while 25% felt they were not important/not at all important (Figure 2.7). Findings for Scotland were similar, with 78% saying that digital

technologies were essential/important. For both the Highlands and Islands and Scotland, findings were broadly in line with 2014.

Figure 2.7 – Overall importance of digital technologies to current business operations

Q: Overall, how important is digital technology to the current operations of your business?



Base: All businesses : Highlands and Islands (1,209) and Scotland (3,256)

To provide further insight, businesses were asked to rate how integral the use of digital technologies were to their business, using a scale of 1 to 10 where 1 means it would make little difference to the business if they did not use it, and 10 means it is a central part of how the business operates. For businesses in the Highlands and Islands, the overall mean score among all of the digital technologies explored in the survey was 6.2, similar to that seen in Scotland in 2017 (6.4) and the baseline findings for both areas in 2014 (6.0 in Highlands and Islands, 6.1 in Scotland) (Table 2.11). The mean importance scores for each individual digital technology were similar to Scotland, with the exception of mobile internet technologies and cloud computing which were comparatively lower (6.7 each compared with 7.2 each for Scotland).

Table 2.11 – Mean importance scores for each digital technology

Type of digital technology	**Highland and Islands Mean score 2017**	**Scotland Mean score 2017**	**Highland and Islands Mean score 2014**	**Scotland Mean score 2014**
Company website	6.0	6.1	6.3	6.0
Social media	5.6	5.6	5.0	4.8
Mobile internet technologies	6.7	7.2	6.5	6.8
Cloud computing	6.7	7.2	6.2	6.3
Data analytics	5.3	5.6	5.4	5.9
Business management software	6.6	6.8	6.9	7.0
Average	**6.2**	**6.4**	**6.0**	**6.1**
Base: All who used each digital technology				

Any variations in views on importance of each technology are outlined below:

Importance of a company website

Reflecting the findings on adoption and usage, tourism and creative industries businesses had a statistically higher than average mean score in terms of the importance of a company website to business operations (7.8 and 6.9 respectively compared with 6.0 overall). Those operating in international markets had a higher mean score than those operating exclusively in domestic markets (7.2 compared with 5.2 among those operating exclusively in domestic markets).

Importance of social media

In terms of social media, there was statistically significant variation by business size in relation to its overall importance. Reflecting earlier patterns on usage of digital technologies, those with 250 or more employees had a higher than average mean score on importance (6.3 compared with 5.6 overall). Similarly, social enterprises (7.2) had a higher mean score than private companies (5.3).

Mobile internet technologies

Businesses in non-fragile areas were more likely than those in fragile areas to report that mobile and internet technologies were important to their business (6.8 compared with 5.8 among businesses in fragile areas).

Cloud computing

There were no statistically significant variations by different types of business with respect to the cloud computing findings.

Data analytics

Food and drink businesses had a lower than average mean score when rating the overall importance of data analytics to their business (4.4 compared with 5.3 overall). The converse was true of those with 250+ employees who had a mean score of 6.6.

There was further variance in findings by fragile areas and those operating in international versus domestic markets:

- those in non-fragile areas had a higher mean score than those in fragile areas (5.4 compared with 4.5 in fragile areas);
- similarly, those operating in international markets had a higher mean score than those operating exclusively in domestic markets (6.1 compared with 4.9 in domestic markets).

Business management software

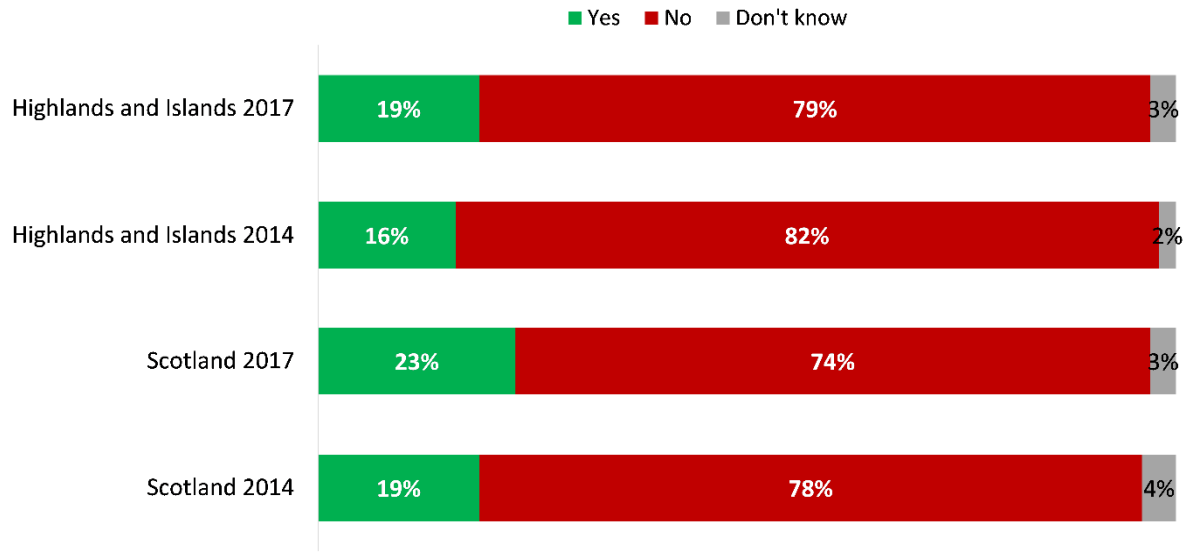
There were no statistically significant variations by different types of business with respect to the business management software findings.

Applications of digital technology

Eight in ten businesses (79%) did not have a specific plan or strategy for their use of digital technology in operational delivery, slightly higher than the comparable national average (74%). Findings for the Highlands and Islands were slightly lower than in 2014 (82%), as were those in Scotland (78%).

Figure 2.8 – Strategy for the use of digital technologies

Q: Does your business have a specific plan or strategy for its use of digital technology in delivering the business?



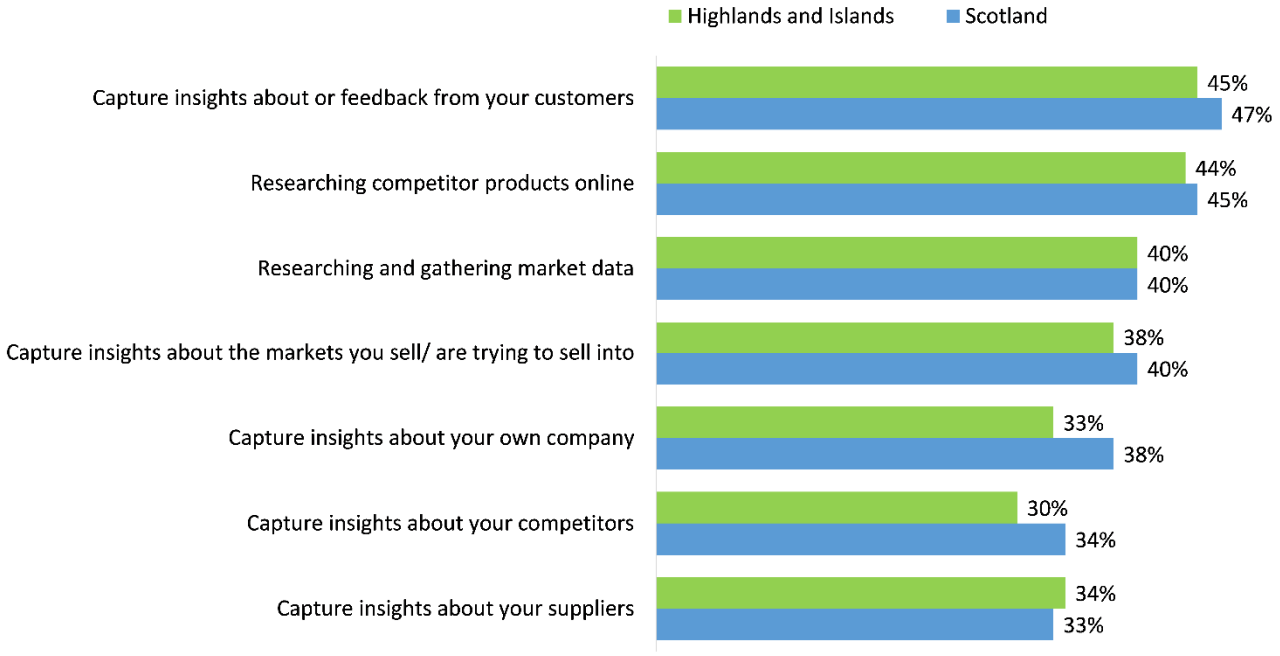
Base: All businesses that use any technology: Highlands and Islands 2017 (1,131) and Scotland 2017 (3,060), Highlands and Islands 2014 (1,981) and Scotland 2014 (3,676)

In terms of variation by type of business, the most marked difference was by organisation size. At the larger end of the scale, 67% of businesses with 250+ employees had a plan or strategy in place, compared with only 13% of those with 2 to 4 employees. There was further variation by sector, with creative industries (34%) and financial and business services (32%) both more likely than average (19%) to have a plan in place, while those operating in international markets were more likely than domestic-only businesses to have one (31% compared with 15%).

Notwithstanding these findings, 74% of those that used digital technologies did so in order to guide development of products and services, suggesting a high level of exploitation of these technologies. More specifically, 45% reported that they used digital technologies to capture insights or feedback from customers, and a similar proportion (44%) to research competitor products. Moreover, two-fifths (40%) used digital technologies to research and gather market data, while around a third used them to capture insights about their own company (33%), their suppliers (34%), and their competitors (30%). Findings for the Highlands and Islands are consistent with those for Scotland (Figure 2.9).

Figure 2.9 – Use of digital technologies to gain insights which guide development of products or services

Q: Have you or do you use digital technologies in any of the following ways to gain insights which guide the development of you products or services?



Base: All businesses who used any digital technology: Highlands and Islands (1,131) and Scotland (3,060)

The following types of business were more likely than others to have used digital technologies in *any* way to guide development of products and services:

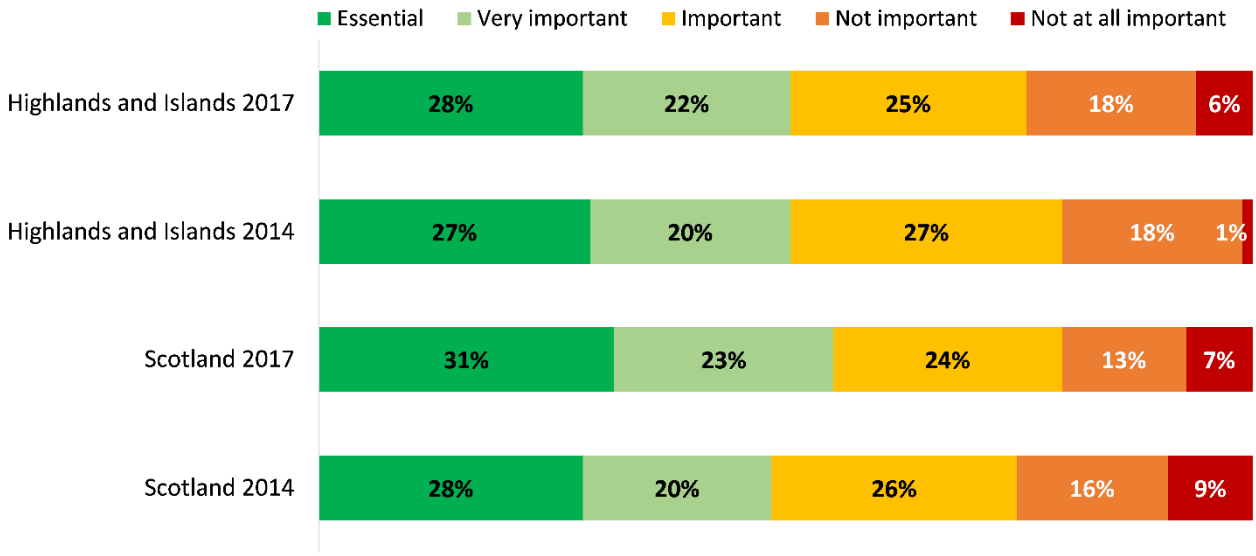
- tourism businesses (81%) were more likely than financial and business services (60%) businesses;
- those in the sample with 250+ employees (100%) were more likely than those with 2-4 employees (76%);
- businesses that operate in international markets (84%) were more likely than those operating exclusively in domestic markets (73%).

Future use of digital technologies

Views on future importance of digital technologies were similar to those on its current importance. As shown in Figure 2.10, three quarters (75%) said that digital technologies were essential (28%), very important (22%) or important (25%) to the future growth or competitiveness of their business. The remaining quarter (24%) felt it was not important (18%) or not at all important (6%). A higher proportion of businesses in the Highlands and Islands reported that digital technologies were not important to their future in comparison with Scotland overall (18% compared with 13%). Otherwise, findings were similar to those of Scotland, and both areas were in line with baseline findings from 2014.

Figure 2.10 – Overall importance of digital technologies to future business operations

Q: And how important is digital technology to future growth or competitiveness of your business?



Base: All businesses : Highlands and Islands (1,209) and Scotland (3,256)

There is a correlation between views on current and future importance. As shown in Table 2.12, 81% of those who thought digital technology was essential to their current business also thought it was essential for their future. At the other end of the scale, 63% of those who though it was not at all important currently, felt the same about its importance to their future operations.

Table 2.12 – Future importance of digital technology by current importance

	Current importance				
Importance to future	**Essential (%)**	**Very important (%)**	**Important (%)**	**Not important (%)**	**Not at all important (%)**
Essential	81	15	4	1	-
Very important	10	69	19	5	2
Important	6	11	63	21	2
Not important	1	4	12	66	31
Not at all important	1	*	2	5	63
Base: All businesses (1,209) ('don't knows' are not shown)					

In terms of aspirations to develop or use more of each of the digital technologies in the next 12 months, there was a sliding scale of intent, ranging from 57% hoping to do more with their website, to 22% with business management software (Table 2.13).

Table 2.13 – Future plans for each digital technology

	Hope to develop/use more in next 12 months		
	Yes %	No %	Don't know %
Company website	57	40	2
Social media	56	42	2
Mobile internet technologies	49	47	3
Cloud computing	29	64	6
Data analytics	25	68	7
Business management software	22	72	6
Base: All businesses (1,209)			

There was no significant variation in future aspirations to develop or use more digital technologies by type of business.

When comparing future aspirations with current use of each digital technology, current users of the technology are more likely than non-users to have plans to develop their use more in the next 12 months. For example, 77% of those who use social media hope to use it more, compared with 20% of that do not currently use it, and 62% of cloud computing users aspire to use it more, compared with only 16% of non-users. However, these findings also suggest that a proportion of non-users may become users of digital technologies in the future, as they hope to develop or use these technologies more in the next 12 months. That proportion varies between 12% for data analytics and 30% for company websites (Table 2.14).

Table 2.14 – Future plans for each digital technology, by use and non-use of each

	% saying they hope to develop/use more in next 12 months	
	% of those who currently use technology	% of those who do not currently use technology
Company website	75	30
Social media	77	20
Mobile internet technologies	61	23
Cloud computing	62	16
Data analytics	51	12
Business management software	56	17
Base: All who use and don't use each technology		

3. TRADE, ONLINE PLATFORMS AND PUBLIC SERVICES

The survey explored the extent to which digital technology had an impact on the way businesses conduct trade. This included: the level of international trade carried out by businesses, and how that varied depending on their digital engagement; the level of e-commerce activity, or sales made via the internet; operation of and use of online collaborative platforms; and the extent to which businesses engaged public services online. Each of these topics are explored in turn in this section.

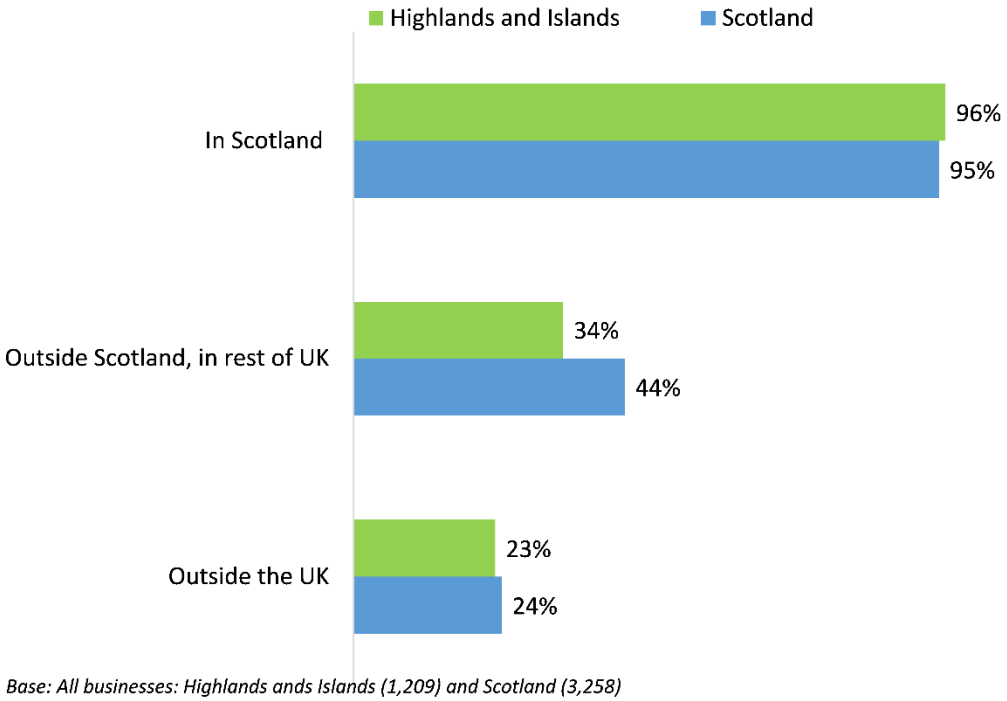
Internationalisation

Markets operated in

A vast majority (96%) of businesses in the Highlands and Islands sold goods or services in Scotland, in line with the findings for all Scottish businesses (95%). Around two thirds (63%) only sold in Scotland and not in other markets (these are referred to as 'domestic businesses'), higher than the proportion for all Scottish businesses (54%). A third (34%) of businesses in the Highlands and Islands sold goods or services outside of Scotland but in the rest of the UK, lower than the comparable figure for all Scottish businesses (44%) (these are referred to as 'rUK businesses'). A quarter of businesses in the Highlands and Islands (23%) and Scotland (24%) sold goods or services outside of the UK (Figure 3.1) (these are referred to as 'international businesses'). The proportion of international businesses in the Highlands and Islands increased from the 17% recorded in 2014[9], and the proportion in Scotland increased from 18%.

Figure 3.1 – Markets currently operated in

Q: In which of these markets does your business currently sell goods or services?



Base: All businesses: Highlands ands Islands (1,209) and Scotland (3,258)

[9] The question wording used in 2014 differed from that used in 2017. In 2014, businesses were asked *"Does your business sell goods or services or licence your product outside the UK?*", with the option of saying "*Yes", "No"* or *"Don't Know."*

Certain types of business were more likely than other to operate in each market.

- Domestic businesses, were higher than average (63%) among food and drink businesses (72%).
- rUK businesses, were higher than average among:
  - those operating in the creative industries (80%) and tourism (55%) sectors:
  - large businesses (250+ employees) (56%):
  - those in Lochaber Skye and Wester Ross (44%)[10].

- International businesses had a similar profile to rUK businesses and were higher than average among:
  - those operating in the creative industries (72%) and tourism (56%) sectors:
  - large businesses (250+ employees) (46%):
  - those in Lochaber Skye and Wester Ross (38%).

Looking at international businesses specifically, there was a correlation between selling goods internationally and having digital technologies in place. As shown in Table 3.1, those with each digital technology in place were more likely to sell outside the UK than those without the technology. For example, 33% of those who have a website sold internationally, compared with 7% of those without a website.

Table 3.1 - % selling outside of the UK, by whether or not they use each digital technology

	Use technology	**Do not use technology**	***Base***
Digital technology	% selling outside UK	% selling outside UK	
Website	33	7	*753*
Social media	30	11	*763*
Mobile internet and technology	26	17	*842*
Cloud computing	34	19	*355*
Data analytics	35	16	*431*
Business function, management or efficiency software	34	22	*137*
Base: All using each digital technology			

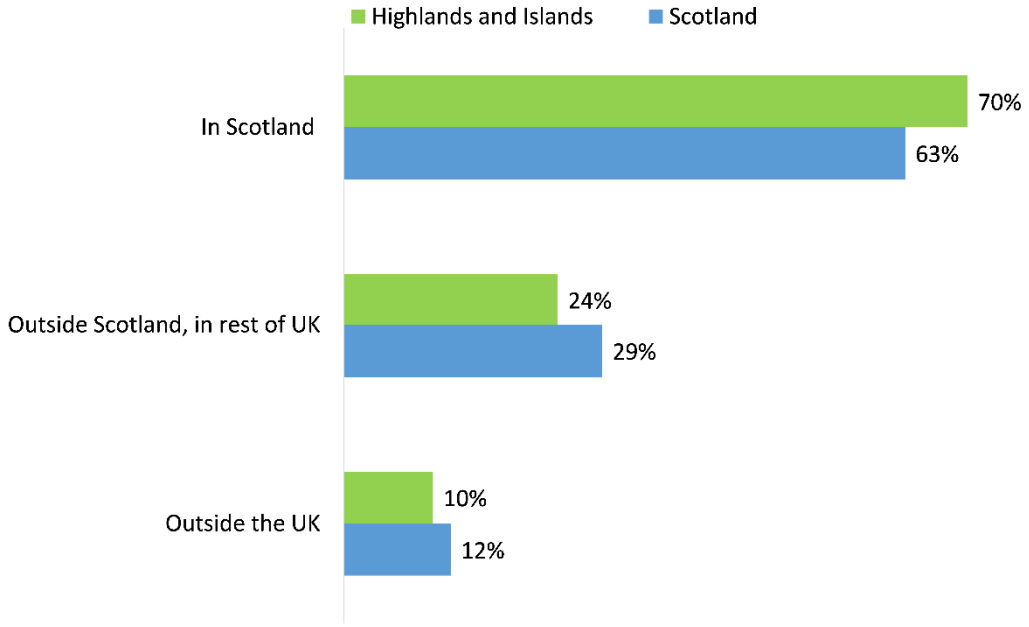
Markets in which most sales were made

Businesses that operated in more than one market were asked which market they made most sales in. A majority (70%) made most of their sales in Scotland, while a quarter (24%) made most sales in the rest of the UK and one in ten (10%) made them outside of the UK. These findings are comparable with those of Scotland as a whole, although the proportion selling mainly to Scotland is higher in the Highlands and Islands (70% compared with 63%).

[10] When interpreting this difference, it is important to note the profile of businesses from these areas who took part in the survey. The sample of businesses in Lochaber, Skye and Wester Ross contained a higher proportion of tourism businesses than the overall sample (22% of businesses in the region compared with 9% overall). Higher proportion of rUK and international businesses in this region may therefore be linked to confidence among tourism businesses.

Figure 3.2 – Market in which most sales were made[11]

Q: In which of these markets do you make most of your sales?



Base: All businesses who operate in more than one market: Highlands and Islands (425) and Scotland (1,367)

Examining the market in which most sales were made by the specific markets operated in, there is little variation from the overall findings shown in Figure 3.2. The only exception is among those operating outside of the UK, who were less likely than average to make most of their sales in Scotland (56% compared with 70%) and more likely to make most of their sales in the rest of the UK (33% compared with 24%) and outside the UK (17% compared with 10%) (Table 3.2).

Table 3.2 – Market in which most sales were made, but markets operated in

	Markets operated in		
Market in which most sales are made	**Operating in Scotland %**	**Operating in rUK %**	**Operating outside UK %**
Scotland	70	70	56
Outside Scotland, in rest of UK	24	25	33
Outside UK	10	10	17
Base: All businesses operating in each area			

Reflecting their higher likelihood of selling internationally, tourism businesses and those based in Lochaber, Skye and Wester Ross[12] were more likely than average to make most of their sales outside the UK (32% and 24% respectively compared with 10% overall). Otherwise, there were no significant variations by type of business.

[11] Note this was a multi-code response: businesses could choose more than once answer, in case they made equal proportion of sales in the markets asked about and therefore no single market was where they made "most" sales

[12] As noted earlier, findings for Lochaber, Skye and Wester Ross may reflect the higher than average proportion of tourism businesses in this region

Likelihood of operating in new markets in the future

Of the businesses that did not operate outside of Scotland, most were unlikely to start doing so in the next 12 months: 92% were unlikely to start selling to the rest of the UK, and 95% were unlikely to start selling outside of the UK. These findings were in line with those seen among businesses in Scotland as whole (92% and 94% respectively).

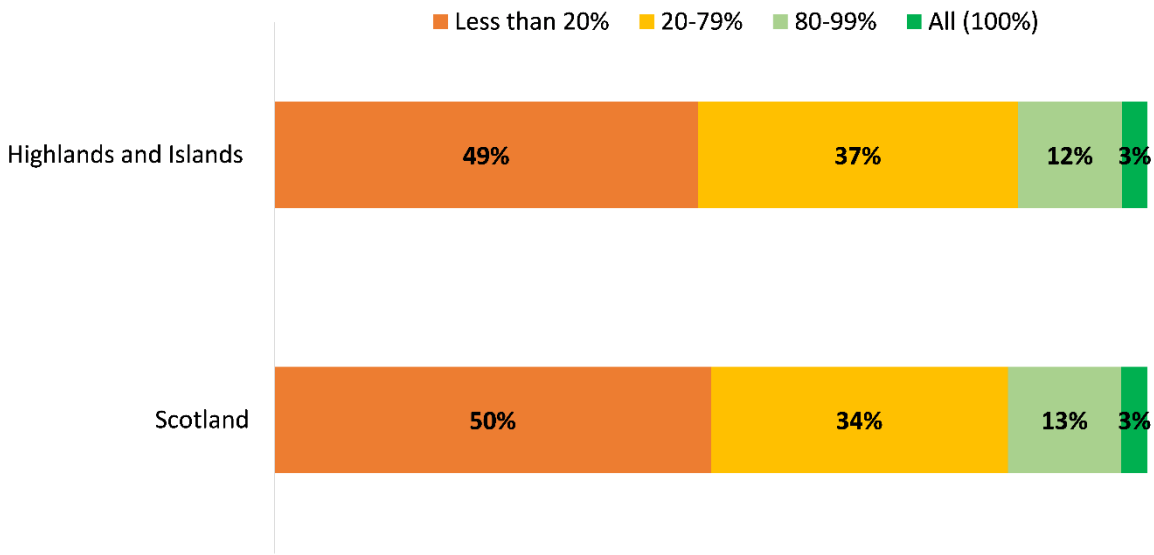
E-commerce

Use of e-commerce

Two thirds of businesses (65%) did not currently sell via e-commerce, while 32% did. Among those who did practice e-commerce, sales tended to be in small volumes: 49% of those that sold this way said it accounted for less than 20% of their overall sales, while only 3% said it accounted for all of their sales. The level of e-commerce activity was in line with that of Scotland overall (Figure 3.3).

Figure 3.3 – Proportion of sales made via e-commerce

Q: What proportion of your organisation's sales are made via e-commerce?



Base: All businesses who sell via e-commerce, excluding 'don't knows': Highlands and Islands (407) and Scotland (1,006)

In terms of growth sector, e-commerce was higher among those working in tourism (61%) and creative industries (59%) (Table 3.3). Businesses in Lochaber, Skye and Wester Ross[13] also demonstrated a greater level of trade activity than other businesses, being more likely than average to sell via e-commerce (48% compared with 32% overall).

[13] As noted earlier, findings for Lochaber, Skye and Wester Ross may reflect the higher than average proportion of tourism businesses in this region

Table 3.3 – Use of e-commerce, by growth sector[14]

	Sell via e-commerce (%)	*Base*
All	32	*1,209*
Tourism	61	*106*
Creative industries	59	*42*
Non-growth	29	*703*
Financial and business services	29	*92*
Food and drink	21	*242*
	(N)	
Energy	3	*22*
Life sciences	1	*2*
Base: All businesses (don't knows' are not shown)		

International businesses and rUK businesses were more likely than average to use e-commerce (66% and 55% compared with 32%), and more likely than those operating only in Scotland (20%) (Table 3.4).

Table 3.4 – Use of e-commerce by markets operated in

	Sell via e-commerce (%)	*Base*
All businesses	32	1,209
Operate in Scotland only	20	754
Operate outsides Scotland, in rest of UK	55	424
Operate outside the UK	66	277
Base: All businesses (don't knows' are not shown)		

Unsurprisingly, e-commerce was higher among those with a company website, with 43% of these businesses having sold via the internet. However, it is worth noting that 15% of those without a company website did carry out e-commerce, doing so through third party or intermediary online resources (see section below on e-commerce platforms). As we saw with international sales, e-commerce was also higher among those businesses that were engaged with each aspect of digital technology. For example, 42% of those who used social media also used e-commerce, compared with 15% of those who did not use social media (Table 3.5).

[14] As the base size for Energy and Life Sciences is less than 30, the number of responses (rather than percentages) are shown. As number of responses have been weighted, the base size shown for these sectors are the weighted, rather than unweighted, base.

Table 3.5 – Use of e-commerce by whether or not they use each digital technology

	Use technology	Do not use technology	*Base*
Digital technology	% selling via e-commerce	% selling via e-commerce	
Website	43	15	*753*
Social media	42	15	*763*
Mobile internet and technology	35	25	*842*
Cloud computing	40	29	*355*
Data analytics	47	24	*431*
Business function, management or efficiency software	50	30	*137*
Base: All using each digital technology			

For most businesses (73%), the level of e-commerce carried out had remained about the same level compared to 2-3 years ago. However, 19% had seen e-commerce sales increase, while only 2% had seen them decrease.

Increases in sales were more prevalent in the sectors and locations that carried out a larger amount of e-commerce, namely those in the tourism (38% noted increased sales) and creative industries (30%) sectors and those in Lochaber, Skye and Wester Ross[15] (27%).

E-commerce platforms

Among those using e-commerce, the most common platform for doing so was their own website (70%), followed by digital marketplaces or platforms such as Amazon, Ebay, Etsy or Alibaba (28%). Findings for the Highlands and Islands were broadly in line with those for Scotland (Table 3.6), however the proportion using their own website was lower in the region (70% compared with 74%) while the proportion using social media was higher (7% compared with 3%).

Table 3.6 – Platforms used for e-commerce activity

	Highlands and Islands (%)	Scotland (%)
Own website	70	74
Digital marketplace or platform, such as Amazon, Ebay, Etsy or Alibaba	28	29
Social networks/media	7	3
Specialist/industry specific websites	5	4
Booking.com	3	1
Airbnb	1	*
Email	1	2
Trip Advisor	1	*
Online banking	1	1
Paypal	1	*
Other	7	8
Base: All businesses who use e-commerce	*407*	*1,006*

[15] As noted earlier, findings for Lochaber, Skye and Wester Ross may reflect the higher than average proportion of tourism businesses in this region

Of those who used their own websites for e-commerce, 18% had tailored their website for international markets (for example, by offering different language options or product ranges) while 81% had not. The proportion that *had* tailored their websites was higher among international businesses (27%), which is in line with findings from 2014 (32% - the five percentage point difference is not statistically significant). No social enterprises in the sample had tailored their websites for e-commerce.

Reasons for not using e-commerce

Among those businesses that did not sell via e-commerce (65%), the main reason for not doing so was that they felt it was not relevant to their business (83%). Other reasons noted, albeit by small minorities, included that the business was too small (5%), a lack of time to implement e-commerce functions (2%), lack of understanding (2%) and lack of skills within the organisation to do so (2%). These findings were in line with Scotland as a whole (Table 3.7).

Table 3.7 – Reasons for not using e-commerce (top ten responses)

	Highlands and Islands (%)	**Scotland (%)**
Not relevant to the business	83	82
Business is too small	5	5
Lack of time to implement	2	2
Don't understand it/wouldn't know how to	2	2
Lack of skills in the organisation	2	2
Currently under development	2	2
Prefer current business model (face to face/phone)	2	2
Don't need to/want to	2	2
There is enough work without it	1	1
Base: All businesses who do not sell via e-commerce	*764*	*2,132*

E-commerce for international business

Opinion was split among those using e-commerce on the impact it had on international trade. When asked whether e-commerce had increased the number of international markets they were able to export to, 38% of businesses agreed while 30% disagreed (25% neither agreed nor disagreed) (Figure 3.4). This reflected findings for Scotland as a whole.

Figure 3.4 – Impact of e-commerce on international exports

Q: To what extent do you agree or disagree that your use of e-commerce has increased the number of international markets you are able to export to?

Base: All businesses who sell via e-commerce: Highlands and Islands (407) and Scotland (1,006)

Among e-commerce businesses, more than two fifths (44%) had faced challenges delivering international e-commerce services. This included logistics (5%); customs or other regulations (5%); costs, including shipping and postage (5%); ensuring the appropriate technical infrastructure was in place (4%); a need for better advertising or marketing (4%); and issues with internet connection (4%) (Table 3.8). A fifth of e-commerce businesses (22%) said they faced no challenges in delivering international e-commerce. Findings were comparable with Scotland overall.

Table 3.8 – Challenges faced in delivering international e-commerce (top 10 responses)

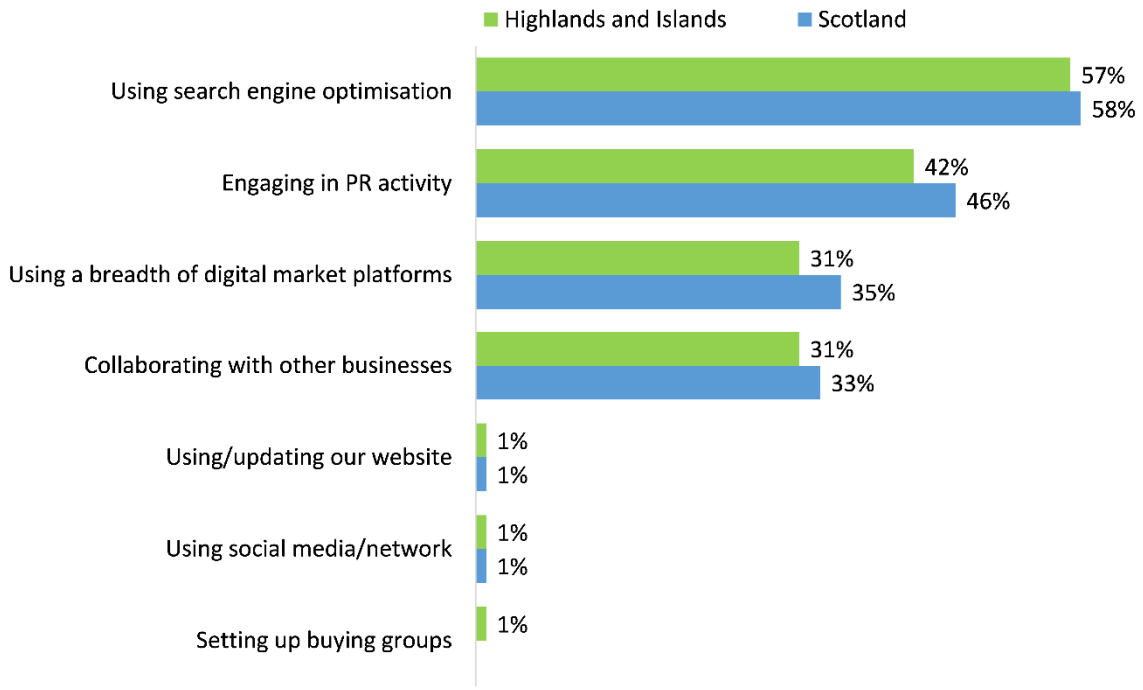
	Highlands and Islands	Scotland
Challenges	%	%
Logistics/reverse logistics	5	6
Customs or other regulations	5	5
Costs/shipping/postage costs	5	4
Ensuring appropriate technical infrastructure is in place	4	3
A need for better advertising/marketing	4	3
Internet connection issues/slow broadband	4	3
Ensuring translation is appropriate	1	3
Competition	3	2
Tariffs	3	2
Payment methods including refunds	2	2
Base: All businesses using e-commerce	*407*	*1,006*

Future use of e-commerce

Businesses using e-commerce demonstrated an appetite to grow this aspect of their operations and most were actively taking steps to maximise their digital presence and support their e-commerce activity. This included using search engine optimisation (57%), engaging in PR activity around this aspect of their business (42%), using a breadth of digital market platforms (31%) and collaborating with others to achieve cost savings (31%) (Figure 3.5).

Figure 3.5– Steps taken to maximise digital presence and support e-commerce

Q: Which of the following steps, if any, are you taking to maximise your digital presence and support your e-commerce activity?



Base: All businesses who sell via e-commerce: Highlands and Islands (407) and Scotland (1,006)

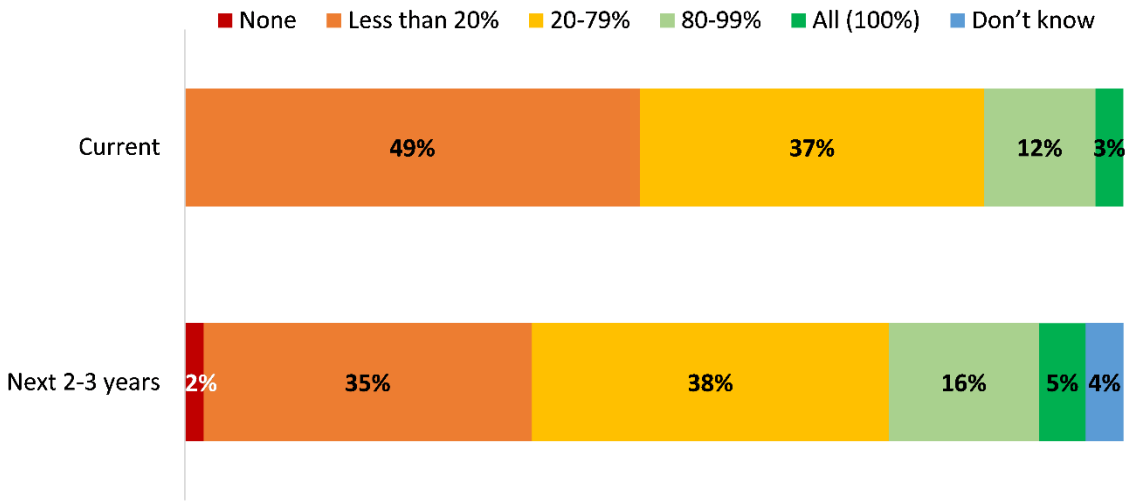
Large businesses (250+ employees) were more likely than average to be taking certain steps to maximise their digital presence, namely: using search engine optimisation (87% compared with 57% overall); collaborating with other businesses (87% compared with 31%); engaging in PR activity (69% compared with 42%); and using a breadth of digital market platforms (69% compared with 31%).

International businesses were also more likely than those not operating internationally to be: using search engine optimisation (62% compared with 52%); engaging in PR activity (52% compared with 34%); and using a breadth of digital market platforms (45% compared with 19%).

In terms of future sales, the majority (94%) of those who conducted e-commerce expected to continue to do so in the next 2-3 years, and at higher volumes than currently. For example, 21% expected e-commerce to account for more than 80% of their overall sales in future, compared with 15% who said it accounted for this amount currently. Similarly, 35% expected e-commerce to make up less than 20% of their sales, compared with 49% who said it made up this amount currently (Figure 3.6). A minority (2%) looked to be ceasing e-commerce activity, reporting that they expected e-commerce to make up none of their sales in the next 2-3 years.

Figure 3.6 – Current vs expected proportion of future e-commerce over next 2-3 years.

Q: What proportion of your organisation's sales are made via e-commerce?
Q: What percentage of your sales do you expect to conduct via the internet or e-commerce over the next 2-3 years



Base: All businesses who sell via e-commerce (407)

Collaborative economy

Only a small minority of businesses (4%) operated as an online collaborative platform, while the majority (94%) did not. This is in line with the findings for Scotland as a whole (3% and 95% respectively). Collaborative economy businesses were more prevalent in the tourism sector (10%) and in Lochaber, Skye and Wester Ross[16] (11%).

The use of online collaborative platforms, such as Airbnb, Liftshare and Uber, was also uncommon: 92% did not use these platforms, while 7% did, the same findings as for Scotland. Businesses in the tourism sector were more likely than others to have used online collaborative platforms (16%).

Among those that operated as, or used online collaborative platforms, the most commonly mentioned benefits of doing so were: reaching new markets (26%), business travel being made easier or less expensive (25%), increasing sales (21%), accessing a wider range of professional services (17%) and enabling innovative approaches to conducting business (12%) (Table 3.9). The top benefits for businesses in the Highlands and Islands are in line with those for Scotland as a whole (any apparent variation between the two areas are not statistically significant).

There was no significant variation in views of the benefits of using collaborative platforms by different types of business.

[16] As noted earlier, findings for Lochaber, Skye and Wester Ross may reflect the higher than average proportion of tourism businesses in this region

Table 3.9 – Benefits of using online collaborative platforms (top 10 responses)

	Highlands and Islands	Scotland
Benefits	%	%
Reaching new markets	26	23
Business travelling is easier or less expensive	25	34
Increasing sales	21	16
Accessing wider range of professional services	17	15
Enabling innovative approaches to conducting business	12	10
Ease of use/convenience/simplicity	4	8
Financial controls/cost saving	4	10
Increasing exposure/advertisement/marketing	4	2
Better customer experience	4	1
Sharing information	3	4
Base: All businesses operating as/using online collaborative platforms	*110*	*285*

Digital public services

The survey measured engagement with online public services by exploring use of Scottish Government, Scottish Local Authority or Scottish Government agency websites. Overall, 45% had used these websites to obtain or read information, 43% to return filled in forms electronically, 36% to obtain printable forms, and 33% to carry out a transaction digitally. Online engagement for each was higher for businesses in the Highlands and Islands, than was reported for Scotland overall.

However, compared with 2014, there has been a decrease in most forms of engagement in both the Highlands and Islands and in Scotland overall. The exception to this was digital transactions which has stayed at the same level in both areas (Table 3.10).

Table 3.10 – Engagement with public services online

	Highlands and Islands 2017	Highlands and Islands 2014	Scotland 2017	Scotland 2014
Engagement with public services online	%	%	%	%
Obtaining or reading information	45	57	35	52
Returning filled-in forms electronically	43	48	33	36
Obtaining printable forms	36	41	26	42
Carry out transactions digitally	33	33	25	28
Base: All businesses	*1,209*	*2,193*	*3,258*	*4,002*

Food and drink businesses were more likely than average to have used public services online for each purpose: to return filled-in forms (64% compared with 43%), obtain or read information (61% compared with 45%), obtain printable forms (50% compared with 36%), and carried out transactions digitally (47% compared with 33%).

Larger businesses (250+ employees) were also more likely than average to have engaged with public services online for each purpose: 75% had done so to obtain or read information (compared with 45%); 56% to return filled-in forms (compared with 43%); 50% to obtain printable forms (compared with 36%) and 45% to carry out transactions digitally (compared with 33%).

The survey specifically asked about use of the mygov.scot website. Two-fifths (41%) had used the website for business purposes in the last 12 months, higher than Scotland overall (34%). The main reasons given for using the mygov.scot website were to find out information or advice (57%), or to apply for a service or an entitlement (21%). These figures are consistent with those for Scotland overall.

4. CYBER RESILIENCE

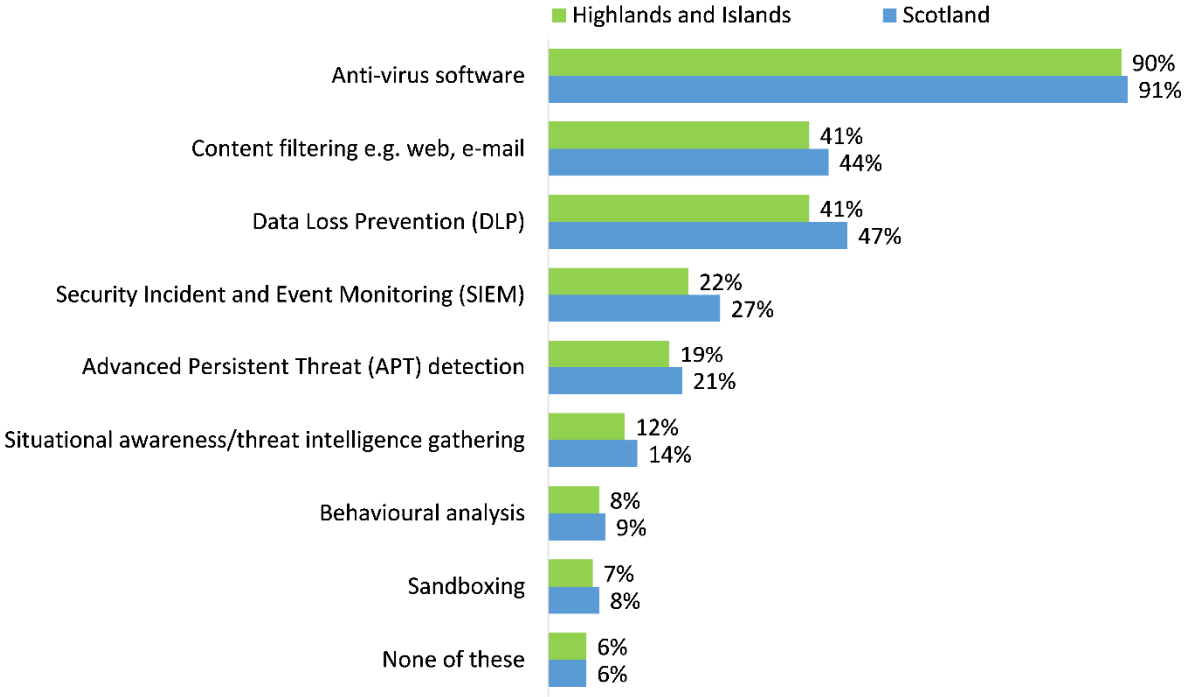
Businesses were asked about their cyber resilience, or how they protect themselves from cyber security threats when conducting business online. These topics were not covered in the 2014 survey.

Technologies and technical controls used

The majority of businesses (92%) had used some form of cyber security technology. Most had used anti-virus software (90%), while smaller proportions had used Data Loss Prevention (DLP) (41%), content filtering (41%) and Security Incident and Event Monitoring (SIEM) (22%). Findings were broadly in line with those for Scotland, with the exception of DLP and SIEM, which were less commonly used in the Highlands and Islands than in Scotland overall (41% and 22% compared with 47% and 27% respectively (Figure 4.1).

Figure 4.1 – Cyber security technologies used

Q: Does your organisation have in place any of the following cyber security technologies?

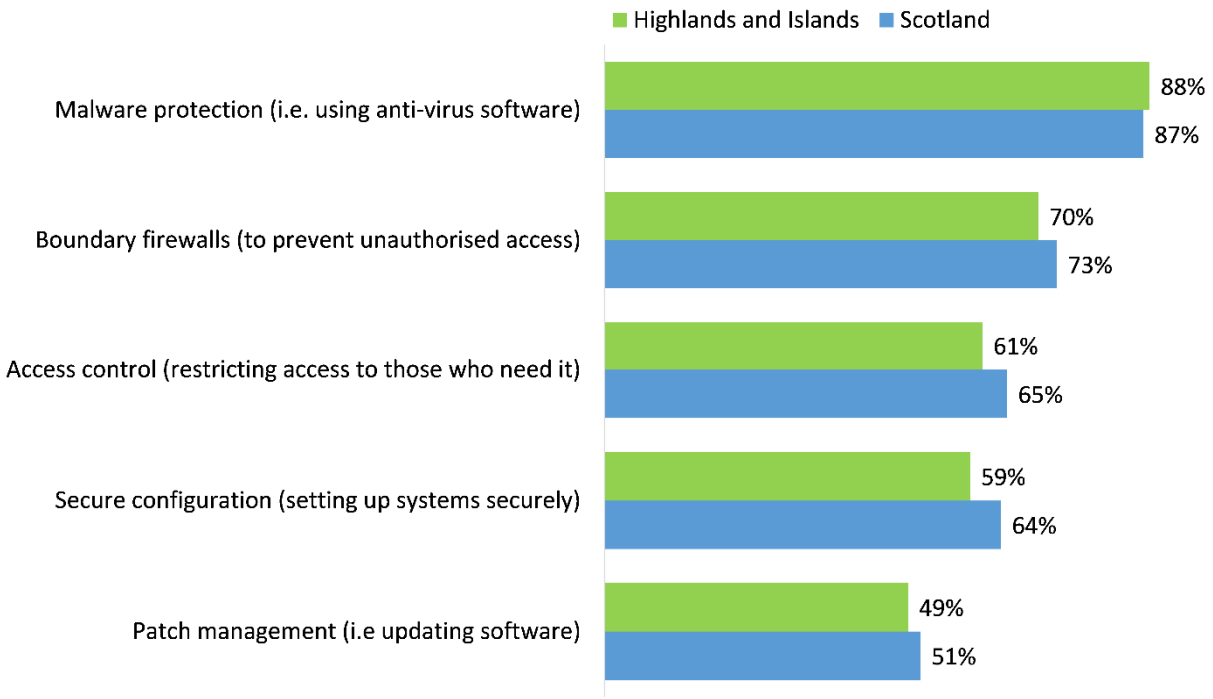


Base: All businesses: Highlands and Islands (1,209) and Scotland (3,258)

The majority (91%) of businesses had also used some form of technical controls to help manage their cyber security. The most common of these was malware protection (88%) and the least common was patch management (49%) (Figure 4.2). Again, findings were broadly in line with those for Scotland, with the exception of access control (61%) and secure configuration (59%), which were both less used in the Highlands and Islands than in Scotland (67% and 64% respectively). There were no significant differences by type of business.

Figure 4.2 – Cyber security technical controls used

Q: Which of the following technical controls does your organisation apply?



Base: All businesses: Highlands and Islands (1,209) and Scotland (3,258)

Cyber security accreditation

In spite of the majority having used cyber security technologies and technical controls, only a minority (9%) had cyber security accreditation (in line with 10% in Scotland overall). There was little variation by type of business, with the exception of tourism businesses who were more likely than others to have accreditation (21%).

The majority of businesses (64%) did not know what specific type of cyber security accreditation they had - 14% did report that they had Cyber Essentials accreditation, while 6% had Cyber Essentials Plus. Among those that did not have cyber security accreditation, most (87%) did not plan to obtain this in the next 12 months (in line with 84% in Scotland), while only 6% did plan to.

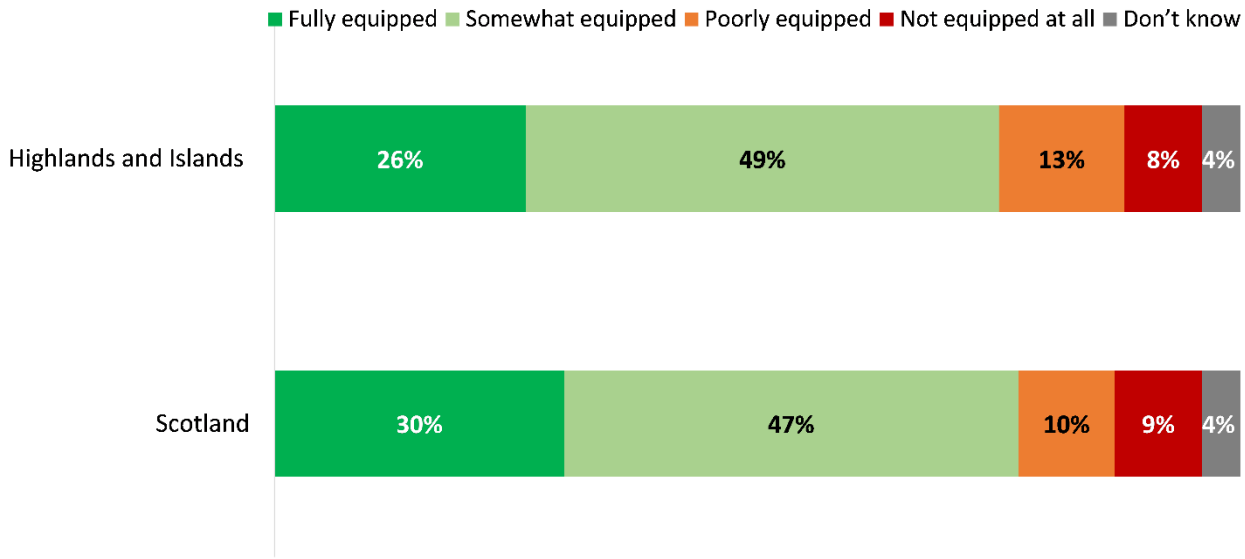
Skills within the organisation

Seven in ten businesses (70%) were not fully equipped with the skills to protect against and deal with cyber security threats. Around half (49%) did feel they were somewhat equipped, while one in five (21%) described themselves as either poorly (13%) or not equipped (8%) (Figure 4.3).

A quarter of businesses (26%) felt that they were fully equipped with the relevant skills within their team to protect against and deal with cyber security threats,

Figure 4.3 – Extent to which businesses felt equipped to deal with cyber security threats

Q: To what extent do you feel that your organisation is equipped with the relevant skills within your team to protect against and deal with cyber security threats?



Base: All businesses: Highlands and Islands (1,209) and Scotland (3,258)

There was little variation by type of business, however, those in the creative industries sector were more likely than average to feel fully/somewhat equipped (86% compared with 75% overall). Elsewhere, those in Shetland were more likely than average to be poorly equipped or not equipped at all (31% compared with 21% overall).

There was correlation between cyber resilience and digital engagement: those using fewer digital technologies were more likely to be poorly equipped/not equipped than those using a greater number of digital technologies (Table 4.1).

Table 4.1 - Extent to which businesses felt equipped to deal with cyber security threats, by number of digital technologies used

	Number of digital technologies used			
	None	**1-2**	**3-4**	**5-6**
Extent to which they felt equipped	%	%	%	%
Fully/somewhat equipped	59	71	78	87
Poorly/not at all equipped	24	26	19	11
Don't know	18	4	3	2
Base:	*85*	*483*	*474*	*167*

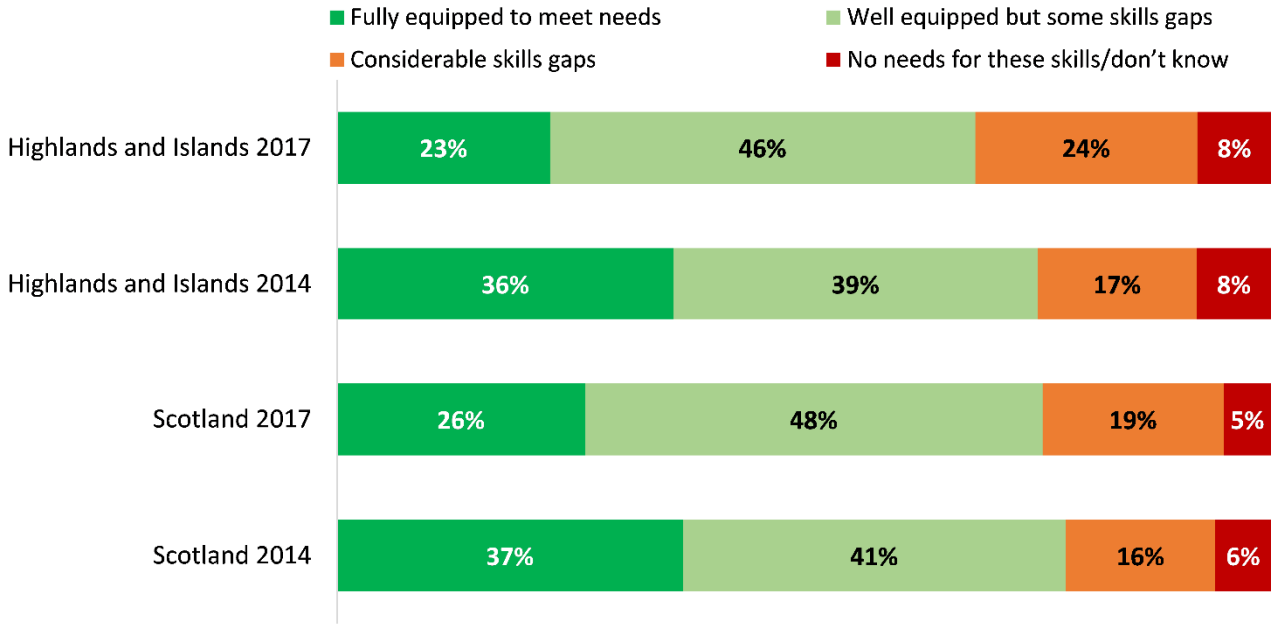
5. DIGITAL SKILLS

Extent of digital skills gaps

Findings point to a continued digital skills gap among businesses in the Highlands and Islands. Only 23% said they were fully equipped to meet their business's digital technology needs, in line with the findings for Scotland overall (26%). The proportion that were fully equipped was lower than that recorded in the Highlands and Islands in 2014 (36%), a pattern that was also seen in Scotland as a whole (decreasing from 37% to 26%). This decrease may reflect the changing nature of digital needs between 2014 and 2017, with advances in digital technology during this time period creating demand for new types of skills. Indeed, as shown in Figure 5.1, a quarter of businesses (24%) said they were not very well equipped and have considerable skills gaps, up from 17% in 2014. A similar pattern was seen in Scotland, where the proportion who were not very well equipped increased from 16% to 19%.

Figure 5.1 – Digital skills gaps

Q: Across your staff as a whole, would you say your staff are…?



Base: All businesses: Highlands and Islands (1,209) and Scotland (3,258)

Those working in the financial and business services sector appeared better equipped than others: 32% said they were fully equipped to meet their technology needs, compared with 23% overall, and only 11% said they had considerable skills gaps compared with 24%.

Turning to variation by size, smaller businesses were more likely than larger business to say they had considerable skills gaps. For example, 26% those with 2-4 employees had considerable skills gaps compared with 10% of those with 250+ employees. In contrast, the largest businesses (250+) were more likely than others to say that they were well equipped but with some skills gaps (76% compared with 46% overall and 41% of those with 2-4 employees) (Table 5.1).

Table 5.1 – Digital skills gaps, by size of business

	Number of employees					
	2-4	**5-9**	**10-19**	**20-49**	**50-249**	**250+**
Extent to which they felt equipped	%	%	%	%	%	%
Fully equipped to meet the business's digital technology needs	24	25	22	18	13	10
Well equipped but with some skills gaps	41	46	53	55	68	76
Not very well equipped – we have considerable skills gaps	26	23	21	27	13	10
Not applicable – we do not require these skills	8	7	2	-	3	6
Base (excludes don't knows)	*678*	*299*	*117*	*34*	*31*	*50*

There was little variation by sector, with the exception of food and drink businesses who were more likely than average to say they had considerable skills gaps (30% compared with 24% overall).

The more engaged businesses were in digital technologies, the less likely they were to have considerable skills gaps. For example, 36% of those that did not engage with any technologies said they had considerable skills gaps, compared with just 14% of those that used 5 or 6 technologies (Table 5.2).

Table 5.2 – Digital skills gaps, by number of digital technologies used

	Number of digital technologies used			
	None	**1-2**	**3-4**	**5-6**
Extent to which they felt equipped	%	%	%	%
Fully equipped to meet the business's digital technology needs	19	24	23	25
Well equipped but with some skills gaps	30	39	50	60
Not very well equipped – we have considerable skills gaps	36	26	23	14
Not applicable – we do not require these skills	15	11	3	1
Base (excludes don't knows)	*85*	*483*	*474*	*167*

Among those that identified skills gaps, just over a third (35%) related to technical needs such as software and web development skills, while around one in ten (13%) related to business and commercial skills (Table 5.3). It should be noted that a significant proportion (35%) stated that their skills gaps were not included in the list as shown in Table 5.3, or said they did not know what specific skills they needed (24%).

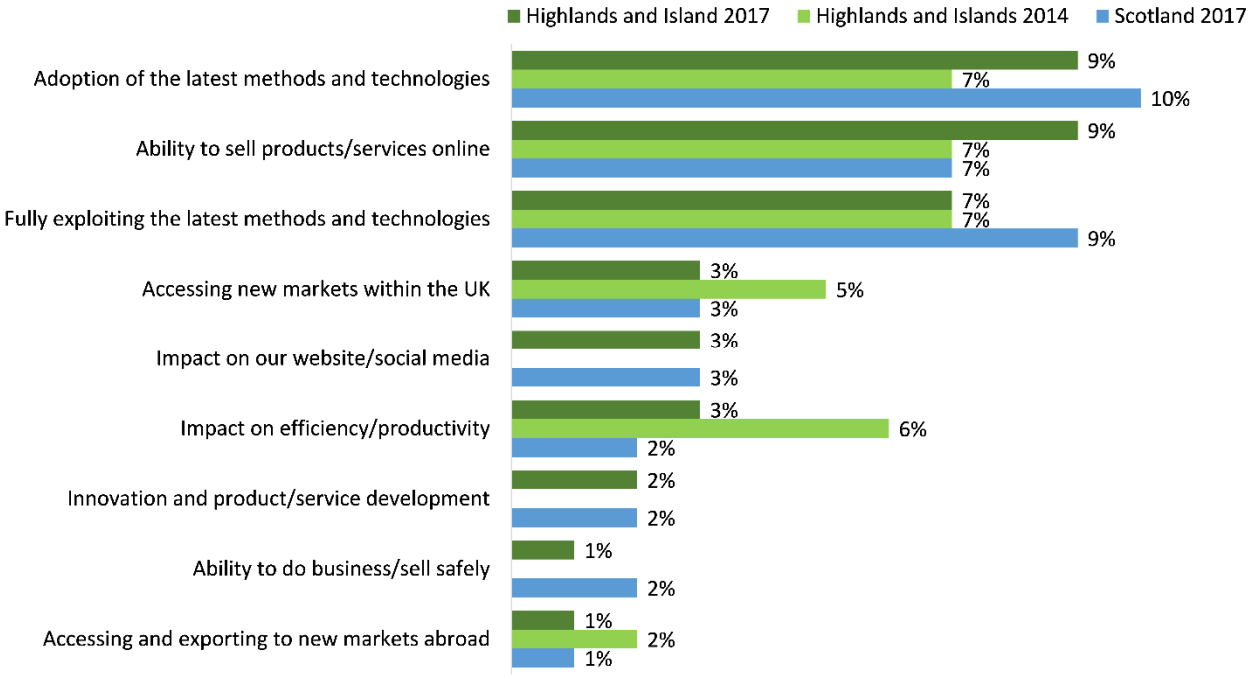
Table 5.3 – Specific skills gaps identified

	Highlands and Islands	Scotland
	%	%
Technical skills	**35**	**35**
Software skills	22	21
Web development skills	10	10
Web content creation	5	5
Cyber security skills	4	4
Information security skills	3	2
Mobile development skills	3	3
Coding skills	3	3
Data analysis	2	2
Business and commercial skills	**13**	**14**
Unspecified business and commercial skills	6	5
Digital product/service marketing skills	6	6
Commercial use of data	3	3
Digital leadership and management skills	2	2
None of the above	**35**	**33**
Don't know	**24**	**24**
Base: All who have digital skills gaps	*838*	*2,220*

Digital skills gaps had impacted on a range of areas, with 39% of businesses naming at least one area in which they had seen impacts (in line with 40% in Scotland overall). The most commonly mentioned impacts were their ability to adopt the latest methods and technologies (9%), to sell over the internet (9%) and to fully exploit the latest methods and technologies available (7%). Findings are in line with those for Scotland as a whole, and of the 2014 baseline position for the Highlands and Islands (Figure 5.2).

Figure 5.2 – Impact of digital skills gaps

Q: Which areas have been impacted by your staff's digital skills gaps?



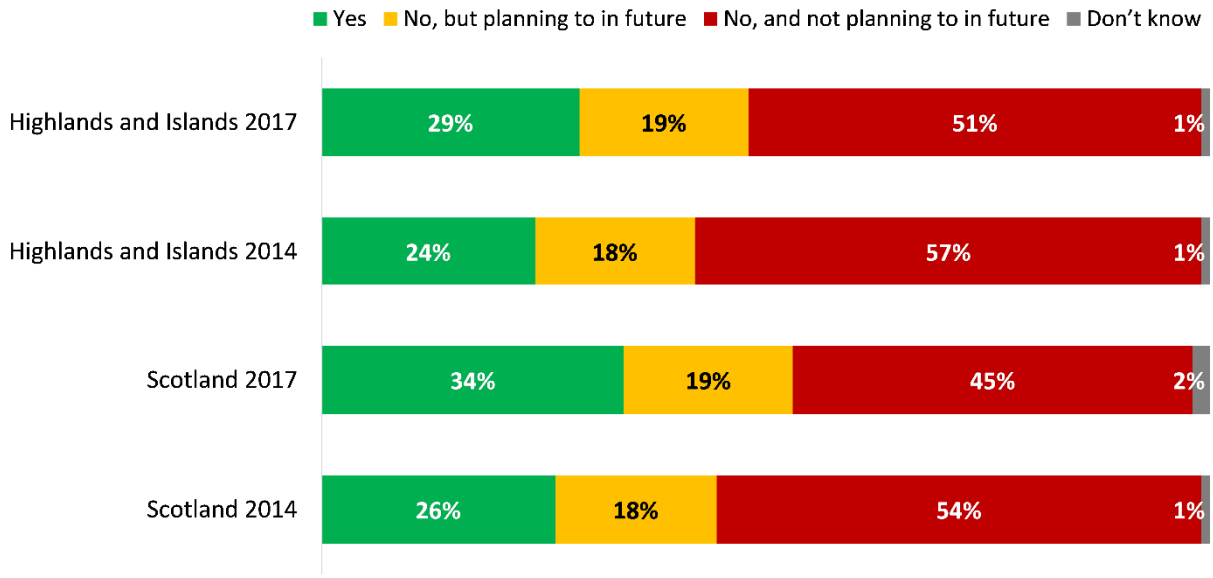
Base: All businesses who have digital skills gaps: Highlands and Islands (838) and Scotland (2,220)

Although 70% of businesses had identified at least some digital skills gaps, only 29% were taking any action to develop their employees' digital technology skills. Around a fifth (19%) were not currently taking action but were planning to do so in the future, while 51% were not taking action or planning to in the future.

However, in both the Highlands and Islands and Scotland, appetite for addressing digital skills gaps has risen since 2014. Proportions stating that they were either taking action or planning to, increased from 42% to 48% in the Highlands and Islands and from 44% to 53% in Scotland as a whole (Figure 5.3).

Figure 5.3 – Action taken to address digital skills gaps

Q: Is your business taking any action to develop your current employees' digital technology skills, for example through training?



Base: All businesses: Highlands and Islands (1,209) and Scotland (3,258)

Businesses in the Inner Moray Firth were more likely than average to have already taken action to develop employees' digital skills (37% compared with 29% overall). Also in terms of location, those in fragile areas were less likely to have taken action than those in non-fragile areas (20% compared with 31%).

There was further variation by sector, with those in the financial and business services (53%) and creative industries (48%) sectors being more likely than average to have already taken action. In contrast, food and drink businesses were more likely than average to say they had not taken action and were not planning to in future (68% compared with 51% overall). (Table 5.4).

Table 5.4 – Actions taken to address digital skills gaps, by growth sector[17]

	Sector						
	Creative industries	**Financial and business services**	**Food and drink**	**Tourism**	**Non-growth sector**	**Energy**	**Life Science**
Whether action had been taken	%	%	%	%	%	N	N
Yes	47	54	11	32	30	5	2
No, but planning to in future	17	18	18	21	20	3	-
No, and not planning to in future	32	27	70	45	49	8	-
Base (excludes don't knows)	*42*	*92*	*241*	*202*	*703*	*15*	*2*

[17] As the base size for Energy and Life Sciences are less than 30, the number of responses (rather than percentages) are shown. As number of responses have been weighted, the base size shown for this sector is the weighted, rather than unweighted, base.

Action to address skills gaps was also more apparent among social enterprises (47% had taken action) than it was among private sector businesses (27%).

There was clear correlation between digital technology use and action being taken to address digital skills gaps. For example, only 8% of those that did not engage with any technologies had taken action to address gaps, compared with 64% of those that engaged with 5 or 6 technologies (Table 5.5).

Table 5.5 – Actions to address digital skills gaps, by number of digital technologies used

	Number of digital technologies used			
	None	**1-2**	**3-4**	**5-6**
Whether action had been taken	%	%	%	%
Yes	8	14	36	64
No, but planning to in future	9	19	20	23
No, and not planning to in future	82	65	42	13
Base:	*85*	*483*	*474*	*167*

One potential barrier to addressing digital skills needs is the ability to recruit or retain the digital technology specialists required within the business. However, the majority of businesses had not faced difficulties in this regard in the last 12 months: 94% said they had no problems, including 74% who had not recruited in this area. Only 3% said they had faced difficulties: 2% with finding or keeping candidates with the right skills, and 1% with finding or keeping candidates with the right qualifications. Findings were broadly in line with those for Scotland. There were no significant differences in the types of business who had faced difficulties, which may be due to the small number of businesses within this category.

Among the minority that had faced difficulties recruiting or retaining digital technology specialists, a range of approaches had been taken to overcome those difficulties including retraining of existing staff (7%), recruiting straight from school, college, university or CodeClan (7%), offering training as part of the recruitment process such as Modern Apprenticeships (7%) and relaxing the recruitment criteria (6%) (Table 5.6).

Table 5.6 – Actions taken to overcome recruitment difficulties

	Highlands and Islands	**Scotland**
	%	%
Retraining current staff	7	7
Looking to recruit straight from school/college/university/CodeClan	7	7
Offering training as part of recruitment, such as utilising Modern Apprenticeships rather than graduates	7	5
Relaxing recruitment criteria	6	2
Keep trying/looking/searching	4	6
Advertising/increasing advertising	4	3
Recruiting from abroad	2	9
Outsourcing/subcontracting	2	3
Base: All who have faced difficult recruiting or retaining digital technology specialist in past 12 months	*41*	*118*

6. DIGITAL ECONOMY MATURITY INDEX

Background

Using data from the Digital Economy Business Survey, HIE and its partners developed a Digital Economy Maturity Index (DEMI). DEMI aims to:

- measure the level of digitisation of businesses and segment the business population into levels of digital maturity
- establish the characteristics of businesses in each segment and identify the opportunities to develop their use of digital technologies based on their strengths and challenges
- measure progress of digitisation of businesses over time.

DEMI was originally constructed using a range of indicators of digital maturity derived from the questions asked in the 2014 survey. These indicators were then updated to reflect new areas that were included in the 2017 survey (use of the collaborative economy and views on cyber resilience[18]). The new index consists of five main strands (Adoption, Usage, Benefits, Skills and Cyber Resilience), under which there are a total of 15 sub-indicators (Table 6.1 and see Appendix B for a full breakdown of indicators and sub-indicators).

Table 6.1 – DEMI Indicators

Adoption	Usage	Benefits	Skills	Cyber resilience
Type of internet connection	Technologies used	Benefits experienced from using digital technologies	Digital technology skills gaps	Equipped to deal with cyber security threats
Importance of digital technology to current operations of business	Integration of technology into business	Use of technology to help innovation	Plans to develop employees' digital skills	Use of cyber security controls
	Engagement with the collaborative economy	Proportion of sales made over the internet		
	Engagement with public services online	Internationalisation		
	Strategy for use of digital in delivering business			

Each indicator has been given a score based on its relative importance in terms of digital maturity, with a maximum overall score of 100 being possible. Based on these scores, businesses are placed within one of the following six segments, which reflect the extent of their digital maturity:

[18] Due to the change in indicators between 2014 and 2017, findings are not directly comparable with those of 2014.

Table 6.2 – Segments and score bands

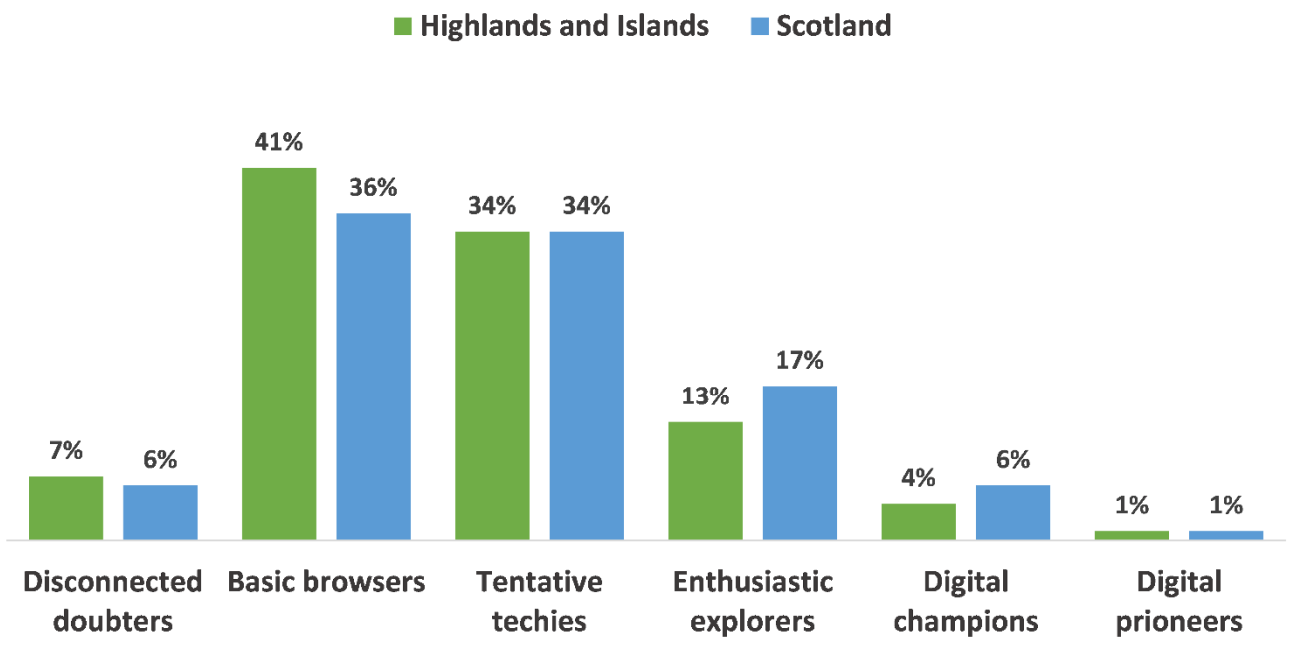
Segment	DEMI score band
Disconnected Doubters (the least digitally mature)	0-10
Basic Browsers	11-30
Tentative Techies	31-49
Enthusiastic Explorers	50-66
Digital Champions	67-80
Digital Pioneers (the most digitally mature)	81-100

This section presents findings from DEMI for Highlands and Islands businesses, benchmarked against Scotland where appropriate.

DEMI profile of Highlands and Islands businesses

Businesses in the Highlands and Islands exhibit a wide range of digital maturity, with representation in each of the six DEMI segments. As shown in Figure 6.1, the majority of Highlands and Islands businesses (82%) fall within the lower half of the index (i.e. with a DEMI score of between 0 and 49), with the largest proportions being classed as either Basic Browsers (41%) or Tentative Techies (34%).

Figure 6.1 – DEMI profile of businesses



Base: All businesses: Highlands and Islands (1,209), Scotland (3,258)

Businesses in the Highlands and Islands are more likely than those in Scotland to fall within the lower half of the index (82% compared with 76%), and less likely to be in the upper half (18% compared with 24%). The segments within which there was most significant difference between the Highlands and Islands and Scotland were Basic Browsers (41% compared with 36%), and Enthusiastic Explorers (13% compared with 17%).

Findings for both the Highlands and Islands and Scotland were broadly similar to those seen in 2014, however both areas have seen a slight upward movement in digital maturity. In the Highlands and Islands, the proportion in the lower half the index decreased from 86% in 2014 to 82%, while the proportion in the upper half increased from 14% to 17%. This change is mainly drive by the decrease in the proportion in the lowest segment, Disconnected Doubters, which decreased from 15% to 7%. The overall mean score increased by 2.0 points. Scotland saw a similar change, from 82% and 18% in 2014, to 76% and 24% in 2017, and an increase in the mean score by 2.4 points (Table 6.3).

Table 6.3 – Segments and score bands[19]

Segment	HIE 2014	HIE 2017	2014-17 +/-	Scotland 2014	Scotland 2017	2014-17 +/-
Disconnected doubters	15%	7%	-8%	14%	6%	-8%
Basic browsers	41%	41%	-	38%	36%	-2%
Tentative techies	30%	34%	+4%	30%	34%	+4%
Enthusiastic explorers	12%	13%	+1%	15%	17%	+2%
Digital champions	2%	4%	+2%	3%	6%	+3%
Digital pioneers	0.2%	1%	+0.8%	0.2%	1%	+0.8%
Mean score (0-100)	32.1	34.1	+2	33.5	35.9	+2.4

Characteristics of DEMI segments

The characteristics of businesses in each DEMI segment differs in terms of their size, sector, length of operation and future growth aspirations. As shown in Table 6.4, in the Highlands and Islands, digitally mature businesses tend to be larger, operating for less than five years, and with expectations of growth in the next 12 months. They are more likely than average to work in tourism, have more than one establishment within the organisation, and to have a high turnover (of £1 million or more). They are less likely than average to be located in a fragile area. These characteristics echoes those seen among the more digitally mature businesses in 2014.

Conversely, the less mature businesses tend to be smaller, established for at least 10 years, and with expectations to continue to perform at the same level in the next 12 months, again echoing findings from 2014. They are more likely than average to work in food and drink and have only one establishment in the organisation.

The characteristics of the segments in the Highlands and Islands are similar to those seen for Scotland as a whole (with the exception of growth sector, location in the Highlands and Islands and fragile area, which are only included in the analysis of Highlands and Islands data).

Digital pioneers are not included within this analysis as the base size is too small to identify any significant characteristics of these businesses (12 businesses).

[19] As noted early, due to the change in indicators between 2014 and 2017, findings are not directly comparable with those of 2014.

Table 6.4 – Characteristics of DEMI segments, Highlands and Islands businesses

Segment	Types of businesses over-represented in each segment
Disconnected doubters (*Base: 82)*	• Food and drink (39% of disconnected doubters vs 20% of all businesses) • 2-4 employees (78% vs 56%) • Operating for more than 10 years (90% vs 77%) • The only establishment in the organisation (99% vs 88%) • Expect to remain the same in the next 12 months (76% vs 47%)
Basic browsers (*Base: 490)*	• Food and drink (29% vs 20%) • 2-4 employees (64% vs 56%) • Operating for more than 10 years (83% vs 77%) • The only establishment in the organisation (93% vs 88%) • Expect to remain the same in the next 12 months (58% vs 47%)
Tentative techies *(Base: 420)*	• Operating for between 5 and 10 years (18% vs 12%) • Expect to grow in the next 12 months (55% vs 44%)
Enthusiastic explorers *(Base: 153)*	• Tourism (14% vs 9%) • 10-49 employees (78% vs 56%) • In a non-fragile area (90% vs 82%) • Operating for less than 5 years (16% vs 10%) • One of a number of establishments in the organisation (22% vs 12%) • Turnover of £1million or more (19% vs 8%) • Expect to grow in the next 12 months (70% vs 44%)
Digital champions *(Base: 53)*	• Tourism (19% vs 9%) • 250+ employees (21% vs 4%) • In a non-fragile area (93% vs 82%) • One of a number of establishments in the organisation (21% vs 12%) • Turnover of £1million or more (33% vs 8%) • Expect to grow in the next 12 months (71% vs 44%)

The digital activity of each segment is presented in Table 6.5, under the five indicators. Where findings for a segment are different from the average for all businesses, this is noted in the table.

Table 6.5 – Level of digital activity for each segment, Highlands and Islands businesses

Segment	Adoption	Usage	Benefits	Skills	Cyber security
Disconnected doubters (*Base: 82)*	Lower than average internet connection (88% vs 97%) Less likely to have connection speed higher than 24 MBits/s (21% vs 34%) Less likely than average to view digital technology as important for current (20% vs 75%) or future (17% vs 75%) business operations	Below average use of digital technology (mean number = 0.2 vs 2.7). Most used is website (11%), least are cloud computing, data analytics and software (0%). Lower than average mean score on importance of each digital technology (0.6 vs 6.2) Lower than average engagement with public services online (23% vs 60%) None operate as/use collaborative economy (vs 8%) None have a digital technology strategy in place (vs 19%)	Only 13% have experienced any benefits from digital technology (vs 90%) 4% have used technology to help innovation (vs 63%) Lower than average use of e-commerce (2% vs 32%) Less likely than average to trade internationally (2% vs 23%).	61% have 'considerable' or 'some' skills gaps (lower than 70% overall). Less likely than average to be taking/planning action to improve skills gaps (6% vs 48%)	28% are not at all prepared for cyber security threats (higher than 8% overall). Less likely than average to have cyber security controls in place (68% vs 93%).
Basic browsers (*Base: 490)*	Average levels of internet connection (96% vs 97%) Less likely to have connection speed higher than 24 MBits/s (25% vs 34%) Less likely than average to view digital technology as important for current (61% vs 75%) or future (61% vs 75%) business operations	Below average use of digital technology (mean number = 1.7 vs 2.7). Most used is mobile (64%), least is software (1%). Lower than average mean score on importance of each digital technology (4.2 vs 6.2) Average level of engagement with public services online (60% vs 60%) 1% operate as/use collaborative economy (vs 8%) 3% have a digital technology strategy in place (vs 19%)	89% have experienced benefits from digital technology (in line with 90% overall) 46% have used technology to help innovation (vs 63%) Lower than average use of e-commerce (17% vs 32% overall) Less likely than average to trade internationally (11% vs 23%).	67% have 'considerable' or 'some' skills gaps (in line with 70% overall). Less likely than average to be taking/planning action to improve skills gaps (31% vs 48%)	25% are poorly or not at all prepared for cyber security threats (in line with 21% overall). 91% have cyber security controls in place (vs 93%).

Segment	Adoption	Usage	Benefits	Skills	Cyber security
Tentative techies *(Base: 420)*	Average levels of internet connection (98% vs 97%) As likely as average to have connection speed higher than 24 MBits/s (38% vs 34%) More likely than average to view digital technology as important for current (92% vs 75%) or future (90% vs 75%) business operations	Average usage of digital technology (mean number = 3.2 vs 2.7). Most used is mobile (81%), least is software (8%). About average mean score on importance of each digital technology (6.0 vs 6.2) Average level of engagement with public services online (60% vs 60%) 8% operate as/use collaborative economy (vs 8%) 22% have a digital technology strategy in place (vs 19%)	All have experienced benefits from digital technology (vs 90%) 82% have used technology to help innovation (vs 63%) Average usage of e-commerce (39% vs 32% overall) Average proportion of international businesses (25% vs 23%).	75% have 'considerable' or 'some' skills gaps (in line with 70% overall). More likely than average to be taking/planning action to improve skills gaps (58% vs 48%)	19% are poorly or not at all prepared for cyber security threats (in line with 21% overall). 95% have cyber security controls in place (vs 93%).
Enthusiastic explorers *(Base: 153)*	All have internet connection As likely as average to have connection speed higher than 24 MBits/s (38% vs 34%) More likely than average to view digital technology as important for current (98% vs 75%) or future (99% vs 75%) business operations	Above average use of digital technology Mean number used = 4.6 (vs 2.7). Most used is website (96%), least is software (25%). Above average mean score on importance of each digital technology (6.9 vs 6.2) Above average engagement with public services online (69% vs 60%) 24% operate as/use collaborative economy (vs 8%) More likely to have a digital technology strategy in place (44% vs 19%)	All have experienced benefits from digital technology (vs 90%) 93% have used technology to help innovation (vs 63%) Above average usage of e-commerce (60% vs 32% overall) More likely than average to trade internationally (47% vs 23%).	72% have 'considerable' or 'some' skills gaps (in line with 70% overall). More likely than average to be taking/planning action to improve skills gaps (82% vs 48%)	35% are fully equipped for cyber security threats (higher than 26% overall). All have cyber security controls in place (vs 93%).

Segment	Adoption	Usage	Benefits	Skills	Cyber security
Digital champions *(Base: 53)*	All have internet connection More likely than average to have connection speed higher than 24 MBits/s (64% vs 34%) More likely than average to view digital technology as important for current (98% vs 75%) or future (99% vs 75%) business operations	Above use of digital technology Mean number used = 5.5 (vs 2.7). 100% use of most, except data analytics (95%) and software (68%). Above average mean score on importance of each digital technology (7.9 vs 6.2) Above average engagement with public services online (77% vs 60%) 34% operate as/use collaborative economy (vs 8%) More likely to have a digital technology strategy in place (55% vs 19%)	All have experienced benefits from digital technology (vs 90%) All have used technology to help innovation (vs 63%) Above average usage of e-commerce (75% vs 32% overall) More likely than average to trade internationally (62% vs 23%).	75% have 'considerable' or 'some' skills gaps (in line with 70% overall). More likely than average to be taking/planning action to improve skills gaps (91% vs 48%)	45% are fully equipped for cyber security threats (higher than 26% overall). All have cyber security controls in place (vs 93%).

7. SUMMARY

Connectivity

Internet connectivity in the Highlands and Islands was high, with almost all businesses (97%) now having an internet connection. The nature and speed of connectivity appear to have advanced significantly since the last survey in 2014: the proportion with fibre optic broadband, high-speed broadband, and superfast broadband have all increased, as they have in Scotland as a whole.

Digital technologies

The survey asked about the use of a number of digital technologies, namely, company website, mobile and internet technologies, social media, data analytics, cloud computing, and software solutions such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM). Use of digital technologies among businesses in the region broadly reflects that seen among businesses in Scotland. As with the rest of the country, the level of use of each type of technology varied, ranging from 70% using mobile internet and technologies to just 11% who used software solutions, and only a small minority used all six technologies. In comparison with 2014, use of social media, mobile internet and technologies and cloud computing had increased. The proportion of businesses with a company website, on the other hand, decreased – a pattern seen in the region and in the country as a whole. Notably, websites are no longer the most widely used source of digital technology, signalling a move away from this more traditional format towards newer methods of digital engagement that make use of mobile connections and social networking tools, as well as use of alternative e-commerce platforms such as third party websites.

Certain types of business demonstrated higher level of digital technology use than others. Larger businesses (those with 250+ employees) and those working in creative industries and tourism were more likely to use certain technologies, namely social media, mobile and data analytics.

While use of specific technologies varied, overall the majority of businesses in the Highlands and Islands (and in Scotland more widely) deemed digital technologies to be essential or important to their current operation, and to their future growth and competitiveness. In spite of most businesses acknowledging the importance of digital technologies, the majority did not have a specific plan or strategy in place for making use of these resources. This was a slightly higher proportion than that seen in Scotland as a whole, and highlights a potential gap between the importance placed on digital engagement and the extent to which businesses are actively planning to keep informed of and to maximise use of technology. Businesses may therefore benefit from further guidance or signposting to ways in which they can plan for future use of digital technology.

International trade and e-commerce

Turning to aspects of trade that are impacted by digital technology, the level of international trade carried out by Highlands and Islands businesses had increased since 2014, with around a quarter of businesses in the region now selling goods or services outside the UK. A similar increase was seen among businesses in Scotland as a whole. International businesses tended to be larger, and working in tourism or creative industries. International trade was linked with digital engagement, with those businesses that had used each form of technology being more likely to sell internationally than those that had not used the technology.

In addition to international trade, a third of businesses in the Highlands and Islands sold goods or services outside of Scotland but in the rest of the UK (rUK), lower than the level seen for all Scottish businesses. As with international businesses, those trading in rUK tended to be larger, and working in tourism or creative industries.

In line with activity seen in Scotland as a whole, a third of Highlands and Islands businesses carried out e-commerce although their sales tended to be in small volumes. For most, the level of e-commerce had remained relatively stable over the past 2-3 years, but one in five had increased their activity, while only a small minority had seen a decrease. E-commerce was not restricted to those with a company website highlighting the important role played by other digital marketplaces and platforms, as well as social media. Looking to the future, the vast majority expected to continue to conduct e-commerce, and at higher volumes than currently, and businesses using e-commerce demonstrated an appetite to grow this aspect of their operations. Indeed, most businesses using e-commerce were actively taking steps to maximise their digital presence and support their e-commerce activity.

Findings therefore suggest that both international trade and e-commerce, aspects of business activity that are supported by digital technology, are increasingly important for the Highlands and Islands, as they are for the rest of the Scotland.

Collaborative economy

The collaborative economy, being one of the more recent advances in the digital marketplace appears to still be in the early stages of uptake among businesses. Only a small minority operated as an online collaborative platform with use of such online platforms also being uncommon.

Digital public engagement

The survey measured engagement with online public services by exploring use of Scottish Government, Scottish Local Authority or Scottish Government agency websites. Online engagement with public services was higher for businesses in the Highlands and Islands than was reported for Scotland overall. However, compared with 2014, there has been a decrease in most forms of engagement in both the Highlands and Islands and Scotland.

Cyber security

Turning to cyber security, the majority of businesses had used cyber security technologies and technical controls, and three quarters felt that they were equipped with the relevant skills within their team to protect against and deal with a cyber security threat. There was correlation between cyber resilience and digital engagement: those engaged in fewer digital technologies were more likely to be poorly equipped or not at all equipped than those engaged in more digital technologies. In spite of the majority having used cyber security technologies and technical controls, still only a minority had gone as far as having cyber security accreditation (the same proportion as in Scotland as a whole).

Digital skills

Findings point to a continued digital skills gap among businesses in the Highlands and Islands. Only a quarter said they were fully equipped to meet their business's digital technology needs, lower than the level recorded in 2014, a pattern that was also seen in Scotland as a whole. This decrease may reflect the changing nature of digital needs between 2014 and 2017, with advances in digital technology in that time period creating demand for new types of skills that are not being fully met by most businesses. Indeed, a quarter of businesses said they were not very well equipped and had considerable skills gaps. In spite of most businesses identifying at least some digital skills gaps, only 29% were taking any action to develop their employees' digital technology skills. Appetite for addressing digital skills gaps was, however, higher than it was in 2014, showing a positive move in the direction of businesses taking action to enhance their skills in this area.

Digital Economy Maturity Index

Findings from the DEMI analysis highlight that businesses in the Highlands and Islands exhibit a wide range of digital maturity, with representation in each of the six DEMI segments. The majority of Highlands and Islands businesses fall within the lower half of the index (i.e. with a DEMI score of between 0 and 49), with the largest proportions being classed as either Basic Browsers or Tentative Techies.

Digitally mature businesses in the Highlands and Islands tend to be larger, operating for less than five years, and with expectations of growth in the next 12 months. They are more likely than average to work in tourism, have more than one establishment within the organisation, and to have a high turnover (of £1 million or more). They are less likely than average to be located in a fragile area.

Conversely, the less mature businesses tend to be smaller, established for at least 10 years, and with expectations to continue to perform at the same level in the next 12 months. They are more likely than average to work in food and drink and have only one establishment in the organisation.

For the least digitally mature, findings suggest a lack of interest in digital technologies and lack of appetite for growing digital engagement in the future. Disconnected Doubters have low use of digital technologies, and are least likely to view them as important. This is reflected in the absence of plans or strategies for future use of technology. It could therefore be argued that Disconnect Doubters are unlikely to benefit from efforts to increase their digitisation. However, there may be opportunities to encourage greater cyber security among the two least mature groups, Disconnected Doubters and Basic Browsers. Businesses in these segments are the least equipped for cyber security threats and least likely to have any controls in place to deal with such issues.

Businesses in the middle range of the index may benefit from future skills development. For example, while most Tentative Techies and Enthusiastic Explorers consider digital technology as important to their business, a significant proportion of these businesses identify digital skills gaps in their organisations.

By nature of being the most mature Digital Champions and Digital Pioneers represent those businesses with arguably less need for further digital development. However, among some of these businesses there is still potential to increase certain aspects of digitisation, such as more widespread high speed internet connection, and more uptake of lesser-used digital technologies such as data analytics, cloud computing, and online collaborative platforms.

APPENDIX A: SAMPLE PROFILE

Table 1.1 Breakdown of completed interviews by sector

Sector	Number of interviews	%
1 Agriculture	244	20
2 Business activities	255	21
3 Construction	134	11
4 Health/social work	50	4
5 Hotels/restaurants	105	9
6 Manufacturing	77	6
7 Transport/communications	75	6
8 Wholesale/retail	187	16
9 Other services	82	7
Total	1209	100

Table 1.2 Breakdown of completed interviews by growth sector

Growth sector	Number of interviews	%
1 Creative industries	42	4
2 Energy (including renewables)	22	2
3 Financial and business services	92	8
4 Food and drink	242	20
5 Life sciences	2	0.2
6 Tourism	106	9
7 Non-growth sector	703	58
Total	1209	100

Table 1.3 Breakdown of completed interviews by size band

Number of employees	Number of interviews	%
2 to 4	678	56
5 to 9	299	25
10 to 19	117	10
20 to 49	34	3
50 to 99	20	2
100 to 249	11	1
250 or more	50	4
Total	1209	100

Table 1.4 Breakdown of completed interviews by location

Location	Number of interviews	%
1 Argyll and the Islands	259	21
2 Caithness and Sutherland	117	10
3 Inner Moray Firth	276	23
4 Lochaber, Skye and Wester Ross	133	11
5 Moray	202	17
6 Orkney	96	8
7 Outer Hebrides	67	6
8 Shetland	59	5
Total	1209	100

Table 1.5. Breakdown of completed interviews by fragile areas

Location	Number of interviews	%
Fragile	216	18
Non-fragile	993	82
Total	1209	100

Table 1.6. Breakdown of completed interviews by type of business

Type of business	Number of interviews	%
Private company	1,091	90
Social enterprise	112	9
Other	6	1
Total	1,209	100

APPENDIX B: DEMI INDICATORS

Indicator	Sub-indicator	Score	Max score
ADOPTION			
Type of internet connection	NGA (<24 Mbit/s)	4	4
	Standard broadband	2	
	Internet not broadband	1	
	No internet connection	0	
Overall importance of digital technology to current operations of business	Essential	4	4
	Very important	3	
	Important	2	
	Not important	0	
USAGE			
Technologies used	Website	1	12
	Social media	1	
	Mobile internet and technologies	2	
	Cloud computing	2	
	Data analytics	3	
	Management software	3	
Integration of technology into business	Essential (9-10)	5	30
	Very important (7-8)	4	
	Important (5-6)	3	
	Use but not important (3-4)	2	
	Use but not at all important (1-2)	1	
Engagement with public services online	Yes, engage with service online	2	2
	No, do not	0	
Strategy for use of digital in delivering business	Yes	2	2
	No	0	
BENEFITS			
Benefits experienced from using digital technologies	Website	1	12
	Social media	1	
	Mobile internet and technologies	2	
	Cloud computing	2	
	Data analytics	3	
	Management software	3	
Using digital technology to help innovation	Research competitor products online	1	6
	Researching and gathering market data online	2	
	Collecting consumer feedback via website or social media	3	

Proportion of sales made over the internet	All - 100%	5	5
	80-99%	4	
	60-79%	3	
	40-59%	3	
	20-39%	2	
	<20%	1	
	None	0	

Internationalisation	Use of digital technology has increased the number of international markets exported to	4	8
	Website tailored to international markets	4	

SKILLS			
Digital technology skills gaps	No skills gaps	3	3
	Some skills gaps	2	
	Considerable skills gaps	1	
	Not applicable	0	

Doing anything to develop employees' digital skills	Yes	3	3
	No but planning to in future	1	
	No and not planning to in future	0	

COLLABORATIVE ECONOMY			3
Operate as or use collaborative platforms	Yes - operate and use	3	
	Yes - use, but don't operate	2	
	No - neither	0	

CYBER RESILIENCE			3
Equipped to deal with cyber security threats	Fully	3	
	Somewhat	2	
	Poorly	1	
	Not at all	0	

Cyber security controls	Have technical controls in place and cyber security accreditation	3	3
	Have controls in place and planning to obtain cyber security accreditation	2	
	Have controls in place, but no accreditation or plans for accreditation	1	
	No controls in place and no accreditation/plans for accreditation	0	

TOTAL MAX	**100**