R100 Interim Evaluation

Final Report

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	Name	Position	Signature	Date
Prepared by:	Rachel Thomas	Associate Transport Planner	RMT	27th May 2025
Reviewed by:	Scott Leitham	Director	SL	27th May 2025
Approved by:	Scott Leitham	Director	SL	27th May 2025
For and on behalf of Stantec UK Limited				

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Executive Summary

Introduction

This report sets out an evaluation of the Scottish Government's Reaching 100% (R100) Programme. Reaching 100% (R100) is a £600m programme which aims to extend 'superfast' broadband access at a minimum to 100% of premises across Scotland. The programme is made up of 3 strands:

- R100 contracts being delivered by Openreach *which are primarily providing gigabit capable, full fibre connections*
- the R100 Scottish Broadband Voucher Scheme (SBVS) which offers a subsidy of up to £5,000 for premises not covered by R100 contracts or commercial build – while an important element of R100, SBVS makes up a small proportion of the overall programme
- planned commercial investment by a variety of broadband providers

At the time of publication, rollout is ongoing, with delivery of connectivity via R100 contracts and SBVS split into North, Central and South contracts. At the time fieldwork commenced in October 2024, the North, Central and South contracts (including SBVS) had delivered 15,093, 17,361, and 16,525 premises respectively.

The **Investment Objectives** for the R100 Programme are as follows:

- **Improve business performance** in Scotland by facilitating increased productivity, innovation, and access to new markets.
- **Improve wellbeing** of people across Scotland.
- **Reduce the negative impact of the digital divide**, through a) addressing regional disparities in provision and b) increased availability amongst groups disproportionately represented in these areas.
- **Strengthen communities**, including in rural areas, by offering enhanced opportunities to work, trade, and deliver public services, helping to address depopulation.
- **Aid the transition to net zero** by reducing travel requirements that result from ability to work or engage with others remotely.
- **Increase Scotland's capacity to maintain business productivity**, activities important for wellbeing, and access to essential services in the face of communication disruption, especially for those rural and island communities.

The primary aim of the evaluation was to evaluate the R100 Programme against the above investment objectives. In addition, the evaluation also aimed to expand the evidence base on broadband use and its benefits to help inform the continued development of the Scottish Government's Digital Appraisal Manual for Scotland (DAMS).[1]

[1] Digital appraisal manual for Scotland: guidance - gov.scot (www.gov.scot)

Methodology

Having completed a literature review on the benefits of enhanced digital connectivity, a series of logic maps specifying the range of potential outputs, outcomes and impacts which may result from the delivery of the R100 Programme were developed.

Primary research was then undertaken in order to gather evidence of the potential changes. The primary research involved two stages as follows:

- **Stage 1**: a survey of residential and organisations / businesses affected by the R100 Programme
- **Stage 2**: follow up focus groups / interviews with residents and businesses / organisations identified during Stage 1

Each of these is discussed further below.

Stage 1: Surveys

Three groups of properties affected by the R100 programme and therefore of interest to the research were identified as follows:

- **Group 1:** those who have been provided with broadband via R100 and have taken up the connection
- **Group 2:** those who have been provided with broadband via R100 but have not taken up the connection
- **Group 3:** those who are scheduled to receive broadband via R100 but have not yet been connected

In order to gather information from each of the above groups, two online surveys were produced; the first aimed at residential properties and the second aimed at businesses / organisations.

The surveys were structured around both the Investment Objectives and the potential outputs, outcomes, and impacts identified within the logic maps. Each survey incorporated separate sub sections accessible via appropriate survey routing for properties in each of the above three groups. A broad overview of the topic areas covered in each of the surveys sub-sections is set out in Table 1.

To ensure only those in the above groups (and therefore those who were eligible to respond) were able to access the survey, a postcode / address checker was used as a gateway to the survey. Those who entered an eligible postcode / address were then routed to the correct sub-section of the survey based on the group they fell into as recorded in the Scottish Government's data on R100.

Table 1: Broad overview of topic areas covered in the surveys

	Group 1: Provided with broadband access via R100 and have taken up the connection	**Group 2:** Provided with broadband access via R100 but have not taken up the connection	**Group 3:** Scheduled to receive broadband access via R100 but have not yet been connected
Resident Survey	**Voucher applicant** ▪ SBVS or IVS ▪ Ease of application process **Current connection (i.e. the connection provided via R100)** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Household access to internet devices** **Household use of current connection** ▪ Household admin ▪ Activities relating to employment and education ▪ Entertainment activities ▪ Social media and messaging ▪ Shopping related activities ▪ Health related activities **Life Choices** ▪ For those who experienced the improvement, impact on nature of work, access to education, lifestyle, and wellbeing ▪ For those who moved to the property post the improvement, impact on decision to move **Wellbeing** **About your Household** **About you**	Respondents asked if they have a connection. **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Household access to internet devices** **Household use of current connection** ▪ Household admin ▪ Activities relating to employment and education ▪ Entertainment activities ▪ Social media and messaging ▪ Shopping related activities ▪ Health related activities **<u>If no,</u>** Respondents asked how they access the internet and if there are things their household is missing out on because they do not have a connection **<u>All respondents asked questions on:</u>** **Reasons for not upgrading** **Wellbeing** **About your Household** **About you**	Respondents asked if they have a connection. **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Household access to internet devices** **Household use of current connection** ▪ Household admin ▪ Activities relating to employment and education ▪ Entertainment activities ▪ Social media and messaging ▪ Shopping related activities ▪ Health related activities **<u>If no,</u>** Respondents asked how they access the internet and if there are things their household is missing out on because they do not have a connection **<u>All respondents asked questions on:</u>** **Wellbeing** **About your Household** **About you**

	Group 1: Provided with broadband access via R100 and have taken up the connection	**Group 2:** Provided with broadband access via R100 but have not taken up the connection	**Group 3:** Scheduled to receive broadband access via R100 but have not yet been connected
Business / Organisation Survey	**Type of business / organisation** ▪ Public sector Organisation ▪ Charity / community group ▪ Commercial Business **Voucher applicant** ▪ SBVS or IVS ▪ Ease of application process **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Use of current connection** ▪ Overall use and by category (e.g. selling services, staff recruitment etc) **Business / organisation Choices** ▪ For those who experienced the improvement, importance of superfast broadband for business operation ▪ For those who moved to the property post the improvement / started new business impact of broadband availability on decision to move / start up **About your Business / Organisation**	**Type of business / organisation** ▪ Public sector Organisation ▪ Charity / community group ▪ Commercial Business **Respondents asked if they have a connection.** **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Use of current connection** ▪ Overall use and by category (e.g. selling services, staff recruitment etc) **Extent to which current connection limits business activities** **<u>If no,</u>** Respondents asked how they access the internet and if there are things their business is missing out on **<u>All respondents asked questions on:</u>** **Reasons for not upgrading** **About your Business / Organisation**	**Type of business / organisation** ▪ Public sector Organisation ▪ Charity / community group ▪ Commercial Business **Respondents asked if they have a connection.** **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Use of current connection** ▪ Overall use and by category (e.g. selling services, staff recruitment etc) **Extent to which current connection limits business activities** **<u>If no,</u>** Respondents asked how they access the internet and if there are things their business is missing out on **<u>All respondents asked questions on:</u>** **About your Business / Organisation**

The surveys were live for a 27-week period from October 22nd, 2024, to 1st May 2025 and were promoted to eligible respondents via: community awareness raising activities and 'to the occupier' letters issued to eligible addresses.

In total, 941 unique[2] household responses were received to the survey. The tables below show the breakdown of residential and business responses by group. The overall number of household responses is satisfactory and provides a reasonable level of confidence in the results. As may be expected, the responses to the business survey are lower and therefore a note of caution is needed when interpreting the business survey results.

Table 2: Number of responses received to the resident survey by group

Resident Survey Group	Number of responses
Group 1: Provided with broadband access via R100 and have taken up the connection	335
Group 2a: Those who are eligible for the Scottish Broadband Voucher Scheme but have not applied for the scheme	157
Group 2b: Those for whom a new superfast (or quicker) connection is available as a result of the R100 programme, but they have not taken it up	32
Group 3: Scheduled to receive broadband access via R100 but have not yet been connected	341
Total	865

Table 3: Number of responses received to the business survey by group

Business Survey Group	Number of responses
Group 1: Provided with broadband access via R100 and have taken up the connection	34
Group 2a: Those who are eligible for the Scottish Broadband Voucher Scheme but have not applied for the scheme	16
Group 2b: Those for whom a new superfast (or quicker) connection is available as a result of the R100 programme, but they have not taken it up	0
Group 3: Scheduled to receive broadband access via R100 but have not yet been connected	26
Total	76

Stage 2: Focus Groups

In addition to the above surveys, a series of online focus groups / one-to-one interviews with residents and businesses affected by the R100 Programme were also undertaken. The aim of these focus groups / interviews was to explore the topic areas covered within the survey in more depth and gather individual experiences to help supplement and augment the survey findings.

Focus group attendees / interviewees were recruited via a question in the above surveys which asked respondents whether they would be interested in taking part in follow up focus groups / interviews. In total 49 participants took part in this aspect of the research.

The focus groups / interviews were delivered virtually via Microsoft Teams and lasted up to one hour each. There were two researchers in attendance, one steering the discussion and one scribe. In

[2] In total, 986 responses were received to the survey. However, 45 of these were duplicate responses (i.e. more than one response was received from a single property). Given that the survey records use of the internet by the household as a whole, where more than one response from a property was received, the response provided by the eldest household member was retained and any further responses from the same household were removed from the analysis.

advance of the focus groups / interviews, separate Resident and Business Topic Guides were prepared which were used as a broad framework to help guide the discussions.

Key Findings

The key findings from the evaluation with respect to each of the R100 Investment Objectives are summarised below. These findings represent the impact of R100 to date - the full effects of R100 will likely take further time to mature, with some impacts taking longer to materialise than others.

Improve business performance in Scotland by facilitating increased productivity, innovation, and access to new markets.

While the business survey sample sizes were small and therefore it is difficult to draw firm conclusions, the results of the research suggest that the delivery of improved connectivity through the R100 programme has resulted in improved business performance for the businesses who have taken up the connection. Focusing specifically on the metrics within this objective:

- **69%** (n=20) of Group 1 businesses in the sample reported an overall positive benefit on business performance
- **76%** (n=22) reported a positive impact on **productivity**
- **52%** (n=15) reported a positive impact with respect to **innovation**
- **31%** (n=9) reported a positive impact with respect to **access to new markets**.

The Group 1 businesses in the sample also reported positive benefits with respect to turnover (41%, n=12), the number of customers / visitors to their business premises (38%, n=11), the range of products / services provided (35%, n=10), and the cost of supplies (34%, n=10).

A range of positive impacts with respect to business activities were also identified, with the results providing an indication of the key mechanisms through which the improvement in connectivity results in improved business performance. The business activities on which the improved connectivity had the largest positive impacts were:

- Accounting and financing activities - 66% (n=19) of Group 1 businesses in the sample identified a positive impact
- Accessing online networks and storage - 66% (n=19) identified a positive impact
- Selling products or services, including online bookings / tickets - 59% (n=17) identified a positive impact
- Promotional activities, including via social media – 52% (n=15) identified a positive impact

A high proportion of Group 2 and Group 3 businesses in the sample identified their current broadband connectivity as a key constraint on business performance. Overall:

- 59% (n=19) of Group 2 and Group 3 businesses in the sample strongly agreed or agreed that their current broadband connectivity **impedes the performance of their business / organisation**
- 60% (n=18) strongly agreed or agreed that their current broadband connectivity contributes to **lower levels of productivity**
- 58% (n=18) strongly agreed or agreed that their current connectivity **limits innovation**

- 36% (n=11) strongly agreed or agreed that their current broadband connectivity **limits their access to new markets**

The above issues were also highlighted in the open text responses to the survey and in the one-to-one interviews with businesses in Group 1 highlighting the significant efficiency gains and those in Group 2 and 3 reporting reduced productivity, higher operational costs and missed market opportunities.

Key Point: Overall, the results of the research suggest that the delivery of R100 has led to improved business performance and increased productivity, innovation, and access to new markets for the businesses / organisations who have taken up the connection. A range of mechanisms for this were identified through the research, including improved accounting and financing, being able to access online networks and storage, and the ability to more easily advertise / promote and sell products / services. While considerable benefits for businesses were identified, it should be borne in the mind that achievement of these is contingent on businesses taking up the connection, with those that don't upgrade at risk of relative declines in productivity and competitiveness. The barriers to take-up and the implications of this are discussed further below.

Improve wellbeing of people across Scotland

To help identify wellbeing impacts, two questions which specifically focused on the topic of wellbeing were included in the resident survey as follows:

- a question asking Group 1 respondents who lived at the property when broadband was installed whether the improvement in broadband had a positive or negative impact on their wellbeing

- a question which replicated the format of the questions on personal wellbeing included in the UK's APS[3] whereby respondents are asked one question covering each of the four measures of personal wellbeing (namely life satisfaction, feeling the things done in life are worthwhile, happiness, and anxiety) - this approach to capturing wellbeing impacts is well established in the literature and has been used in previous evaluations of similar schemes although attributing any change identified to the investment being evaluated can be challenging.

In terms of the former, **nearly 50% (49%, n=130) of Group 1 respondents in the sample stated that the improvement in connectivity had had a positive impact on their wellbeing**.

With respect to the UK APS personal wellbeing question, the results indicate that **respondents in Group 1 had higher wellbeing scores than those in Group 2 and Group 3**, corroborating the above findings. It is noted however there are a wide range of factors which could influence the APS wellbeing scores and it is therefore difficult to attribute the differences between the groups directly to the R100 Programme.

Beyond the specific questions on wellbeing, Group 1 respondents to the survey also identified a range of positive impacts of the improved connectivity which are likely to contribute to improved wellbeing. For example, a high proportion of Group 1 respondents (proportions shown in brackets) reported positive impacts on:

- Keeping in touch with family and friends (63%, n=165)

- Feeling of connectedness to wider world (62%, n=164)

- Finding out about what is going on in the local area (47%, n=125)

[3] see https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingintheukqmi

- Feeling of connectedness to the local community (35%, n=94)

The positive benefits with respect to wellbeing were also noted by Group 1 respondents in the open text survey responses and the focus group discussions, with respondents noting that they are now better connected with family and friends and the local community and that this has resulted in reduced isolation and improved mental health.

While there were clear wellbeing benefits for Group 1 respondents, it should be recognised that these benefits do not extend to those who have not taken up the connection offered by R100 and in contrast to those in Group 1, those not taking up the connection may be at risk of further marginalisation and reduced levels of wellbeing, particularly where digital connectivity and digital services replace more traditional means of communication without inclusive alternatives.

Key Point: Overall, while it is difficult to draw firm conclusions from the results of the specific question on personal wellbeing, the wider research suggests that the delivery of R100 has resulted in improved wellbeing amongst those respondents who have taken up the connection offered via R100. As with businesses, while considerable benefits in terms of wellbeing were identified, it should be borne in the mind that achievement of these is contingent on households taking up the connection, with those that don't upgrade at risk of further marginalisation / reduced levels of wellbeing, particularly where digital connectivity and digital services replace more traditional means of communication. The barriers to take-up and the implications of this are discussed further below.

Reduce the negative impact of the digital divide, through a) addressing regional disparities in provision and b) increased availability amongst groups disproportionately represented in these areas.

There is a clear disparity in provision between connectivity levels in urban areas in Scotland and those in more rural locations[4] and this inequality can have a range of negative impacts which can affect the long-term sustainability of rural areas. R100 aims to address this disparity and thereby reduce the negative impacts of the digital divide through the delivery of broadband services in locations where they would not otherwise be provided by the market.

The Scottish Government maintains a database of properties which have either benefited from the R100 programme or are due to benefit over the upcoming period and data from the September 2024 version of this database suggests that 80% of the properties affected by R100 are in rural locations with just 17% located in urban areas.[5] The programme therefore appears to be effectively targeting rural areas with the aim of addressing the above disparities in provision.

While the programme is targeting rural locations, it is noted that the research suggests that **those provided with connectivity via the main contracts were more satisfied with the speed and reliability of their connection than those provided with connectivity via IVS or SBVS (who are perhaps more likely to be in rural and island communities)**. Perhaps unsurprisingly given the need for voucher recipients to more actively engage with the programme / suppliers, voucher recipients also appeared to experience more challenges with respect to communication. There is therefore a risk of uneven outcomes across the programme footprint and an element of continued geographic inequality.

The impact on the availability of broadband amongst **groups disproportionately represented in these areas** will depend on the ultimate level of take-up amongst these groups. While the specific groups in question are not defined in the objective, the following is of note:

[4] As set out in Chapter, according to Ofcom's 2023 Connected Nations Report, nearly all residential properties and 97% of commercial properties in Scotland's urban areas are able to access superfast broadband compared to just 89% and 97% of residential and commercial properties respectively in Scotland's rural locations – see https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-2023/interactive-report; accessed February 2024

[5] The remaining 3% are located in accessible small towns (2%), remote small towns (1%) or very remote small towns (1%)

- Rural areas in Scotland tend to have a higher proportion of elderly residents
- The most remote rural locations have higher proportions of those aged 65+ with long-term health problems and / or disabilities
- While the picture in terms of income is more complex, island and rural communities experience higher costs of living which impacts levels of disposable income
- In terms of businesses, microbusinesses and sole traders make up a large share of rural enterprises.

A number of key barriers to take-up were identified in the research, including:

- **A lack of awareness of R100**
- **Cost barriers – including the cost of the connection and the cost of devices**
- **Process barriers – i.e. the complexity of the voucher application process / changing an existing contract.**

These are discussed below.

Lack of Awareness

The research suggests that **a lack of awareness of R100 is the primary barrier to up-take**, with more than 85% of Group 2 households eligible for the voucher scheme, 50% of Group 2 households eligible via the main contracts, and 81% of Group 2 businesses unaware of R100. Furthermore, **for the large majority of households who were unaware, the lack of awareness was the only barrier to take-up** with the majority of those in the sample who were unaware (89% of households with a current connection and 74% of those without a current household connection) stating that they intend to apply now that they know about the programme.

A lack of awareness was also raised in the focus groups, with some beneficiaries noting that they only found out they were receiving a connection when engineers appeared and others noting that communication was of a poor quality. A lack of awareness of R100 is a particular challenge with respect to the voucher scheme which requires eligible property owners to take the initial action and progress with an application. From an equality perspective, **awareness gaps may disproportionately affect older residents and disabled people, who are more reliant on clear, accessible, and timely information.** Unclear communication also risks reinforcing scepticism about public investment initiatives and, in rural areas particularly, may be interpreted as evidence of being lower priority.

Cost and Process Barriers

These barriers are likely to be more acute for:

- **Low-income households** who are most affected by affordability challenges
- **Older adults with lower digital confidence** who are less likely to complete voucher applications or switch providers without support
- **Disabled people** who may encounter additional obstacles in the application processes if accessibility is not built in.
- **Small businesses**, particularly in agriculture and tourism, who often lack administrative capacity to navigate complex application processes or invest in new technology and who may therefore be at risk of relative declines in productivity and competitiveness.

Where take-up is limited or focused on particular groups, the overall benefits of R100 will be reduced and equality of access will not be achieved. Further, as digital connectivity becomes the norm, excluded groups risk becoming more marginalised. In order to maximise the effectiveness of the programme and achieve broader equality aims, there may therefore be a need for:

- More targeted communication which is delivered in accessible formats and distributed through trusted intermediaries, including schools, GP practices, libraries and community groups.
- Direct support and guidance for groups more likely to be affected by cost and complexity barriers.

Key Point: The R100 programme appears to be effectively targeting rural locations with the aim of addressing the regional disparities in broadband provision. While effectively targeting rural areas and therefore addressing existing disparities, it is worth nothing that satisfaction amongst voucher recipients (who are likely to be concentrated in more remote rural locations) was lower, creating a risk of some level of continuing geographic inequality. The extent to which the R100 results in greater availability of broadband connectivity amongst certain groups in targeted areas will depend on the ultimate level of take up amongst such groups. The emerging findings from this research suggest that the key barriers to take up are a lack of awareness of R100, the cost of upgrading; and the complexity of the voucher application process / changing an existing contract. These barriers are likely to be more acute for certain groups in society. In order to ensure this objective and wider equality aims are achieved, targeted communication and more direct support and guidance for these groups would be beneficial.

Strengthen communities, including in rural areas, by offering enhanced opportunities to work, trade, and deliver public services, helping to address depopulation.

The results of the survey and focus groups suggest that the delivery of R100 has provided **enhanced opportunities to work** for those taking up the connection.

While based on a small sample, **20% (n=54) of Group 1 residents who had lived at the property when broadband was installed said they were able to work from home more frequently as a result of the improved connectivity**. Being able to work from home can particularly help strengthen communities in rural areas where the barriers to accessing employment are often higher due to long travel distances, high travel costs, and a lack of transport connectivity. As well as facilitating working from home, there was also some evidence from the survey that R100 had enabled some Group 1 respondents to **work more hours** (5%, n=12), **change job** (3%, n=9), or **take on an additional job** (3%, n=7) although sample sizes were small and therefore it's difficult to draw firm conclusions on these aspects.

In addition to employment, while sample sizes are small, there was some evidence that the improvement in broadband had enabled access to education, with 9% (n=25) of Group 1 respondents stating that they can now access formal learning opportunities which they previously could not access. A range of courses were identified in the open text responses including degrees, diplomas, postgraduate studies, and professional and work-related training. There was also some evidence that the delivery of broadband had led to a general improvement in digital skills for some, with 33% (n=87) of Group 1 respondents stating that the improvement had had a positive impact on their digital skills and 28% (n=75) stating that it had had a positive impact on their confidence using the internet

In terms of providing **enhanced opportunities to trade**, while sample sizes were relatively small, there was some evidence from the Group 1 business survey that R100 had had a positive impact on trade with:

- 59% (n=17) of Group 1 businesses stating that the improvement in broadband had had a positive impact on **selling products / services**

- 38% (n=11) recording a positive impact with respect to **the number of customers / visitors to their promises**
- 34% (n=10) recording a positive impact with respect to the **range of products / services provided**
- 34% (n=10) recording a positive impact with respect to the **cost of supplies**
- 31% (n=9) recording a positive impact with respect to **access to new markets**

Conversely, those who had not taken up the R100 connection or had not yet been provided with the connection, identified a number of challenges in terms of trade due to their current levels of connectivity. For example:

- 63% (n=19) of Group 2 and 3 respondents strongly agreed or agreed that their current broadband connectivity **limits their ability to sell / provide products and / or services**
- 43% (n=13) strongly agreed or agreed that their current broadband connectivity **limits their ability to make bookings**
- 40% (n=12) strongly agreed or agreed that their current broadband connectivity **prevents them using lower-cost suppliers**
- 36% (n=11) strongly agreed or agreed that their current broadband connectivity **limits access to new markets**

While the research did not explicitly cover the **delivery of public services**, there was evidence that respondents from all three groups complete government processes, pay council bills and access virtual GP appointments online, highlighting the importance of internet connectivity for such activities regardless of the level of connectivity. The wider availability of broadband connectivity may contribute to increased use and the greater viability of such services with resultant cost savings for both those using and providing the services.

In terms of **strengthening communities**, there was also some evidence from the survey that the availability of broadband had had a positive impact on the level of community activities in some areas with 24% (n=63) of Group 1 respondents stating that there had been a positive impact on this aspect. The findings with respect to the number of shops and other services available locally were more mixed with roughly equal proportions of Group 1 respondents stating that the improvement in broadband had a positive / negative impact on this aspect. The impact on local shops / services may take longer to materialise than the period covered in this research. As touched upon above, where the availability of broadband leads to the closure of local shops and other services, there may be a consequent impact on community cohesion and a disproportionate impact on groups in society who do not use online services, such as older people, low confidence users, or those on lower incomes, who may experience feelings of increased isolation.

Depopulation is a particular challenge in rural locations where more limited employment, education and social opportunities can lead to outmigration, particularly amongst younger cohorts. Enhancing digital connectivity can help to break this cycle as improved connectivity can make activities, including the delivery of education, services, and business activities viable in less central locations. While sample sizes were small and therefore it is difficult to draw firm conclusions, there is some evidence from the survey that the availability of superfast broadband has encouraged some people to move to the areas affected, with 42% (n=13) of Group 1 respondents who had recently moved stating that they would not have done so if superfast broadband (or quicker) had not been available. As with the impact on local shops / services, the impact in terms of depopulation may take longer to materialise than the period covered in this research.

Key Point: Overall, the results suggest that the delivery of R100 has contributed to a strengthening of the communities affected by the programme particularly with respect to opportunities to work and the

level of community activities in some areas. While sample sizes are small, there is also some indication that the availability of broadband connectivity has influenced people's decision to move to the area. The impact of the programme on the number of shops and other service available locally is less clear. The overall balance of benefits / disbenefits in this respect is likely to differ depending on the community in question and may take longer to materialise than the period covered by this research. It is noted though that if digital services replace local provision, such as banking or council services, without inclusive alternatives, there is a risk that older and low-confidence users are further excluded.

Aid the transition to net zero by reducing travel requirements that result from ability to work or engage with others remotely.

While sample sizes are small, there is some indication from the survey results that the ability to work and engage with others remotely has resulted in a reduction in travel at the local level. Overall, 12% (n=32) of Group 1 respondents to the survey said that the improved connection had resulted in a change in the level of day-to-day travel made by their household, with almost all of these stating that their household travel had reduced. A range of reasons were provided for this, including being able to work from home more frequently; increased use of online shopping; and accessing government and NHS services online. Several respondents also emphasised the benefit of being able to check public transport options before leaving the house, thereby reducing unnecessary trips.

While the above may lead to a reduction in travel and a consequent reduction in greenhouse gas emissions, it is also the case that home working and the delivery of online shopping / services will themselves generate carbon emissions (e.g. through additional domestic energy consumption, more delivery drivers etc) which will in part offset the savings generated. In addition, the research identified evidence of increased community activities as a result of the ability to organise online which may contribute to additional travel albeit potentially more locally based.

Key Point: Overall, the results suggest that the improvement in connectivity has led to a reduction in day-to-day travel for some households due to increased home working, higher levels of online shopping, and use of online government and NHS services. Some of these savings will however be offset by carbon emissions generated via other activities with more detailed analysis required to determine the overall impact.

Increase Scotland's capacity to maintain business productivity, activities important for wellbeing, and access to essential services in the face of communication disruption, especially for those rural and island communities.

The research suggests that the delivery of improved broadband connectivity has improved the capacity of businesses and communities during periods of disruption.

In terms of **business productivity**, evidence from the business survey suggests that Group 1 businesses are now able to undertake a wider range of business activities online, including accounting and financing, accessing online networks and storage, selling products or services, and being able to call customers and suppliers through Wi-Fi. As noted above, there is also evidence of people being able to more frequently work from home because of improved connectivity. In the event of a disruption, there is therefore greater capacity in the system to maintain business productivity.

There is also evidence from the surveys that the availability of broadband has **enabled residents to access travel and emergency information more easily during periods of disruption, helping to maintain access to essential and other key services**. In total, 37% (n=96) of Group 1 households said that the improvement in broadband had benefitted their household in periods of disruption, with respondents highlighting that they are now able to access up-to-date travel and other emergency information which they were previously unable to access.

Key Point: The research suggests that where businesses and residents have taken up the enhanced broadband connectivity provided by R100 additional opportunities for communication and additional

mechanisms by which to deliver business activities have been created and these channels help to maintain business productivity and access to key services during periods of disruption.

1 Introduction

1.1 Overview

1.1.1 Reaching 100% (R100) is a £600m programme which aims to extend 'superfast' broadband access at a minimum to 100% of premises across Scotland. The programme is made up of 3 strands:

- R100 contracts being delivered by Openreach
- the R100 Scottish Broadband Voucher Scheme (SBVS) which offers a subsidy of up to £5,000 for premises not covered by R100 contracts or commercial build
- planned commercial investment by a variety of broadband providers

1.1.2 The **Investment Objectives** for the R100 Programme are as follows:

- **Improve business performance** in Scotland by facilitating increased productivity, innovation, and access to new markets.
- **Improve wellbeing** of people across Scotland.
- **Reduce the negative impact of the digital divide**, through a) addressing regional disparities in provision and b) increased availability amongst groups disproportionately represented in these areas.
- **Strengthen communities**, including in rural areas, by offering enhanced opportunities to work, trade, and deliver public services, helping to address depopulation.
- **Aid the transition to net zero** by reducing travel requirements that result from ability to work or engage with others remotely.
- **Increase Scotland's capacity** to maintain business productivity, activities important for wellbeing, and access to essential services **in the face of communication disruption**, especially for those rural and island communities.

1.1.1 As of March 2025, the R100 programme had delivered broadband to over 72,000 premises through the R100 contracts and 5,000 properties via the voucher scheme.[6] In total the main contracts are expected to deliver connections to over 112,000 premises.[7]

1.1.2 In line with government guidance, this research aims to evaluate the impacts of R100 against its investment objectives, and to comment on the effectiveness and value for money of the scheme. In addition, the evaluation aims to expand the evidence base on broadband use and its benefits to help inform the continued development of the Scottish Government's Digital Appraisal Manual for Scotland (DAMS).[8]

1.1.3 This report sets out the approach to and findings from the evaluation. The research is structured around a set of logic maps which identify a range of potential outcomes of R100 and consequential impacts. Primary research, in the form of online surveys and focus groups / one-to-one interviews, with residents and businesses based in the areas affected by R100

[6] https://digitalconnectivity.campaign.gov.scot/data-insights

[7] https://digitalconnectivity.campaign.gov.scot/data-insights

[8] Digital appraisal manual for Scotland: guidance - gov.scot (www.gov.scot)

are then undertaken in order to explore the topic areas covered within the surveys in more depth and gather individual experiences to help supplement and augment the survey findings.

1.1.4 The report consists of further chapters as follows:

- **Chapter 2** - provides a background on broadband and how it is provided in Scotland and an overview of the R100 programme and its relationship with other similar programmes in the UK
- **Chapter 3** - provides a discussion of the key benefits of improved digital connectivity as identified within the wider literature
- **Chapter 4** - sets out a range of logic maps specifying the potential outcomes and impacts which may result from the delivery of the R100 programme
- **Chapter 5** – discusses the methodological approach to the primary research and provides a summary of the achieved response
- **Chapters 6 and 7** - provides a summary of the responses to the resident and business surveys respectively.
- **Chapter 8** - sets out the findings from the focus groups / one-to-one interviews.
- **Chapter 9** - provides a summary of the research findings in the context of the R100 Investment Objectives.

2 Background

2.1 Overview

2.1.1 This section provides a background on broadband and how it is provided in Scotland before providing an overview of the R100 programme and its relationship with other similar programmes in the UK.

2.2 How is broadband provided and what speeds are available?

2.2.1 In the UK, Fixed broadband is delivered via various technologies (as set out in the list below), with each incremental improvement in technology providing faster speeds and a more reliable connection than the former:

- **Copper (ADSL[9])** – copper cables used to connect from the exchange to the premises. Maximum download speed is 24Mbit/s. Speed diminishes significantly with distance and copper cables are affected by poor weather and are susceptible to faults.

- **Fibre to the cabinet (FTTC)** – Fibre cables to the cabinet and copper cables to the premises. The maximum download speed is usually 80 Mbit/s. As with ADSL, speed diminishes with distance and affected by poor weather / susceptible to faults.

- **Full fibre or 'fibre to the premises' (FTTP)** – Fibre cables to the cabinet and the premises. Unaffected by distance and less susceptible to faults / weather.

- **Hybrid fibre coaxial cable (HFC)** – Fibre cables to the cabinet and coaxial cable from the street cabinet to the premises. Latest technology (DOCSIS 3.1) able to deliver speeds of up to 10Gbit/s and upload speeds of up to 1Gbit/s but in reality, speeds can be below this as shared with multiple users.

2.2.2 As well as fixed broadband, broadband can also be provided wirelessly. There are broadly three types of wireless broadband connection:

- **Fixed Wireless Access** - Broadband to fixed locations can also be delivered wirelessly via radio signals between two points. This is known as Fixed Wireless Access (FWA). FWA broadband networks generally cover areas which are within set distances and line of sight of radio masts. If a property is too far away from a mast or there is no line of sight between the mast and the property because of e.g. hills or trees, then it may be difficult for a supplier to get a signal strong enough to provide a superfast broadband connection.

- **FWA using 4G or 5G** - FWA can also be provided on licensed 4G and 5G networks. In this case a wi-fi router is installed with a mobile sim card and is connected by cable to an external aerial in a suitable outdoor location. 4G FWA is often used where wired connections or FWA is not available. However, like FWA, 4G FWA broadband networks cover areas which are within set distances and line of sight of mobile network radio masts and where a property is too far away from the mobile mast or there is no line of sight, it would be difficult for a supplier to get a signal strong enough to provide a superfast broadband connection. In addition, it's possible that if lots of people are connected to the same mast (mobile and FWA users) at the same time, broadband speeds can drop. As a result, there may be areas of high mobile demand where a reliable FWA cannot be provided.

- **Satellite broadband** - broadband can also be provided via satellite using a dish or antenna on the property. There are two types: Geostationary Orbit (GSO) Satellite and

[9] ADSL: Asymmetric Digital Subscriber Line

Low Earth Orbit (LEO) Satellites. While there are a range of providers offering GSO, LEO is relatively new and is currently only offered by Starlink[10]. Satellite connections do not require a wired connection or 4G and have proved popular in some rural areas where these options are limited or speeds / reliability is poor.

2.3 What broadband speeds are available?

2.3.1 The topic of broadband speeds is complex, and the speed experienced by a user on a given day will vary. Four categories of broadband speed (as delivered to the home, rather than experienced in the home) can broadly be identified in the literature. These are set out in the table below along with the approximate download speed / times, and broadband technologies typically used to provide the services.

Table 2-1: Types of broadband[11]

Broadband category	Speed	Approximate time taken to download one TV show (406MB via on demand)	Typical broadband technologies which provide this service
Decent / Standard	10 Mbit/s	10 mins 50 seconds to 3 mins 23 seconds	Copper ADSL
Superfast	30 Mbit/s	1 min 25 seconds to 43 seconds	FTTC or HFC
Ultrafast	100 Mbit/s or more	22 seconds to 6 seconds	FTTP or HFC
Gigabit	1 Gbit/s and above	3 seconds	FTTP

2.3.2 The speed of broadband determines the activities which can be undertaken using the connection. Fast speeds allow for quicker downloads and uninterrupted streaming and improve the quality of video content meaning it is possible to stream compatible content in full HD, or 4K. In addition, where there are more people using the internet at the same time, (e.g. in larger households) faster upload and download speeds are required as they help to reduce the impact of different family members using connected devices at the same time. While there are various breakdowns setting out what activities can be undertaken at different broadband speeds, the situation is complex and there is no universally accepted categorisation.

2.4 How extensive is broadband coverage across Scotland?

2.4.1 Ofcom reports on the percentage of UK premises (residential and commercial properties) with access to fixed broadband, specifically superfast broadband, gigabit-capable, and full fibre[12]. The table below provides a summary of this data for residential and commercial properties in urban and rural areas of Scotland.

[10] www.Starlink.com

[11] There is no standard definition of broadband speeds and types with different sources adopting slightly different definitions. This table is sourced from What Broadband Speed Do I Need? - Which? It is noted that Ofcom define 'decent' broadband as a minimum download speed of 10mbps and the European Commission define Superfast broadband as 30 Mbps.

[12] Connected Nations 2023 Interactive Report, Interactive report 2023 - Ofcom

Table 2-2: Residential and Commercial Broadband coverage by at least one operator in Scotland[13]

	Residential Overall	Residential Urban	Residential Rural	Commercial Overall	Commercial Urban	Commercial Rural
Not able to receive decent broadband	2%	0%	11%	7%	3%	22%
Able to receive decent broadband	98%	100%	89%	93%	97%	78%
Superfast broadband	95%	99%	79%	85%	91%	63%
Gigabit-capable	72%	80%	34%	45%	54%	16%
Full fibre	53%	58%	32%	30%	35%	15%

2.4.1 The roll-out of broadband services in the UK is led by private suppliers who determine when and where to deliver services based on commercial considerations, with the result that there is a clear division between connectivity levels in urban areas compared to more rural locations where lower population densities lead to a reduced commercial case for investment. In addition, the data suggests that a higher proportion of residential properties have access to broadband compared to commercial premises and there is generally a more pronounced divide between urban and rural coverage with respect to commercial properties as compared to residential properties.

2.4.2 Overall, Ofcom estimates that around 18,000 (0.6%) premises (homes and businesses combined) in Scotland do not have access to a decent broadband service via either a fixed or FWA network and around 6,600 premises cannot access either a decent fixed broadband service or get good 4G coverage indoors. Aside from a handful of exceptions, all of these premises are in rural Scotland[14].

2.5 R100 Programme

2.5.1 As demonstrated above there is a clear division between connectivity levels in urban areas compared to more rural locations due to the reduced commercial case for investment in the latter locations. R100 aims to overcome this inequality by delivering broadband services in locations where they would not otherwise be provided by the market.

2.5.2 The genesis of the R100 programme was the Programme for Government 2016/17 which included a commitment “to extend superfast broadband access to 100% of premises across Scotland”. R100 was subsequently developed to achieve this goal and is now a central action within the Scottish Government’s Digital Strategy published in 2021[15].

2.5.1 The Investment Objectives for the R100 Programme are as follows:

- Improve business performance in Scotland by facilitating increased productivity, innovation, and access to new markets.

[13] https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-2023/interactive-report; accessed February 2024

[14] Connected Nations 2021: Scotland report (ofcom.org.uk); accessed April 2022

[15] A changing nation: how Scotland will thrive in a digital world - gov.scot (www.gov.scot)

- Improve wellbeing of people across Scotland.
- Reduce the negative impact of the digital divide, through a) addressing regional disparities in provision and b) increased availability amongst groups disproportionately represented in these areas.
- Strengthen communities, including in rural areas, by offering enhanced opportunities to work, trade, and deliver public services, helping to address depopulation.
- Aid the transition to net zero by reducing travel requirements that result from ability to work or engage with others remotely.
- Increase Scotland's capacity to maintain business productivity, activities important for wellbeing, and access to essential services in the face of communication disruption, especially for those rural and island communities.

2.5.2 There are three strands of the R100 programme:

- the over £600 million R100 contracts
- the R100 Scottish Broadband Voucher Scheme (SBVS)
- continued commercial coverage provided by commercial suppliers.

2.5.3 The first two of these are discussed further below.

R100 Contracts

2.5.4 The R100 procurement process was split into three regional lots, namely North, Central, and South as shown in Figure 2-1. All three contracts were awarded to BT, who then appointed Openreach as its delivery partner. The Central and South contract was awarded in December 2019 with builds starting in 2020, and the North contract was completed in December 2020, with build commencing in 2021.

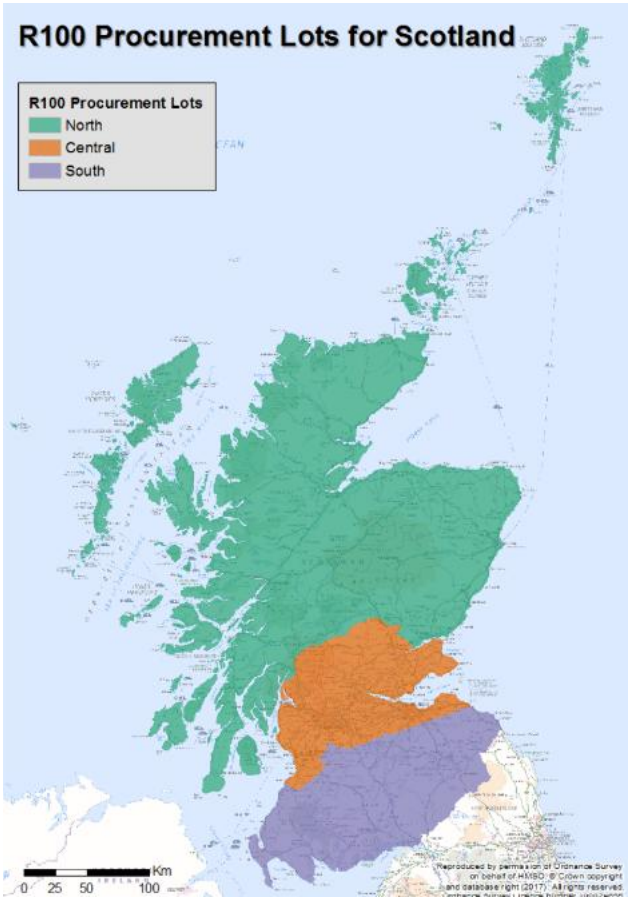


Figure 2-1: R100 Procurement Lots[16]

2.5.5 While initially conceived as a scheme to provide Superfast broadband services, a large proportion of the properties receiving connectivity improvements via R100 have been provided with Gigabit broadband connectivity.

R100 Scottish Broadband Voucher Scheme

2.5.6 The R100 SBVS was launched in September 2020 and provides funding of up to £5,000 to help homes and businesses not in scope of either the main R100 contracts or planned commercial investment to obtain superfast broadband. To access the voucher scheme eligible **property owners must contact registered suppliers** who then apply for the voucher on their behalf. In contrast to the R100 Contracts, attaining broadband via SBVS therefore requires the householder to take the initial action and progress with an application. While an important element of the programme, SBVS makes up a small proportion of the overall programme.

2.5.7 The SBVS scheme is technology neutral, with the solutions offered by registered suppliers determined by an individual property's location. Available technologies include:

- FTTP
- FWA
- FWA using 4G or 5G

[16] Source of image: https://www.scotlandsuperfast.com/r100-programme/about-r100/)

- Satellite - GSO only

2.5.8 As noted above, there are two types of satellite broadband available: GSO and LEO. Currently, no LEO satellite operators have signed up to the R100 programme. As such Starlink is not currently available via R100.

Geographic Scope

2.5.1 The Scottish Government maintains a database of properties which have benefited from the R100 programme, are due to benefit over the upcoming period, and those for whom connections have been delivered commercially. This database is continually updated on a rolling basis as the programme progresses to ensure that Scottish Government funding is only invested where no commercial development is planned. Data from a September 2024 version of this database which focused only on those properties benefitting from R100 or due to benefit from R100 (i.e. those benefitting via commercial deployment were excluded) suggests that 80% of the properties affected by R100 are in accessible, remote or very remote rural areas, with just 17% in urban locations and the remaining 3% in small towns. The areas covered by the programme also include island communities with the delivery of connectivity to these areas bringing additional challenges due to the need for subsea cables.

2.6 Other similar programmes and market interventions

2.6.1 There are a range of other digital infrastructure programmes which have been implemented or are currently being delivered in Scotland, including:

- The UK Superfast Broadband Programme and the Scottish element of this (Digital Scotland Superfast Broadband (DSSB) Programme)
- Local Full Fibre Network
- Project Gigabit

2.6.2 By way of context, each of these are discussed further below.

UK Superfast Broadband Programme and the Digital Scotland Superfast Broadband Programme

2.6.3 The UK Superfast Broadband programme was established in 2010 in response to concerns that the commercial deployment of superfast broadband would fail to reach many parts of the UK. The programme was delivered in three phases:

- **Phase 1:** aimed to extend superfast coverage to 90% of UK premises by December 2016
- **Phase 2:** aimed to extend coverage to 95% of premises by December 2017
- **Phase 3:** aims to provide superfast broadband coverage (or faster networks) in areas where availability remained below the 95% coverage target and extend superfast coverage beyond 95% where possible.

2.6.4 Scotland under the programme titled DSSB was part of the Phase 1 and Phase 2 programme

2.6.5 DSSB involved over £410 million of investment from the Scottish Government, UK Government, Highlands and Islands Enterprise, local authorities, ERDF and the private sector, and was delivered through two regional projects – Highlands and Islands, and the Rest of Scotland. Both contracts went through separate procurement processes, and were ultimately awarded to BT.

2.6.6 The programme aimed to provide users with superfast broadband; over 24Mbps.[17] Most connections delivered through DSSB were FTTC or FTTP. The programme successfully delivered fibre-based access to 95% of home and businesses across Scotland.[18]

2.6.1 The UK Superfast Broadband Programme has now been superseded by Project Gigabit (see below). However, there remain legacy contracts under the Superfast Broadband Programme that are still delivering to homes and businesses. In late 2020, the government approved a further £490 million of new contracts signed to provide mainly gigabit-capable coverage to a further 172,000 premises.[19]

As highlighted above, the R100 project builds on the DSSB programme, with R100 ensuring all homes and businesses can access superfast broadband. Local Full Fibre Network

2.6.2 The Local Full Fibre Network (LFFN) programme launched in 2017 by Building Digital UK (BDUK) an executive agency, sponsored by the UK Department for Science, Innovation and Technology. The programme aimed to accelerate and de-risk deployment of digital infrastructure in order to drive productivity and growth in the UK and had an initial funding envelope of £200million. Local bodies were able to apply for funding from BDUK, and could then choose to deliver locally through one of the following three delivery models within the programme:[20]

- Public-Sector Anchor Tenancy - bringing together local public sector customers, to create enough broadband demand to reduce financial risk of new full-fibre networks
- Public-Sector Building Upgrades - directly connecting public sector buildings, such as schools and hospitals
- Public-Sector Asset Re-use - opening up public sector assets, such as ducts, to allow fibre to be laid more cheaply.

2.6.3 It is understood that the programme largely focused on England. However, in 2022, Highland Council completed a four-year project across Inverness, Fort William, Thurso, and Wick that benefited from funding through the LFFN programme.[21] The programme delivered a gigabit speed fibre optic broadband network which connects 152 public sector sites (schools, hospitals etc).

Project Gigabit

2.6.4 Project Gigabit is the UK government's £5 billion programme that targets hard-to-reach areas where it is more difficult and more expensive to build digital infrastructure. There are three aspects to the programme:

- **Project Gigabit Procurements** - the majority of premises that will be connected by Project Gigabit will be served by the Project Gigabit Procurements element of the Programme. These involve local, regional, and cross-regional contracts with broadband suppliers to deliver gigabit-capable infrastructure to an agreed set of premises.

[17] At the point of delivery, 24Mbps was defined as 'Superfast' broadband. Since, the EU has defined 30Mbps as 'Superfast'.

[18] dssb_understanding_fibre_broadband_speeds_2020_update_v4.pdf (scotlandsuperfast.com)

[19] https://www.gov.uk/guidance/a-councillors-guide-to-project-gigabit

[20] 18-049091-01_LFFN_Wave_1_final_evaluation_technical_annex.pdf (publishing.service.gov.uk)

[21] Public sector and business to benefit from new multi-million-pound full fibre broadband investment | The Highland Council

- **Gigabit Voucher Scheme** - eligible residential and business not currently within Project Gigabit projects can apply for a UK Gigabit Voucher worth up to £4,500 to help cover the costs of installing gigabit broadband. While to date these have focused on locations in England[22], there are a number of active GVS projects in Scotland.

- **GigaHubs** – focuses on connecting public sector buildings, including schools, GP surgeries, libraries and other public buildings, with gigabit-capable broadband in order to improve public services. These premises will act as "hubs" to bring gigabit-capable speeds into the heart of communities. It is anticipated that the investment will also incentivise other broadband suppliers to build off the newly installed network making the surrounding areas increasingly viable for commercial intervention. Data from BDUK Rural Gigabit Connectivity Hubs Evaluation published in December 2023 suggests that between July 2019 and April 2022, there were 1,088 Hub connections, with most being in primary schools. Of these, 173 were in Scotland (16%).[23]

2.6.5 The Scottish Government carried out an Open Market Review of all current and planned infrastructure within the scope area between 21st February 2022 and 21st March 2022 and, following a public review, defined the eligible Intervention Area for potential future procurements under the Gigabit Infrastructure Subsidy Scheme (see Figure 2-2). Premises are defined as either White, Grey, Under Review or Black as per the definitions below. Subsidy is only available for premises defined as white.

- White - indicates premises with no gigabit network infrastructure and none is likely to be developed within 3 years

- Black - indicates premises with two or more qualifying gigabit infrastructures from different suppliers being available, or will be deployed within the coming 3 years

- Grey - indicates premises with a single qualifying gigabit infrastructure from a single supplier is available, or is to be deployed within the coming 3 years

- Under Review - indicates premises where suppliers have reported current or planned commercial broadband coverage, but where claimed current gigabit coverage has not been verified, or, in respect of planned build, where evaluators are confident that gigabit infrastructure will be delivered, but some risks to delivery remain, or there are some gaps in evidence.

[22] Gigabit Broadband Voucher Scheme information - GOV.UK (www.gov.uk)

[23] BDUK_Rural_Gigabit_Connectivity_Hubs_Evaluation.pdf (publishing.service.gov.uk)

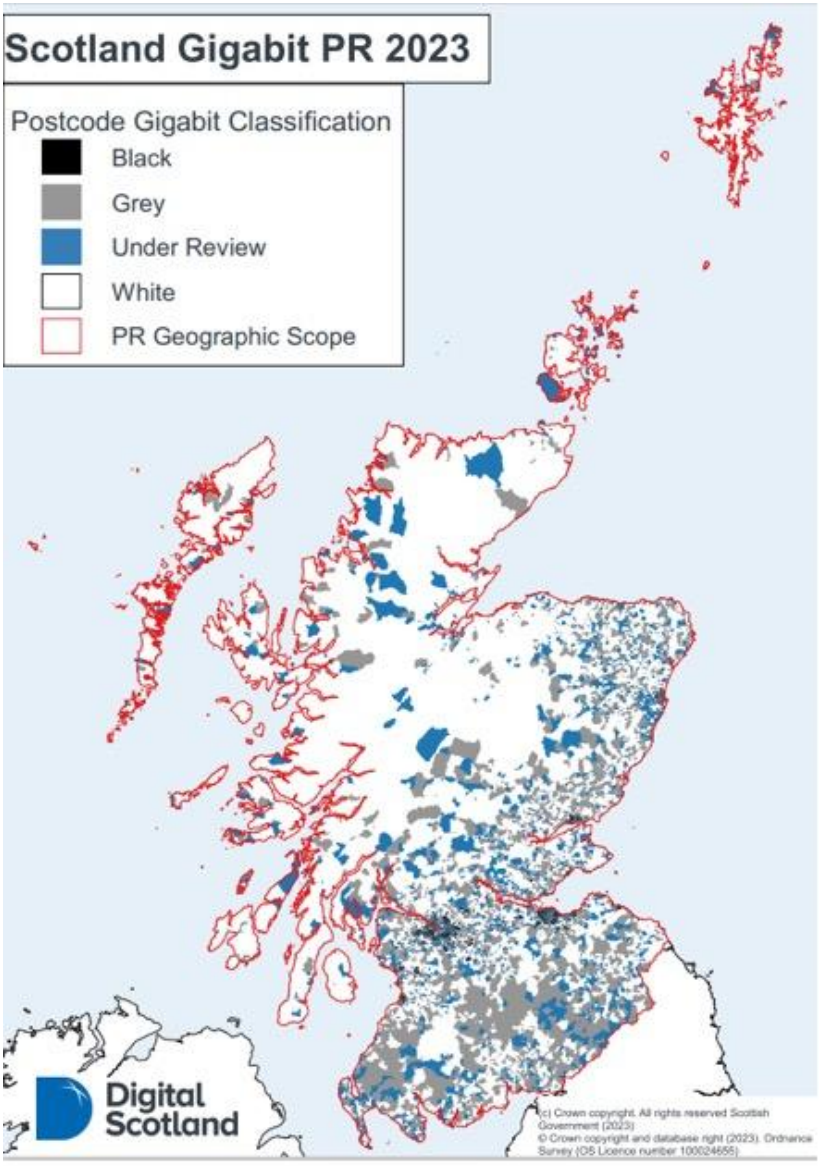


Figure 2-2: Eligible Intervention Area for potential future procurements under the Gigabit Infrastructure Subsidy Scheme – see above text for definitions of colour bands

2.6.6 The Scottish Government has delegated authority from UK Government and performs the role of contracting authority. According to the November 2024 Project Gigabit update[24], in Summer 2024, the Scottish Government launched:

- a local procurement in the Scottish Borders and parts of Mid- and East Lothian, incorporating over 11,000 eligible premises
- a regional procurement in the Dundee, Aberdeenshire and Moray Coast area, incorporating over 68,000 eligible premises.

2.6.7 Further procurements are expected to cover Orkney and Shetland, Fife, and Perth and Kinross.

[24] Project Gigabit progress update – November 2024 - GOV.UK

2.6.8 BDUK also signed a framework agreement with Openreach in 2024 to provide access to gigabit-capable broadband to hard-to-reach premises across the UK. This framework enables the delivery of multiple call-off contracts covering premises in different clusters of geographic regions of the UK. Seven call-off contracts have been awarded under the framework thus far, including a £157 million contract for the delivery of gigabit-capable broadband to 65,000 premises in Scotland.

3 Benefits

3.1 Overview

3.1.1 Prior to developing the research programme, this chapter sets out the results of a high-level review of the wider literature on the benefits of improved broadband connectivity.

3.1.2 To help inform the review and gain insights on the topic of digital exclusion, in addition to consulting relevant literature, a number of one-to-one telephone consultations were undertaken with relevant organisations. The list of organisations consulted is included in Appendix A .

3.1.3 The review is split into sections covering benefits associated with each of the following:

- Employment, education, and training
- Improved access to public services and public sector efficiency
- Schools and pupils
- Online shopping and banking
- Enhanced levels of wellbeing
- Local businesses
- Support for rural communities
- Reduced carbon emissions

3.1.1 The findings from the review were used to help inform the development of a set of logic maps setting out the range of potential ‘outcomes’ and ‘impacts’ which may result from the delivery of the R100 programme, and which will be explored within the research. These are set out in detail in Chapter 4.

3.1.2 A key point in assessing likely benefits is that the large majority of ‘in-scope’ R100 households do have access to 'standard broadband’ (ADSL), rather than no broadband at all. This means that many of the benefits of R100 will be incremental rather than binary in nature. This is discussed further in Chapter 4.

3.2 Employment, education, and training

3.2.1 A key employment benefit of improved broadband connectivity identified within the wider literature is the **ability to work from home** for jobs in some sectors (permanently, or as part of a flexible working arrangement), rather than travel into work.

3.2.2 For example, in a residents’ survey undertaken as part of the 2023 impact evaluation of the BDUK Voucher Scheme, it was found that 57% of working age respondents were using the internet to work from home. Of these, 91% said their upgrade was important in enabling them to do so, with a large proportion (70% in total) stating that it was very important.[25]

25 https://assets.publishing.service.gov.uk/media/650986e7a41cc3000d5613f5/BDUK_Vouchers_Evaluation_Impacts_and_Value_for_Money_Assessment_-_Summary_Report.pdf

3.2.3 Being able to work from home can be a particular benefit in Scotland's rural and island communities where the barriers to accessing employment opportunities are often higher due to long travel distances, high travel costs, and a lack of transport connectivity. Having the ability to work from home also ensures continuity of employment during emergencies, such as the COVID-19 pandemic.

3.2.4 Beyond working from home, a range of related and sometimes consequential employment related benefits arising from improved connectivity can be identified in the literature. These include:

- **Improved access to job advertisements and applications -** the majority of job advertisements and application processes are now online and without a home broadband connection, accessing such opportunities is more challenging.
- **New entrants into the labour market** as previously economically inactive people join the labour force. For example, the most recent evaluation of the UK's Superfast Broadband Programme found that the number of unemployed claimants fell by 9.8 for every 10,000 premises upgraded.[26]
- **Better matching of labour to jobs** as employees in some sectors are no longer limited to jobs within a commutable distance from their home, particularly benefitting people in rural areas.
- **Improved employee productivity** as a result of the reallocation of commuting time to productive activities; fewer work distractions; and reduced absenteeism. For example, the most recent evaluation of the UK's Superfast Broadband Programme found that the turnover per worker amongst (non-relocating) firms in the areas benefitting rose by 0.17%.[27]
- **An increase in the number of hours worked and / or higher wages** as a result of the above, for example:
  - the most recent evaluation of the UK's Superfast Broadband Programme found that hourly earnings of employees working for firms located in the areas affected increased by between 0.6% and 0.8% in response to the upgrade.[28]
  - the evaluation of the BDUK Voucher Schemes published in August 2023 found that 54% of residents surveyed who found a new job or improved their career prospects reported an increased salary. It was estimated that this led to net additional earnings of £9.5m per annum. [29]
- **People electing to set up a new business** as a result of enhanced connectivity.

3.2.5 Through supporting flexible and remote working, enhanced connectivity can also help **particular groups in society** to either enter the labour market or work more hours, including parents, women, carers, and those with disabilities. For example, for Scotland's disabled population, many of whom face mobility or health-related barriers, remote working can remove the need for long commutes or inaccessible workplaces. Similarly, carers, who are disproportionately women, can better balance paid work and care when reliable broadband is

[26] Superfast Broadband Programme - State Aid evaluation report 2023, 21-087286-01_Superfast_State_Aid_Evaluation_-_Main_State_Aid_Report_-_FINAL_VERSION_RedactedV2.pdf (publishing.service.gov.uk)

[27] Overall, turnover per worker increased by 0.42% and 0.17% if only those firms that had not relocated were considered. See Superfast Broadband Programme - State Aid evaluation report 2023, 21-087286-01_Superfast_State_Aid_Evaluation_-_Main_State_Aid_Report_-_FINAL_VERSION_RedactedV2.pdf (publishing.service.gov.uk)

[28] Superfast Broadband Programme - State Aid evaluation report 2023, 21-087286-01_Superfast_State_Aid_Evaluation_-_Main_State_Aid_Report_-_FINAL_VERSION_RedactedV2.pdf (publishing.service.gov.uk)

[29]

available at home. Connectivity can also provide a means for continued engagement in the labour market for older workers seeking phased retirement.

3.2.6 In this way, enhanced connectivity can help increase labour market participation, reduce the gender gap in employment (which is typically higher in rural communities[30]), and improve overall productivity. For example, in its response to the call for evidence on the benefits of improving connectivity in very hard to reach premises, Openreach stated that nationwide-full fibre could result in "*nearly 1,000,000 more people [entering] … the workforce by 2025*", including "*over 300,000 working-age carers, nearly 250,000 older workers, and 400,000 parents of dependent children*" with a resultant increase in GVA of just over 1.3%.[31]

3.2.7 Access to connectivity is now also an essential pre-requisite in order to access **education and training opportunities**. This includes formal online courses as well as online information, research, and videos. As with working from home, the availability of online education services can provide particular benefits for (i) those in Scotland's rural and island communities where the barriers to accessing more traditional face-to-face options are often higher and (ii) groups in society who require a greater degree of flexibility around learning options and / or do not have access to private transport which would enable them to access traditional face-to-face options. Improved connectivity is therefore a critical enabler for educational equity.

3.2.8 In the residents' survey undertaken to help inform the 2023 impact evaluation of the BDUK Voucher Schemes, two thirds (62%) of those surveyed were making greater use of the internet for educational purposes as a result of being able to use the internet more easily and more effectively. There was also some evidence that certain groups in society were more likely to be studying for an adult qualification for the first time, including those in lower skills occupations, those from households with children, and those working part time.

3.2.9 Online education options can therefore help to improve equality of access between rural and urban locations (and between those with access to private transport and those without) and increase participation. It can also be argued that easier access to employment and education can contribute to reduced out-migration, particularly amongst younger cohorts, and help to support the overall viability of the area. This is discussed further in Section 3.8.

3.3 Improved access to public services and public sector efficiency

3.3.1 Improved digital connectivity can also enable individuals to access services, including NHS services[32], government services and social security entitlements[33], helping to increase participation and reduce costs for providers. In Scotland, there has been a growing move to online service provision in recent years and this change is set to continue with the Scottish Digital Strategy, published in 2021, setting out an action to *'transform key public services'* so that '*it is easier to deal online with all levels of government*'.[34] Those without digital connectivity will clearly be excluded from these opportunities.

3.3.2 In the health field, in part spurred by COVID-19, the use of telephone appointments and telemedicine, whereby patients and healthcare professionals connect remotely rather than in a healthcare setting is growing. For example, the Scottish Government's 'Attend Anywhere' video consultation service provides a purpose-built platform to enable patients and healthcare

[30] https://ec.europa.eu/info/strategy/priorities-2019-2024/new-push-european-democracy/long-term-vision-rural-areas/eu-rural-areas-numbers_en

[31] Improving broadband for Very Hard to Reach Premises: Government response - GOV.UK (www.gov.uk)

[32] For example, video healthcare consultations, or online repeat prescription services

[33] For example, the majority of UK social security benefits, including Universal Credit (UC), are primarily applied for and managed online.

[34] A changing nation: how Scotland will thrive in a digital world, 2021, A changing nation: how Scotland will thrive in a digital world - gov.scot (www.gov.scot)

professionals to connect remotely and is used by all 14 health boards in Scotland.[35] Various benefits of such approaches are identified within the literature, including:

- **Travel time and cost savings for patients** – such savings can be particularly beneficial for those living in rural and island communities who would otherwise face costly and time-consuming journeys to mainland hospitals
- **Improved access for hard-to-reach groups** – including disabled people, older adults and those with long-term health conditions many of whom may find travel challenging. Such groups stand to gain significantly but also risk exclusion if affordability or digital literacy barriers remain unaddressed
- **Individuals seeking medical help sooner** – which in turn can lead to the earlier detection and treatment of medical conditions
- **Faster and more direct access to specialists** – which can again be particularly beneficial for those living in remote settings who may otherwise be reliant on specialists visiting their home or local clinic.

3.3.3 There is also evidence that telemedicine can lead to improvements in general health amongst the population. For example, a recent European Commission research report found that increasing the adoption of telemedicine by 5% could lead to a 1.7% increase in citizens' Quality Adjusted Life Years[36] and a 3.6% fall in mortality.[37] Such improvements can also feed through to employment productivity benefits through fewer sick days and / or less time spent undertaking medical appointments.

3.3.4 The adoption of telemedicine and e-services also leads to significant savings for service providers through reduced employee travel times and improved efficiency as well as, in the case of the NHS, savings associated with, for example, the earlier detection and treatment of illnesses; reduced need for hospital admissions / earlier discharges; and enhanced monitoring post treatment.[38]

3.4 Benefits for schools and pupils

3.4.1 Enhanced connectivity can also provide benefits at the school level, helping to deliver efficiencies for education providers and enhancing the quality of education. Examples in the literature of the benefits provided by improved connectivity in the education sector include:

- **ensuring multiple pupils and teachers can access the internet at the same time** – this was identified as a key constraint for one primary school involved in the GigaHub programme[39]
- **improving access to educational content and teaching resources**
- enabling the use of **different teaching resources** including innovative educational tools, such as remote field trips and virtual school exchanges, which can improve the quality of education and enhance pupil engagement

[35] see Evaluation of the Attend Anywhere / Near Me video consulting service in Scotland, 2019-2 (www.gov.scot)

[36] A quality adjusted life year (QALY) is a metric which measures the healthy years lived by an individual

[37] 2018_provision_marketstudy_telemedicine_en_0.pdf (europa.eu)

[38] Deloitte: The Economic and Social Impacts of Enhanced Digitalisation in Scotland (2015); Evaluation of the Attend Anywhere / Near Me video consulting service in Scotland, 2019-2 (www.gov.scot)

[39] Connecting gigabit communities: Revisiting rural schools. April 2024, Connecting gigabit communities: Revisiting rural schools - GOV.UK (www.gov.uk)

- **enabling small rural and island schools to coordinate classes** together through teleconferencing, reducing the negative impacts associated with staff shortages

- **efficiencies in terms of management activities / greater use of cloud storage** - evidence from the evaluations of the GigaHubs programme found that schools benefiting from the programme use digital connectivity more often in a range of admin tasks (finance, pupil data management etc).[40]

- **Reducing workloads** - for example, 60% of school staff who responded to the 2022 School Benefits survey undertaken to inform the interim evaluation of the GigaHubs programme said workloads had reduced or were expected to reduce as a result of the technological changes adopted.[41]

- **improving pupil attainment** – for example, in the survey above, 95% of the school staff responding stated that the technology enabled by the broadband upgrade had already or was expected to affect pupil attainment.[42]

3.4.2 Providing enhanced broadband connectivity at home can also facilitate learning and development amongst children. In a residents' survey undertaken to help inform the 2023 impact evaluation of the BDUK Voucher Schemes, 64% of households with children were using the internet for their children's education, with 88% stating that the upgrade was important in enabling them to do so.[43]

3.4.3 Having a reliable and fast internet connection at home is also an essential pre-requisite for remote learning and an often-essential requirement for homework. The ability to undertake remote learning was particularly important during the COVID-19 pandemic and was a particular challenge in some rural locations due to limited connectivity, with the National Association of Local Councils reporting that some students were required to attend school by exception, due to poor connectivity at home.[44] The pandemic accelerated and increased the use of online resources in schools. Where connectivity remains poor, pupils risk falling behind urban peers, exacerbating attainment gaps that already exist between rural and urban areas.

3.4.4 Providing improved connectivity in rural locations (whether at school and/or at home) should also lead to rural children having increased digital competency now and, in the future, which **helps reduce the digital divide** in the long-term. This is increasingly important given the importance of digital skills in the job market. For example, recent research indicates that 75% of all job advertisements in Scotland which are classified as 'low skilled' now require baseline digital skills.[45]

3.5 Online shopping and banking

3.5.1 In addition to public services, internet access also opens-up opportunities to access online and mobile shopping and banking services. For example, in the residents' survey undertaken to help inform the 2023 impact evaluation of the BDUK Voucher Schemes, more than 40% of

[40] BDUK_Rural_Gigabit_Connectivity_Hubs_Evaluation.pdf (publishing.service.gov.uk)

[41] SlidePack_HubsSchoolSurvey_20231212_Accessible__1_.pdf (publishing.service.gov.uk)

[42] SlidePack_HubsSchoolSurvey_20231212_Accessible__1_.pdf (publishing.service.gov.uk)

[43] BDUK_Vouchers_Evaluation_Impacts_and_Value_for_Money_Assessment_-_Full_Technical_Report.pdf (publishing.service.gov.uk)

[44] Improving broadband for Very Hard to Reach Premises: Government response - GOV.UK (www.gov.uk)

[45] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807830/No_Longer_Optional_Employer_Demand_for_Digital_Skills.pdf

households surveyed said that the upgrade in connectivity had made it easier for them to use online banking and online shopping.[46]

3.5.2 Undertaking shopping and banking online saves significant travel time which can be spent doing other, more productive activities. Online shopping also provides consumers with choice and savings through greater competition. It could be argued that the benefits of online are perhaps more substantial in remote locations where choice is limited (and therefore prices are higher), and travel times are longer.

3.5.3 While access to online shopping and banking services brings benefits, however, there are also potential negative impacts, with increased use of online services contributing to a decline in the number of local shops, the closure of bank and building society branches, and the removal of ATMs. For example, in Scotland, the number of bank and building society branches fell by 34% between 2012 and 2021, while the number of ATMs fell by 16% between 2018 and 2022.[47]

3.5.4 The closure of such services can be particularly challenging in rural and island communities where local shops and bank branches can play a vital role in community cohesion. In addition, if digital services replace local provision, such as banking or council services, without inclusive alternatives there can be a disproportionate impact on certain groups in society including older people, low confidence users and those on lower incomes, who may experience feelings of increased isolation.

3.6 Enhanced levels of wellbeing

3.6.1 There is much discussion in the literature on the ability of improved digital connectivity to improve levels of both individual and community wellbeing. Various mechanisms or drivers for this are identified, including:

- reduced social exclusion and isolation as a result of being more able to keep in touch with family and friends and there being more opportunities for social interaction through video / online calls, messaging, and social media platforms such as Facebook and Instagram[48]
- improved feelings of connectedness through access to online news media
- access to a wide range of entertainment opportunities and streaming services
- access to higher quality jobs, education, health and government services
- reduced feeling of injustice / missing out as compared to people located elsewhere in the country
- greater potential for communities to organise online leading to improved community resilience[49]
- improved physical well-being through access to digital health devices which record and track activity

[46] BDUK_Vouchers_Evaluation_Impacts_and_Value_for_Money_Assessment_-_Full_Technical_Report.pdf (publishing.service.gov.uk)

[47] Statistics on access to cash, bank branches, and ATMs, House of Commons Library, 2022, https://researchbriefings.files.parliament.uk/documents/CBP-8570/CBP-8570.pdf

[48] Deloitte: The Economic and Social Impacts of Enhanced Digitalisation in Scotland (2015)

[49] Community resilience can be understood as the cohesion and strength of a community

- increased independence of people with disabilities through access to online services which help to reduce dependence on others

3.6.2 In a residents' survey undertaken to help inform the 2023 impact evaluation of the BDUK Voucher Schemes[50], it was found that:

- 53% of residents reported that their broadband upgrade had **increased their life satisfaction**, with results even higher for working aged people (56%) and households with children (57%)

- 7% of respondents said they **felt less lonely** after the upgrade, with this being significantly higher for some at risk and vulnerable groups, including one-person households (18%), low-income households (16%) and people who were economically inactive (20%)

3.6.3 While improved digital connectivity has the potential to improve wellbeing and mental health in various ways, it should be noted that there is also the potential for negative impacts. For example, the movement to online connections can lead to a decrease in opportunities for face-to-face interactions. As discussed above, this can be particularly challenging for those who are unfamiliar with or do not or cannot use online resources who can feel further excluded from society.

3.6.4 There is also a broader debate as to the overall benefits or disbenefits of social media on mental health and wellbeing. In Ofcom's 2024 Adults' Media Use and Attitudes survey, while 39% of adult users agreed that social media apps are generally good for their mental health, a considerable proportion (21%) disagreed with this statement. Similarly, while 37% agreed that use of social media platforms made them feel better about themselves, 21% disagreed with this statement. The above results differed amongst different groups in society, with young people (16-25) generally identifying more positive impacts than older people (>65).[51]

3.6.5 It is also worth noting that capturing wellbeing benefits can be particularly challenging, in part because they cannot be directly quantified or monetised as is the case with economic benefits. For example, the evaluation of the UK's Superfast Broadband Programme[52] examined the wellbeing impacts of the programme in a number of ways as set out below, with each producing varying results and the evaluation ultimately concluding that further research in this area was required:

- Wellbeing valuation which linked the broadband programme to well-being data in national surveys – which found that there was a wellbeing uplift equivalent to £222 per year per premise compared to premises without broadband access[53]

- A postal survey of upgraded and non-upgraded households and in-depth interviews – which found that there was no statistically significant difference in personal wellbeing between those living in upgraded and non-upgraded households

- A review of personal wellbeing reported in longitudinal social surveys – which indicated there was no significant effect on the population living in upgraded areas

[50] BDUK Vouchers Evaluation Impacts and Value for Money Assessment - Full Technical Report.pdf (publishing.service.gov.uk)

[51] Adults' media use and attitudes 2024: interactive report - Ofcom

[52] Superfast Broadband Programme Evaluation: Key Benefits and Impacts, 2020 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/958225/DCMS_Superfast_Findings_Briefing_v1.pdf#:~:text=The%20Evaluation%20of%20the%20Superfast%20Broadband%20Programme%20is,Government%E2%80%99s%20investment%20in%20improved%20digital%20infrastructure%20through%20BDUK.

[53] Evaluation of the Economic Impact and Public Value of the Superfast Broadband Programme, 2018 Report https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734855/Superfast_Integrated_Report.pdf

- House price analysis – based on a revealed preference method to identify the value house buyers placed on broadband connectivity which found that the programme led to an increase in house prices of between 0.56% and 1.16%

3.7 Benefits for local Businesses

3.7.1 Improved connectivity has the potential to provide a range of economic benefits for local businesses. The mechanisms for this identified in the literature include:

- **Homeworking** – from a business perspective, this can lead to the following benefits:
  - Better matching of labour to jobs as employers are not limited to employees who are geographically contiguous to them – also leading to UK level productivity improvements
  - Improved employee productivity as a result of the reallocation of commuting time to productive activities; fewer work distractions, and less absenteeism
  - Improved recruitment and retention as a result of the above
  - Reduced overhead costs, including office space where this is no longer required or can be reduced and reduced travel times / expense where connectivity enables lead to reduced business travel
- **More efficient day-to-day management** – through the use of online administrative systems and services, such as online banking / faster payments and cloud-based computing. For example, in the **farming industry**, improved digital connectivity can facilitate precision farming whereby technology is used to manage crops or livestock, helping to improve efficiency, increase yields and profits, and lessen environmental impacts - in their submission to the June 2021 call for evidence on the benefits of broadband in very hard to reach premises, the Agricultural Productivity Task Force noted that dairy farmers save approximately 20% on labour through the use of robotic milking systems and some farmers reported increases in milk yields of 2-12%.[54]
- **An increase in the quantity and quality of training for employees** due to the availability and lower cost of online courses.[55]
- **More efficient promotion via online webpage and / or social media**
- **Product or service improvement or innovation** – whereby improved connectivity facilitates the delivery of improved or new goods and / or services.
  - For example, specifically relating to the **tourism industry**, there is now an expectation from the majority of tourists that there will be a fast and reliable internet connection at their accommodation, with visitors often choosing providers on this basis. Where an accommodation provider benefits from an enhancement in connectivity, there may therefore be an increase in demand for services and / or an improved customer experience. The former may be particularly the case where the improvement is significant e.g. from limited to no access to Superfast or Gigabit broadband. In research with the beneficiaries of the Local Full Fibre Network (LFFN) programme undertaken with hotel proprietors in Blackpool in Summer 2021,[56] improved customer experience was identified as a key benefit, with all those surveyed

[54] Improving broadband for Very Hard to Reach Premises: Government response - GOV.UK (www.gov.uk)

[55] Superfast Broadband Programme – State aid Evaluation Report (publishing.service.gov.uk), 2020

[56] Blackpool - connectivity and tourism case study - GOV.UK (www.gov.uk)

noting that they had received very positive feedback from customers since the improvement in connectivity.

- **Access to new markets** – improved connectivity can open-up access to new markets via online sales including through business websites and e-commerce sites such as eBay and Amazon. Access to such sites can be a particular driver for the establishment of home-based companies and sole traders working from home.

- **Greater resilience** – through access to an additional mechanism by which to deliver business activities and an additional means of communication. This is particularly important during periods of e.g. weather, travel or other disruptions and was vital for many businesses' continued survival during the COVID-19 pandemic.

3.7.2 While connectivity enhancements can provide a range of benefits for businesses, it is also important to recognise that microbusinesses and sole traders, which make up a large share of Scotland's rural enterprises, may lack capacity to navigate complex application processes or invest in new technology. In delivering enhancements, it is therefore important to ensure there are equitable opportunities for small-scale operators as well as larger firms.

3.8 Support for Rural Communities

3.8.1 Access to digital connectivity can also play a significant role in the continued sustainability of rural communities.

3.8.2 There can sometimes be a 'circle of decline' (see Figure 3-1) in rural locations whereby limited employment and education opportunities leads to the outmigration of particularly younger cohorts. This leads to a lack of critical mass for services / infrastructure and lower rates of business creation which further reduces employment and education opportunities. Enhancing digital connectivity can help to break this cycle as improved connectivity can make activities, including the delivery of education, services, and business activities viable in less central locations.

3.8.3 Form an economic perspective, where the business benefits identified above lead to an increase in sales either directly as a result of opening new channels to market or indirectly as a result of productivity gains, there can be a resultant increase in turnover and a potential increase in demand for workers which creates jobs in the local economy. For example, it is estimated that firms in the area benefitting from the Superfast Broadband Programme saw turnover grow by almost 1% between 2012 and 2018 while local employment increased by 0.6%, leading to the creation of 17,600 local jobs by the end of 2018.[57]

[57] Superfast Broadband Programme – State aid Evaluation Report (publishing.service.gov.uk), 2020

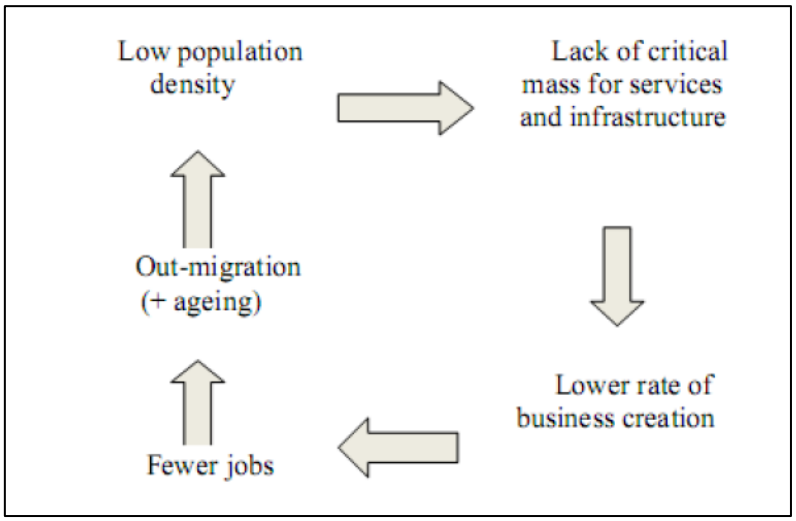


Figure 3-1: Circle of Decline in Rural Regions[58]

3.8.4 It is also the case that enhanced connectivity can lead to **both people and firms relocating to the areas** benefitting from the enhancements which in turn helps to diversify and develop the rural economy. Evidence from the evaluation of the Superfast Broadband Programme indicates that:

- the enhancements in connectivity stimulated in-migration, with the number of patients registered with GP surgeries in the areas affected increasing by between 3-6% on average and suggestions that the number of pupils in affected schools had increased[59].
- the programme led to an increase in house prices (of between £1,900 and £4,900)[60]
- a share of the local economic impacts identified were a result of businesses relocating to the area, with the number of businesses in the areas affected growing by 0.5%, suggesting that the programme may have encouraged the 'dis-agglomeration' of economic activity to rural areas[61]

3.8.5 Similarly, while not a rural area, research with the beneficiaries of Local Full Fibre Network funding undertaken in Blackpool in summer 2021 identified various investments in the area which were reliant on the connectivity provided. This included the establishment of the Winter Gardens Conference Centre and the Digital Nomad Hotel, which offers long term stays to professionals seeking to work remotely in a new location. The research identified *"a diversification of the local economy and a reduction in the 'brain drain' to cities … as local residents can find skilled, professional jobs in their local area"* as a potential long-term consequence of investment in digital infrastructure.[62]

3.8.6 While increased in-migration is likely to have positive impacts, particularly in terms of rural sustainability, there may also be negative impacts if there is no commensurate expansion in public service provision. For example, the evaluation of the Superfast Broadband Programme noted that increased in-migration to the areas affected by the improvements had appeared to

[58] Skerratt, S., (2010) "Hot Spots and Not Spots: Addressing Infrastructure and Service Provision through Combined Approaches in Rural Scotland2, Sustainability, 2, 1719–1741.

[59] Superfast Broadband Programme – State aid Evaluation Report (publishing.service.gov.uk), 2020.

[60] Superfast Broadband Programme - State Aid evaluation report 2023, 21-087286-01_Superfast_State_Aid_Evaluation_-_Main_State_Aid_Report_-_FINAL_VERSION_RedactedV2.pdf (publishing.service.gov.uk)

[61] Superfast Broadband Programme - State Aid evaluation report 2023, 21-087286-01_Superfast_State_Aid_Evaluation_-_Main_State_Aid_Report_-_FINAL_VERSION_RedactedV2.pdf (publishing.service.gov.uk)

[62] https://www.gov.uk/government/publications/blackpool-connectivity-and-tourism-a-lffn-case-study/blackpool-connectivity-and-tourism-case-study

place pressure on some public services such as access to GP care and that this may have partly off-set positive well-being scores amongst the population.[63]

3.8.7 It is noted that local improvements in business productivity as a result of enhanced efficiency can also be translated into an increase in overall economic output. However, where an increase in turnover is a result of firms moving from other locations, there will be a consequent loss of economic activity in these locations (displacement) and therefore such benefits would not translate into national level benefits.

3.9 Reduced Carbon Emissions

3.9.1 There is much discussion in the literature on the potential for enhanced digital connectivity to lead to reduced carbon emissions. In terms of broadband, the main mechanism identified for this is a reduction in travel as a result of home working and / or increased use of online services. For example, while the exact mechanisms involved are highly complex, a recent study conducted by the Carbon Trust found that home working led to reduced emissions on average in all six countries examined, with the carbon saving associated with avoided commuting and avoided office emissions outweighing any additional domestic energy consumption.[64]

3.9.2 Similarly, the 2023 evaluation of UK Gigabit Voucher Scheme found that the reduction in travel amongst households affected had reduced by over 500,000 miles per week, mainly as a result of working from home, resulting in substantial carbon savings.[65] After accounting for increased domestic energy usage and avoided energy consumption in the workplace, BDUK estimated that the Gigabit Voucher Scheme had led to a net reduction of 7,600 tonnes of CO_2e over a three-year period.[66]

3.9.3 While improved digital connectivity has the potential to reduce emissions at the local level, it should be borne in mind that when the whole life cost of technology use is considered, the overall net impact is less clear. For example, the mining and extraction of raw materials for IT equipment emits significant greenhouse gases and contributes to increased e-waste.[67] In addition, cloud services and data processing are an increasing source of emissions.[68]

3.10 Quantification of Value for Money

3.10.1 The above sections referred to the quantification of some benefits in the context of the BDUK schemes and the rollout of the Superfast Broadband Programme. Three sample evaluations have been looked at in more detail from this perspective.

BDUK Vouchers Evaluation: Impacts and Value for Money Assessment (2023)

- Scheme outline: 'Standard' and 'Project' vouchers were used to connect premises in small areas in all parts of the UK, often benefitting individual premises, streets or

[63] Superfast Broadband Programme – State aid Evaluation Report (publishing.service.gov.uk), 2020

[64] Homeworking Report: An assessment of the impact of teleworking on carbon savings and the longer-term effects on infrastructure services, Carbon Trust, 2021, https://www.vodafone-institut.de/wp-content/uploads/2021/06/CT_Homeworking-report-June-2021.pdf

[65] BDUK_Vouchers_Evaluation_Impacts_and_Value_for_Money_Assessment_-_Summary_Report.pdf (publishing.service.gov.uk)

[66] BDUK_Vouchers_Evaluation_Impacts_and_Value_for_Money_Assessment_-_Summary_Report.pdf (publishing.service.gov.uk)

[67] Impacts of the digital transformation on the environment and sustainability, R. Liu et al, 2019, https://ec.europa.eu/environment/enveco/resource_efficiency/pdf/studies/issue_paper_digital_transformation_20191220_final.pdf

[68] Advanced Technologies for Industry – At Watch, Technology Focus on Clous Computing, December 2020, AT Watch Cloud.pdf (europa.eu)

neighbourhoods rather than contiguous areas covered by local area procurements (analogous to R100 voucher scheme). Ran from 2018 to 2021.

- Scheme spend: **£125m** to 2021
- Research Approach: 25,000 residential surveys sent, 5,000 received – before and after ratings of life satisfaction between 1-10 where the change is multiplied by £13,000 per annum (WELLBY)[69]; Use of ONS Business Structure Database (via ONS Secure Research Service) to analyse business characteristics in the study area and control area

3.10.2 In terms of quantification:

- Productivity gains: £37.5m (employment growth versus control groups – additional jobs found to be in higher productivity roles (wage premium) so factored up)
- Wellbeing benefits: £114-£195m (subjective wellbeing approach)
- Environmental £2m
- Total benefits of £153m to £235m giving BCRs of **1.22 to 1.88**

BDUK Rural Gigabit Connectivity Hubs Evaluation, 2023

- Scheme outline: The Hub product invests in connecting remote public buildings, such as schools, GP surgeries and libraries, to gigabit-capable broadband. Connected 1,100 hubs
- Scheme spend: **£28m** to 2021
- Approach:
  - Surveys sent to 508 English schools – 112 complete responses

3.10.3 In terms of quantification:

- *Looking only at the changes in spending on educational technologies in school Hubs, there is evidence that benefits are on track to be greater than costs in monetary terms in that there is evidence of payback. The Hub schools are spending more on educational ICT than is the case in comparable schools and that this switching of resources, if maintained for five years, will be similar to the cost of the connection. This measure focuses only on one school activity and so would understate overall effects, not including other effects that the study finds but cannot be valued.*

Evaluation of the Superfast Broadband Programme (Phase 3), 2023

- Scheme outline: The scheme aimed to provide superfast broadband coverage (or faster networks) in areas where availability remained below the 95 percent coverage target and extend superfast coverage beyond 95 percent where possible (analogous to R100 main contract). Covers period 2016-20 and 289k premises upgraded (269k being residential)
- Scheme spend: **£273m**
- Research Approach: econometric analysis that compared areas benefitting from the programme to other postcodes that were eligible for subsidies - Business Structure

[69] Wellbeing_guidance_for_appraisal_-_supplementary_Green_Book_guidance.pdf (publishing.service.gov.uk)

Database (BSD) via Office for National Statistics (ONS) Secure Research Service (SRS); house prices used as a proxy for social benefits; significant supply side analysis

3.10.4 In areas benefitting from Phase 3, the following benefits were estimated:

- Employment impacts (+0.88%)
- Turnover (+1.6%)
- Number of firms (dis-agglomeration) (+0.5%)
- Turnover per worker (+0.42%)
- Wages (+0.7%)
- Unemployment (unemployment claims fell by 9.8 per 10,000 premises affected)
- House prices (+£1,900 to +£4,900)

3.10.5 UK level benefits were estimated at:

- Productivity - £7.2m (2016/17 to 2021/22)
- Reduction in long term unemployment - £5.5m
- Social benefits (house prices) - £370m-£947m (assuming *house price premium is a reasonable approximation of the average welfare gain associated with the programme*)
- Short term BCR (2016-22) **1.76 to 4.57**

3.10.6 In both cases where comprehensive quantification was undertaken, the social benefits are by far the dominant factor. The techniques to quantify these wellbeing benefits are much less well developed than the techniques to undertake economic impact evaluation and the caveats around this are recorded in both the above reports. Indeed, in both cases, had only the economic impacts been quantified, BCRs of less than one would have been achieved, and a very low value indeed would have emerged from the Superfast Broadband evaluation work.

3.11 Digital Exclusion

3.11.1 Digital Exclusion can be broadly defined as being unable to use the internet and benefit from digital technology. There are a range of factors which contribute to someone being digitally excluded. These can broadly be divided into the following categories:

- **connectivity and coverage –** a suitable connection being unavailable in the location where someone lives
- **affordable access** – an inability to afford the purchase costs for a device and / or the ongoing cost of the connection. The cost of assistive technology likely to present additional barriers to those with disabilities
- **skills / confidence** – a lack of digital skills / confidence to use the internet and / or use the internet safely.
- **motivation** – an inability to see the benefits of internet use / lack of desire to use the internet

3.11.2 Both skills / confidence and motivation can be impacted by a fear of things going wrong and / or concern around online harms and risks (such as scams).

3.11.3 While there is no comprehensive data source on digital exclusion, there are a number of datasets which provide an insight into which segments of the population are more likely to be digitally excluded. These include Ofcom's data on adults' media use and attitudes[70] and Lloyds Bank Digital Index.[71] Key points from each of these is set out below.

Ofcom's 2024 Adults' Media Use and Attitudes:

3.11.4 Ofcom's 2024 Adults' Media Use and Attitudes Report is published annually and is based on data from Ofcom's Adults' Media Literacy Tracker surveys. Key points from the 2024 report include:

- across the UK as whole 6% of respondents did not have the internet at home, with a higher proportion in this category in Scotland (8%)
- there are a range of reasons for not having the internet. While 1% said it was because they did not have broadband where they live and a further 1% said it was because broadband was too slow where they live, the reasons which achieved the highest responses related to motivation, skills / confidence and affordability, with:
  - 69% stating that they did not need to go online or were not interested
  - 17% stating that using the internet is too complicated
  - 16% stating that someone else can go online for them if necessary
  - 9% concerned about internet security / fraud / privacy
  - 9% stating that getting connected is too complicated
  - 9% stating that broadband set up costs are too high
  - 8% stating that the monthly fixed price of broadband is too high
- **those who did not have the internet at home were more likely to be over 65 and in the lowest social grades**.[72]

Lloyds bank Digital Index

3.11.5 The Lloyds Bank Digital Index is published annually and is based upon the behavioural and transactional data of 1 million consumers. Key points from the '2023 UK consumer digital index' include:

- 2.1 million people in the UK (4%) are offline[73]

[70] https://www.ofcom.org.uk/siteassets/resources/documents/research-and-data/media-literacy-research/adults/adults-media-use-and-attitudes-2024/adults-media-use-and-attitudes-report-2024.pdf?v=321395

[71] 231122-lloyds-consumer-digital-index-2023-report.pdf (lloydsbank.com)

[72] 19% of over 65s did not have the internet at home and 12% of those in ONS Social Grade DE (Semi-skilled & unskilled manual occupations, Unemployed and lowest grade occupations) compared to 1% in ONS Social Grade AB (Higher & intermediate managerial, administrative, professional occupations)

[73] The ONS* definition of 'online' is having engaged with the Internet in the last three months. This remains the current industry definition

- compared to the online users, **those who do not use the internet are more likely to be older** (with an average age of 59 compared to 43 for online users); **retired** (34% versus 7%), **have a health condition** (49% versus 23%), and **have no formal qualifications** (24% versus 7%)

- whilst the majority of those offline are over 50 (85%), there are still around 310,000 people (15%) under the age of 50 in this category – **not all of the digitally excluded are therefore in the older age bracket**

- 65% of the population have high or very high digital skills, with the proportion in this category increasing. However, 6.8 million people (13%) have 'ultra-Low digital skills' – **despite skills increasing, there is therefore still a considerable segment of the population who do not have the required skills to use the internet effectively**.

- **Amongst those with ultra-low digital skills, two thirds are over the age 70 and almost three in five (59%) earn £20,000 per year or less**. There is also a higher proportion of females compared to males in the ultra-low category (14% versus 12%)

3.11.6 It is evident that there are a range of factors which may contribute to someone not having the internet at home. While R100 aims to overcome issues associated with connectivity and coverage and may result in cost savings with respect to the connection for some, it does not tackle barriers associated with the affordability of the device and / or a lack of skills, confidence, and / or motivation. It is therefore likely that these factors will contribute to some people not taking up the connection provided via R100.

3.12 Conclusions

3.12.1 This chapter has reviewed the relevant literature on digital connectivity and identified a diverse range of potential benefits which cover multiple policy areas, including economic, health, education, environment, community, and other social goals.

3.12.2 The provision of such services in rural areas acts to mitigate the barriers to access such as long travel distances and can help improve equality of access between rural and urban locations. There is, however, the potential for some negative impacts, particularly where, for example, some groups in society get 'left behind' by digital improvement. The literature review has also demonstrated some of the challenges in measuring the potential social benefits of the improvements.

4 Logic Maps

4.1 Overview

4.1.1 Drawing on the benefits of enhanced digital connectivity identified within the wider literature, this chapter:

- sets out a series of logic maps specifying the range of potential outcomes and impacts which may result from the delivery of the R100 programme for different groups in society
- explores how the potential benefits will differ for each individual property affected, depending on the starting and end position in terms of broadband connectivity and the number of internet users based at the property / how the internet is used.

4.2 Logic maps

4.2.1 Logic maps are diagrams that show the underlying mechanisms through which an action leads to a certain result, by showing the logical steps along an anticipated route from inputs to outputs to outcomes to impacts. Logic maps are central to the evaluation process as they define different chains of causality that help the evaluator to scope and assess the benefits which could emerge from an investment.

4.2.2 Drawing on the findings from the literature review, four logic maps have been developed for the R100 programme, one for each of the following broad categories of beneficiary:

- residents
- businesses
- public service providers

4.2.3 The logic maps are provided in Figure 4-2 below.

4.2.4 The main components of the logic maps are set out in Figure 4-1 and include:

- **Context:** The problems and opportunities which R100 is seeking to address. This effectively forms the rationale for proceeding with the R100 i.e., the case for change which underpins the business case.
- **Input:** The investment and processes required to deliver R100.
- **Outputs:** The direct deliverable(s) from R100 i.e. the improvement in connectivity provided.
- **Outcomes:** Changes in behaviour which result from the changes in connectivity (outputs).
- **Impacts:** Societal changes which occur as a consequence of the changes in connectivity (outputs) and the changes in behaviour (outcomes) which stem from the intervention, e.g., reduced economic inactivity / unemployment, higher productivity, land-value uplift etc.

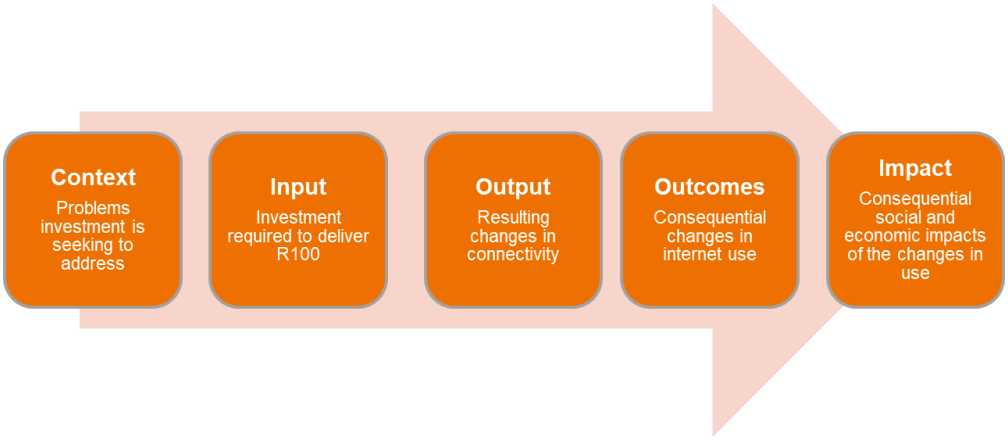


Figure 4-1: Logic map components

4.2.5 It is important to recognise that outputs, outcomes, and impacts materialise at different times.

4.2.6 Whilst outputs are delivered upon project completion or once the investment is operational, outcomes and impacts take longer to materialise, with some longer-term impacts taking 10-15 years to become apparent. In addition, there is a time-lag in the availability of some secondary data sources for measuring outcomes and impacts with, for example, some datasets only produced every ten years in line with Census reporting periods. This acts to further extend the period between the investment being delivered and the time when it is possible to report on its full impacts.

4.2.7 This research is being carried out during the R100 rollout and many of those who have benefitted from R100 to date have only experienced the improved connectivity for a relatively short period of time.[74] As such, **the research will not capture all of the benefits of the programme**. It will, however, provide an indication of the emerging outputs and outcomes and the potential impacts of these.

[74] It is noted that due to the different timeframes of the R100 contracts (see section 2.5), the time period over which beneficiaries have experienced the improved connectivity differs by geography with those benefitting from the programme who are based in the Central and South lots generally having experienced the improved connectivity for a longer period of time than those based in the North lot.

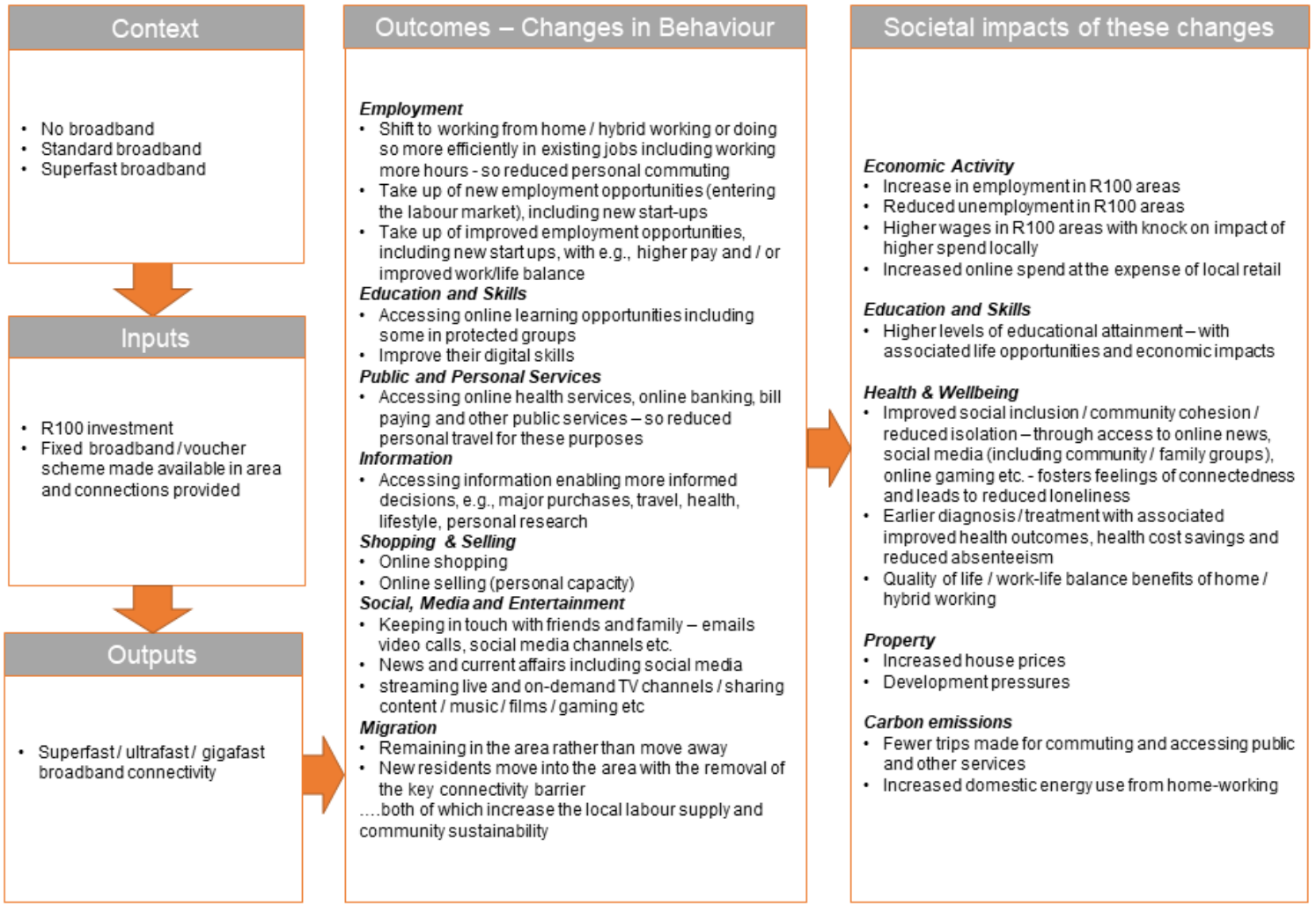


Figure 4-2: Resident logic map

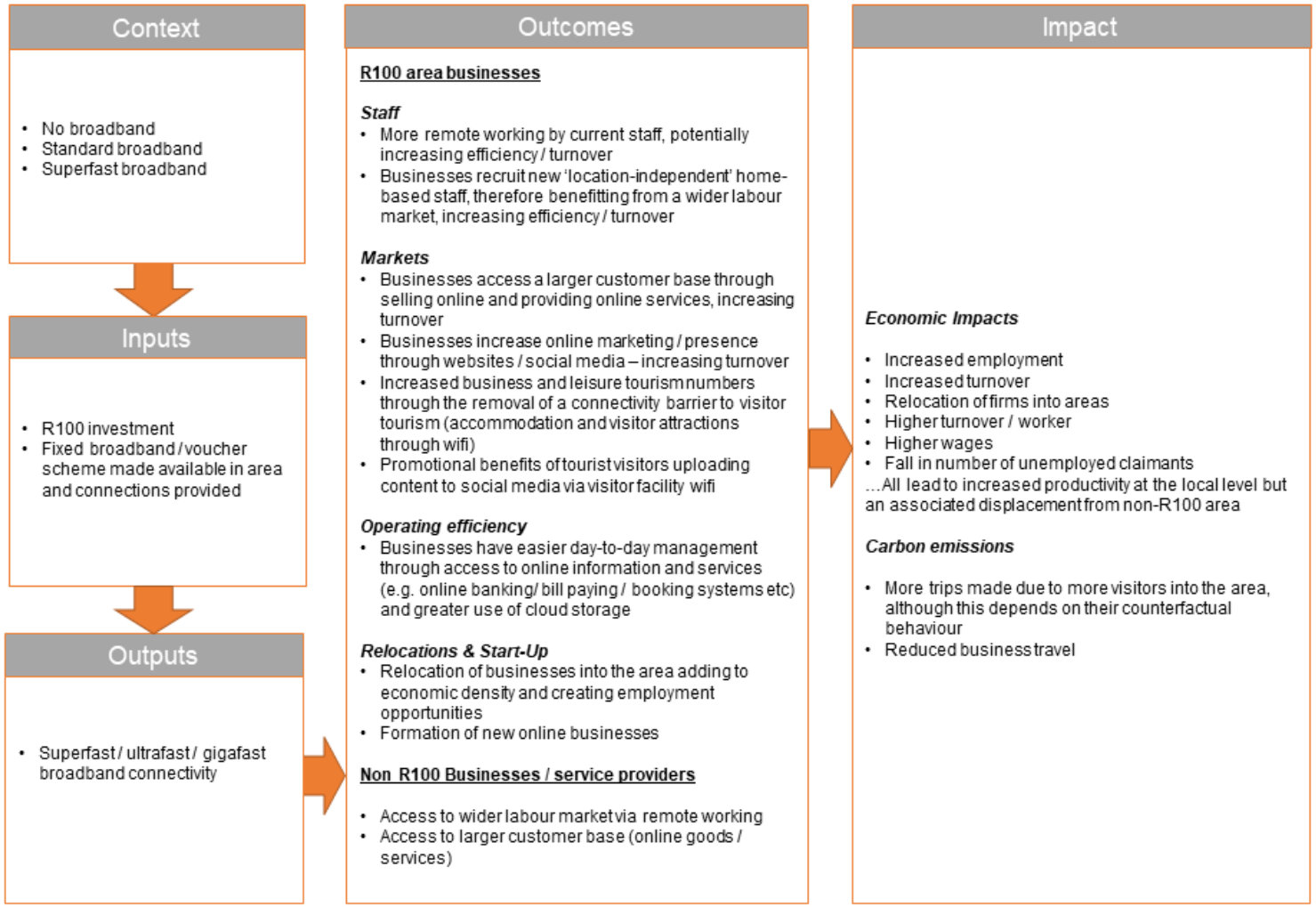


Figure 4-3: Business logic map

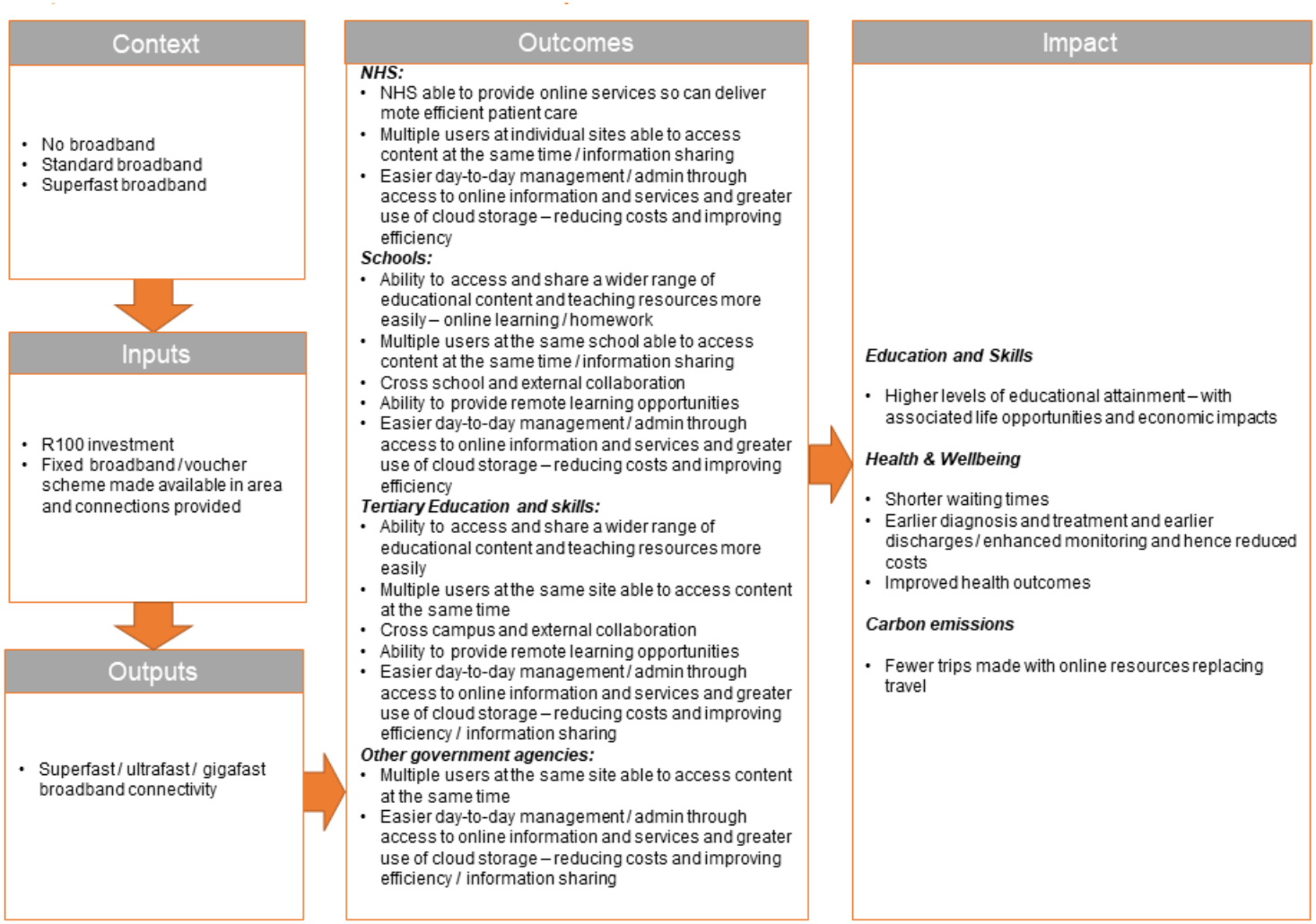


Figure 4-4: Public service provider logic map

4.3 Scale of Potential Benefits

4.3.1 The range of potential benefits experienced by a household or business affected by the R100 programme will depend on:

- their 'base' or starting position with respect to broadband connectivity
- their 'end' position in terms of broadband connectivity following the delivery of R100
- the number of people using the connection at the property
- the activities undertaken by these people e.g. email, making high-definition calls, streaming / uploading content etc
- The length of time since R100 connectivity has been in place for a given area or premises – it is expected than some impacts will take longer to materialise than others.

4.3.2 Prior to the delivery of the R100 programme, some properties will have had no internet connection, and some will have some level of existing broadband connectivity. Post the delivery of R100, properties may benefit from superfast, ultrafast or gigabit broadband.

4.3.3 An initial review of data indicates that the majority of the properties scheduled to be affected will have had some level of broadband connectivity already. As such, for the majority of affected premises the benefits of R100 will be incremental rather than binary in nature i.e. the programme will enable people to do things online more easily.

Internet use and benefits by person type

4.3.4 As discussed above, the range of potential benefits experienced by a household or business will in part depend upon the activities undertaken by the people at the property.

4.3.5 The ONS collates information on internet use and activities by person type[75]. This data draws on information collected via the Opinions and Lifestyle Survey and the most recent dataset available is from 2020. It is recognised this will likely inflate use given the COVID-19 pandemic, but the data usefully shows comparisons between groups in society which are likely to remain applicable despite overall increases in use.

4.3.6 Figures 4.5 and 4.6 show the frequency of internet use by age group and sex. Key points from these graphs are as follows:

- **Younger people generally use the internet more frequently than older age categories** with all those age 34 and below stating that they use the internet daily or almost every day compared to just 67% of those age 65
- **Women and men generally use the internet at a similar level of frequency**
- **Those who are equality act disabled generally use the internet less frequently** than those who are not equality act disabled

4.3.7 Figure 4-7and Figure 4-8 show the proportion of people undertaking various activities online split by age group and sex as recorded via the Opinions and Lifestyle Survey. Key points from these graphs are as follows:

- **Younger people more commonly use the internet for activities which typically require faster connections** including watching video on demand and playing games or

[75] Internet access - households and individuals - Office for National Statistics (ons.gov.uk)

downloading games – in total while 63% of those surveyed aged 16-24 had played or downloaded games in the last three months, just 17% of those over the age of 65 had done so.

- In comparison to other activities, there are **relatively low proportions using online health services**. As may be expected, older people use these services more frequently than young people with those in the age group 55-64 using them most frequently, followed by those aged 65 and over.

- In general, **women use the internet more for instant messaging, social media, making video or voice calls whereas men more frequently use the internet for watching or streaming live or cable TV, watching video on demand, and playing or downloading games**.

4.3.8 Overall, the data suggests that the benefits provided by R100 will differ amongst different groups in society owing to their frequency of use of the internet and the different activities undertaken (and therefore different requirements with respect to broadband speed).

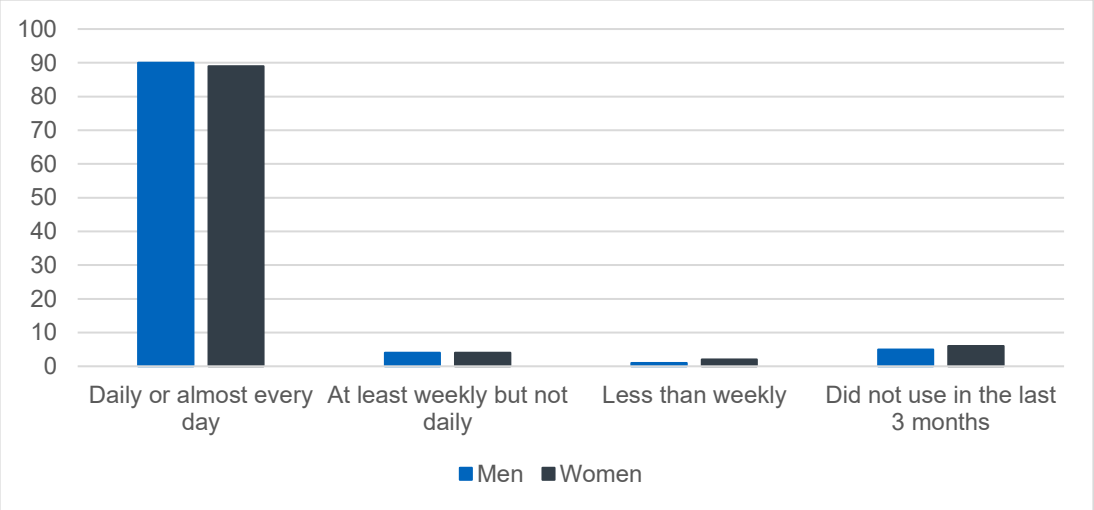


Figure 4-5: Frequency of internet use by sex

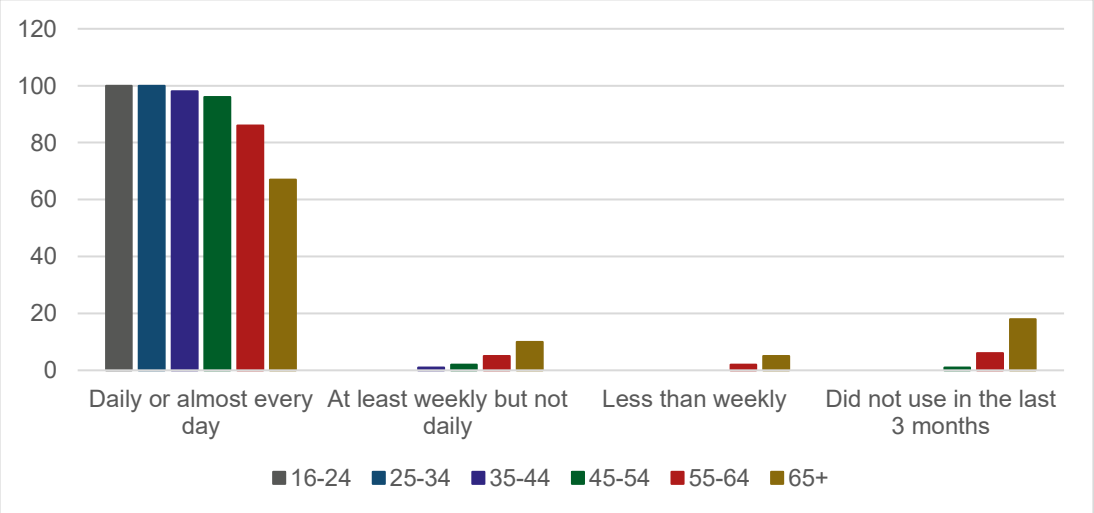


Figure 4-6: Frequency of internet use by age

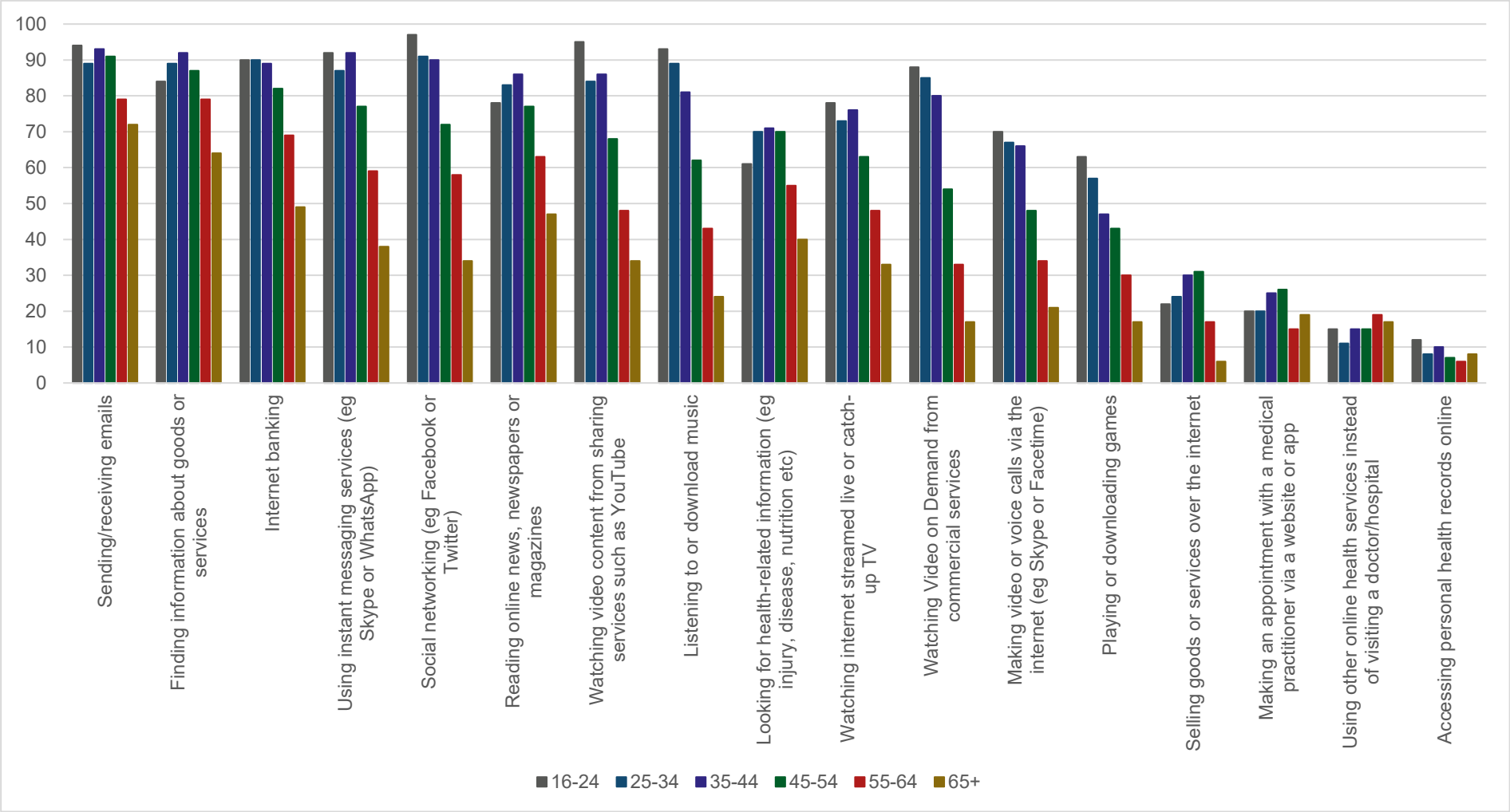


Figure 4-7: Proportion of people who have undertaken various activities online in the last three months by age group

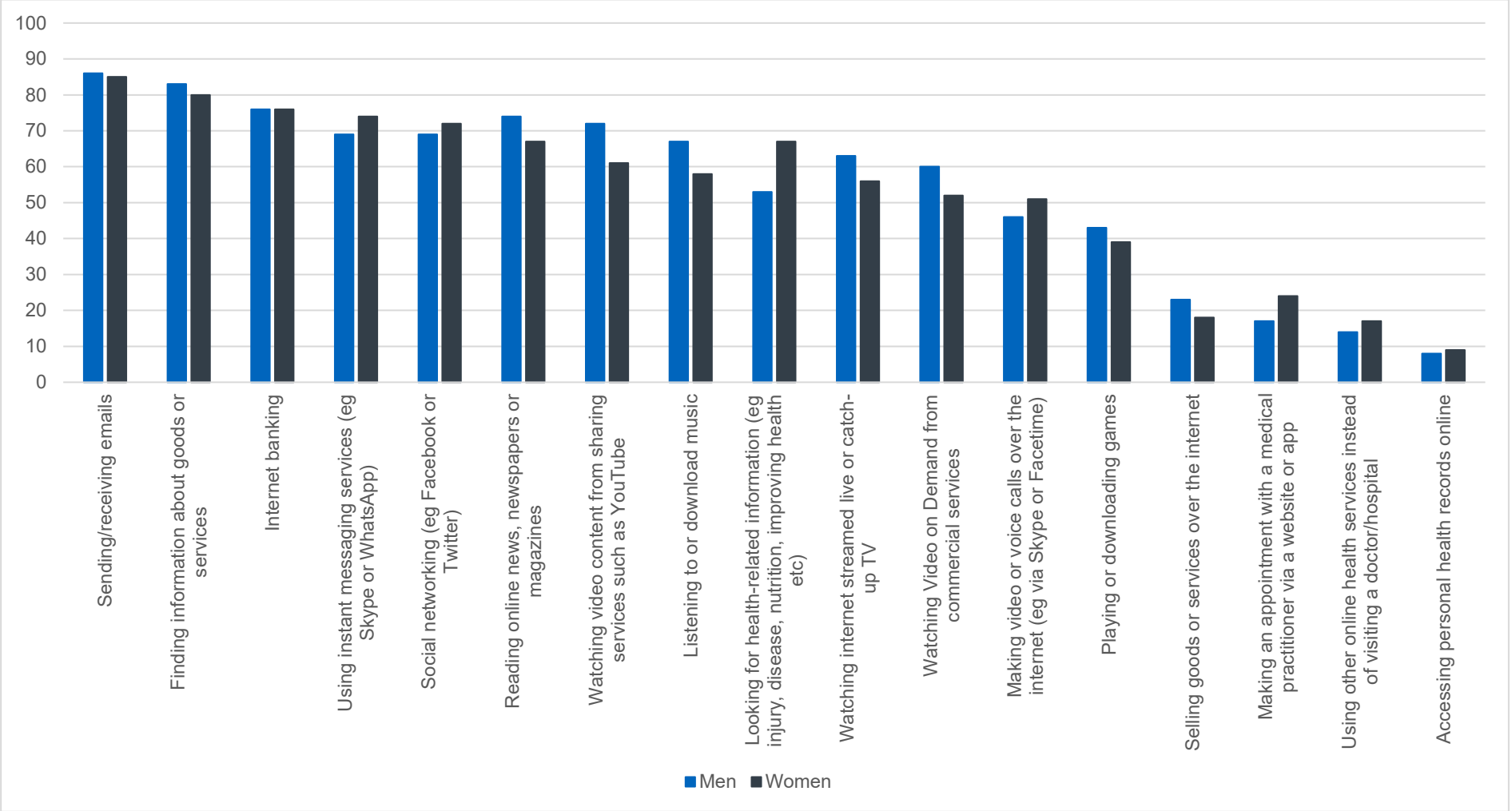


Figure 4-8: Proportion of men and women who have undertaken various activities online in the last three months

5 Methodology

5.1 Overview

5.1.1 This chapter sets out the approach to conducting the primary research with residents and businesses / organisations which aims to gather evidence of the potential outcomes and impacts identified within the logic maps. The chapter describes the relevant groups which are of interest to the research before detailing the approach taken to gather information from these groups. It includes details of the overall structure of the research, the methods employed, and the samples achieved.

5.2 Groups affected by R100

5.2.1 There are three groups of properties affected by the R100 programme and therefore of interest to the research:

- **Group 1:** those who have been provided with broadband via R100 and have taken up the connection
- **Group 2:** those who have been provided with broadband via R100 but have not taken up the connection
- **Group 3:** those who are scheduled to receive broadband via R100 but have not yet been connected

5.2.2 Group 1 clearly forms the focus of the research and Group 3 forms the basis for the counterfactual, a key role of which is to 'validate' Group 1's estimate of their pre-R100 digital usage. There is also value in exploring why those in Group 2 have not taken any action as a result of R100. This could be due to a lack of interest, lack of necessary skills, lack of awareness, cost, or indeed a positive desire not to be connected / better connected to the internet.

5.2.3 Table 5-1 shows the number of properties falling into each group as recorded in the Scottish Government R100 database.

Table 5-1: Number of Premises falling into each group as of September 2024

Group	Description	Residential	Commercial	Dual Use	Total
Group 1	Provided with broadband access via R100 and have taken up the connection	23,911	1,661	16	25,588
Group 2	Group 2a - Provided with broadband access via R100 *voucher* but have not taken up the connection	45,145	13,599	15	58,759
	Group 2b -Provided with broadband access via R100 *main scheme* but have not taken up the connection	31,306	5,164	9	36,479
Group 3	Scheduled to receive broadband access via R100 but have not yet been connected	56,018	7,477	20	63,515
	Total	156,380	27,901	60	184,341

5.3 Research Approach

5.3.1 The research involved two broad stages as follows:

- **Stage 1**: a survey of residential and organisations / businesses affected by the R100 Programme
- **Stage 2**: follow up focus groups / interviews with residents and businesses / organisations identified during Stage 1

5.3.1 In recognition of the potential for differential impacts across different groups in society, a specific **Equality Assessment** which aimed to evaluate the scale and nature of impacts across societal groups as defined within Public Sector Equality Duty (PSED), Fairer Scotland Duty (FSD) and the Islands (2014) Duty was also undertaken.

5.3.2 The approach to the delivery of each of the above stages and the equalities focused assessment is set out below.

5.4 Stage 1: Surveys

Survey Approach

5.4.1 In order to gather information from the three groups identified above, two online surveys were produced; the first aimed at residential properties and the second aimed at businesses / organisations.

5.4.2 To ensure only those in the above three groups and therefore those who were eligible to respond were able to access the survey, a postcode / address checker was used as a gateway to the survey. For this, each potential respondent was required to enter the postcode of their property. If their property was identified as falling within one the above three groups within the Scottish Government R100 database, the respondent was invited to select their property address from a subsequent drop-down menu. Should the property not be listed as in the Scottish Government dataset, the address did not appear when the postcode was entered.

5.4.3 Each survey incorporated separate sub sections accessible via appropriate survey routing for properties in each of the three groups identified above. Those who entered an eligible postcode and address were routed to the correct sub-section of the survey based on the group they fell into as recorded in the Scottish Government dataset. Where possible, this allocation was corroborated with the respondent in the initial survey questions. However, given that a high proportion of respondents are not aware that their current connection is or is due to be provided by R100, it was not possible to corroborate this information in all cases.

Survey Content

5.4.4 The surveys were structured around both the Investment Objectives and the logic maps. A broad overview of the topic areas covered in each survey is set out in the table below.

Table 5-2: Broad overview of topic areas covered in the surveys

	Group 1: Provided with broadband access via R100 and have taken up the connection	**Group 2:** Provided with broadband access via R100 but have not taken up the connection	**Group 3:** Scheduled to receive broadband access via R100 but have not yet been connected
Resident Survey	**Voucher applicant** ▪ SBVS or IVS ▪ Ease of application process **Current connection (i.e. the connection provided via R100)** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Household access to internet devices** **Household use of current connection** ▪ Household admin ▪ Activities relating to employment and education ▪ Entertainment activities ▪ Social media and messaging ▪ Shopping related activities ▪ Health related activities **Life Choices** ▪ For those who experienced the improvement, impact on nature of work, access to education, lifestyle, and wellbeing ▪ For those who moved to the property post the improvement, impact on decision to move **Wellbeing** **About your Household** **About you**	Respondents asked if they have a connection. **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Household access to internet devices** **Household use of current connection** ▪ Household admin ▪ Activities relating to employment and education ▪ Entertainment activities ▪ Social media and messaging ▪ Shopping related activities ▪ Health related activities **<u>If no,</u>** Respondents asked how they access the internet and if there are things their household is missing out on because they do not have a connection **<u>All respondents asked questions on:</u>** **Reasons for not upgrading** **Wellbeing** **About your Household** **About you**	Respondents asked if they have a connection. **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Household access to internet devices** **Household use of current connection** ▪ Household admin ▪ Activities relating to employment and education ▪ Entertainment activities ▪ Social media and messaging ▪ Shopping related activities ▪ Health related activities **<u>If no,</u>** Respondents asked how they access the internet and if there are things their household is missing out on because they do not have a connection **<u>All respondents asked questions on:</u>** **Wellbeing** **About your Household** **About you**

	Group 1: Provided with broadband access via R100 and have taken up the connection	**Group 2:** Provided with broadband access via R100 but have not taken up the connection	**Group 3:** Scheduled to receive broadband access via R100 but have not yet been connected
Business / Organisation Survey	**Type of business / organisation** ▪ Public sector Organisation ▪ Charity / community group ▪ Commercial Business **Voucher applicant** ▪ SBVS or IVS ▪ Ease of application process **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Use of current connection** ▪ Overall use and by category (e.g. selling services, staff recruitment etc) **Business / organisation Choices** ▪ For those who experienced the improvement, importance of superfast broadband for business operation ▪ For those who moved to the property post the improvement / started new business impact of broadband availability on decision to move / start up **About your Business / Organisation**	**Type of business / organisation** ▪ Public sector Organisation ▪ Charity / community group ▪ Commercial Business **Respondents asked if they have a connection.** **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Use of current connection** ▪ Overall use and by category (e.g. selling services, staff recruitment etc) **Extent to which current connection limits business activities** **<u>If no,</u>** Respondents asked how they access the internet and if there are things their business is missing out on **<u>All respondents asked questions on:</u>** **Reasons for not upgrading** **About your Business / Organisation**	**Type of business / organisation** ▪ Public sector Organisation ▪ Charity / community group ▪ Commercial Business **Respondents asked if they have a connection.** **<u>If yes:</u>** **Current connection** ▪ Speed ▪ How connection is provided ▪ Name of provider **Satisfaction with current connection** ▪ Speed ▪ Reliability ▪ Value for money **Use of current connection** ▪ Overall use and by category (e.g. selling services, staff recruitment etc) **Extent to which current connection limits business activities** **<u>If no,</u>** Respondents asked how they access the internet and if there are things their business is missing out on **<u>All respondents asked questions on:</u>** **About your Business / Organisation**

5.4.5 Given that the R100 programme is targeted at the household / property level and therefore the survey aimed to gather information at this level, it was requested that only one person from each household or business / organisation should complete the survey and they should do so on behalf of the households / business / organisation as a whole.

Survey Implementation and Promotion

5.4.6 The surveys were live for a 27-week period from October 22nd, 2024, to 1st May 2025.

5.4.7 The surveys were promoted to eligible respondents via:

- community awareness raising activities
- 'To the occupier' letters issued to eligible addresses

5.4.8 These are discussed in turn below.

Community Awareness Raising

5.4.9 The surveys were initially promoted via:

- the Scottish Government's social media pages
- relevant email contacts who were asked to share the survey via both online media and their local networks:
  - the Scottish Government single point of contact at each local authority - the latter was asked to share the survey via the local authority social media pages and with any relevant external organisations / email groups (e.g. community councils). The Scottish Government engagement team provided assistance to local authorities with relevant material and appropriate text where required.
  - the organisations contacted to help inform the development of the Literature Review (see Appendix A)
  - all relevant community councils for whom an email address was available via online sources.

5.4.10 It is recognised that by definition online access for Groups 2 and 3 will be inferior to Group 1 and therefore promotional activities involving the internet such as social media may have been less likely to reach these groups. However, the results from Scottish Government's evaluation of the Scottish 4G Infill Programme indicated that around 90% of respondents (in what are some of Scotland's remotest areas) did have some broadband / 4G access.[76] The use of online promotional activities was therefore felt to be reasonable, particularly given that it was delivered in combination with other activities such as promotion amongst local networks and occupier letters (see below).

Occupier Letters

5.4.11 Following an initial wave of survey responses, 'to the occupier' letters were issued to eligible addresses advertising the survey. The letters included information on R100 and the evaluation along with a link to the survey. In total, 4,500 letters were issued. The addresses to which the letters were issued were selected based upon consideration of:

[76] See Scottish 4G Infill Programme Evaluation - gov.scot

- a target sample by group and the sample by group received to date via the initial wave of survey responses
- the distribution of properties across the Scottish Governments 8-fold urban-rural classification within the Scottish Government R100 database – this was used as a sample frame with the aim of maximising the representativeness of the sample achieved.

Achieved Sample

Number of Responses

5.4.12 In total, 941 unique[77] household responses were received to the survey. The tables below show the breakdown of residential and business responses by group.

Table 5-3: Number of responses received to the resident survey by group

Resident Survey Group	Number of responses
Group 1: Provided with broadband access via R100 and have taken up the connection	335
Group 2a: Those who are eligible for the Scottish Broadband Voucher Scheme but have not applied for the scheme	157
Group 2b: Those for whom a new superfast (or quicker) connection is available as a result of the R100 programme, but they have not taken it up	32
Group 3: Scheduled to receive broadband access via R100 but have not yet been connected	341
Total	865

Table 5-4: Number of responses received to the business survey by group

Business Survey Group	Number of responses
Group 1: Provided with broadband access via R100 and have taken up the connection	34
Group 2a: Those who are eligible for the Scottish Broadband Voucher Scheme but have not applied for the scheme	16
Group 2b: Those for whom a new superfast (or quicker) connection is available as a result of the R100 programme, but they have not taken it up	0
Group 3: Scheduled to receive broadband access via R100 but have not yet been connected	26
Total	76

5.4.13 The overall number of household responses is satisfactory and provides a reasonable level of confidence in the results.[78] As may be expected, the responses to the business survey are lower and therefore a note of caution is needed when interpreting the business survey results.

[77] In total, 986 responses were received to the survey. However, 45 of these were duplicate responses (i.e. more than one response was received from a single property). Given that the survey records use of the internet by the household as a whole, where more than one response from a property was received, the response provided by the eldest household member was retained and any further responses from the same household were removed from the analysis.

[78] For the residential sample as a whole, we have 95% confidence level with 3.32% margin of error. However, this is complicated by the different groups, with higher confidence for Group 1 (the main element of the research) and Group 3 and lower confidence in the results from Group 2 given the smaller sample size relative to the total population for this group.

5.4.14 Figure 5-1 shows the proportion of survey responses from each local authority area and Figure 5-2 shows the survey responses as a percentage of the R100 properties in that local authority area. A breakdown of the residential and business responses by local authority area is included in Appendix B

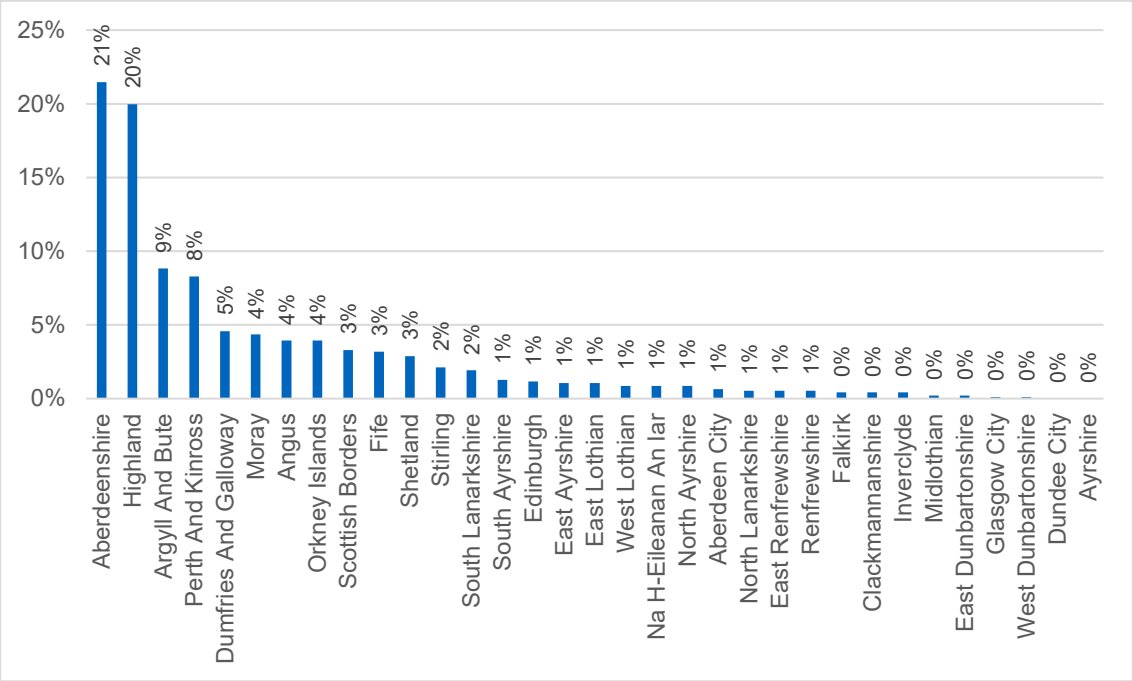


Figure 5-1: Percentage of survey responses by local authority area

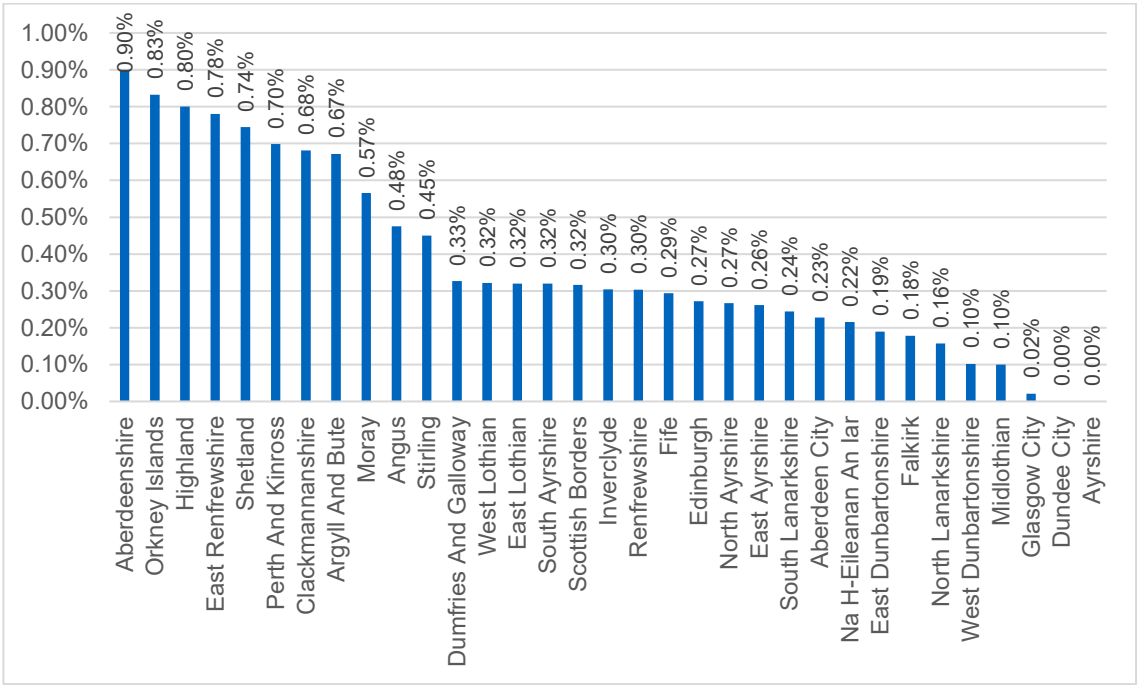


Figure 5-2: Survey responses as a percentage of R100 properties in the local authority area

5.4.15 The largest proportion of responses came from Aberdeenshire (21%), followed by Highland (20%). While the overall number of responses received accounted for a smaller proportion of the overall sample, a large proportion of responses were received from Orkney, East

Renfrewshire and Shetland relative to the number of R100 properties in the area. There may be a variety of reasons for this, including potentially greater promotion of the survey by contacts in these areas.

Demographic and Business Profile

5.4.16 Information on the demographic profile of respondents to the resident survey and background information on the businesses who responded to the business survey is included in Appendix C Key points are as follows:

Residential properties:

- Couples with no children accounted for the largest proportion of respondents in the sample (48%), followed by couples with at least one child (29%) and single person households (13%)
- Overall, a third of households had children (at least one occupant under the age of 16) with the proportion with children slightly higher amongst Group 2 respondents (40%) compared to Group 1 (32%) and Group 3 (30%)
- Nearly a third of households had at least one member whose day-to-day activities were limited because of a health problem or disability

Business / organisations:

- The majority of respondents (89%, n=68) were commercial businesses with 11% (n=8) of responses coming from charitable / community organisations
- Businesses in the agriculture / forestry / fishing industry accounted for the largest proportion of respondents, making up just over 40% (n=25) of the sample. This was followed by businesses in the tourism sector (18%, n=11) and accommodation and food service activities (8%, n=5)
- The businesses were a mix of sizes - 6% had an annual turnover of less than 10k; 18% had an annual turnover between £10k and £50k; around 50% had an annual turnover between £50k and £500k; 19% had an annual turnover between £500k and £5 million and 3% had an annual turnover over £5 million
- On average, the businesses employed 6.5 full time equivalents. There were six sole traders in the sample; 31% (n=21) of the businesses employed temporary staff and 14% (n=9) used volunteers

Survey Analysis

5.4.17 The results of the Resident and Business survey are set out in Chapters 6 and 7.

5.5 Stage 2: Focus Groups / Interviews

5.5.1 In addition to the above surveys, a series of online focus groups / one-to-one interviews with residents and businesses affected by the R100 Programme were also undertaken.

5.5.2 As with the surveys, the focus groups / interviews were designed to gather information on the outcomes and impacts of R100 and the extent to which the project is achieving its Investment Objectives. However, while **the surveys aimed to gather a representative sample of data, the focus groups / interviews aimed to explore the topic areas covered within the surveys in more depth and gather individual experiences** to help supplement and augment the survey findings.

Approach

5.5.3 In order to gather potential focus group attendees / interviewees, a question asking respondents whether they would be interested in taking part in this aspect of the research was included within each of the above surveys.

5.5.4 In total, 233 respondents (207 residents and 26 businesses) stated that they would be interested in taking part in this stage of the research and provided their contact details for this purpose. Emails were issued to all 233 individuals asking for their availability across a range of dates. In order to encourage take-up, an incentive (a £30 Love2Shop e-voucher) was offered to those taking part in the focus groups. In total, 115 residents (out of the original 207) and seven businesses (out of the original 26) responded to the email regarding availability. Of those responding, three residents and one business stated that none of the dates were suitable.

5.5.5 Of the three categories of people affected by R100 (see section 5.2.1), there was a particular interest from respondents in Group 3. This is to be expected as this group is still awaiting connection and may therefore be more inclined to take part.

5.5.6 The resident respondents were allocated to six resident focus groups, with businesses being offered one-to-one interviews given their smaller number. Participants in the focus group were selected based on achieving:

- A roughly equal number of participants from each group
- A geographic representation which was broadly in keeping with the programme as a whole
- Availability of respondents to ensure meetings were well attended
- Where possible, aiming for each focus group to contain attendees from just one of the three Groups affected by R100 – this was to assist with the discussion as the results of the survey suggested that the topics of interest would differ depending on which group respondents belonged.[79]

5.5.7 In total, 49 participants eventually attended the focus groups / interviews (44 residents, and 5 businesses). The number of attendees at each focus group / interview is shown in Table 5-5 along with the Group (1, 2 or 3) to which the attendees belonged. Table 5-6 shows the total number of attendees by Group (1, 2 or 3) along with the breakdown between main contract and voucher recipients for Groups 1 and 2.

[79] It is noted that between the time of completing the survey and taking part in the focus group, some individuals switched groups as follows: One original Group 2 attendee signed up to broadband and therefore switched from Group 2 to Group 1 (focus group 4) and two original Group 3 attendees received access to the R100 programme and therefore switched from Group 3 to Group 1 (focus groups 1 and 3). As such, these focus groups contained attendees from multiple groups.

Table 5-5: Focus Group and Interview Attendees by Group Category

Category	Focus Group / interview	Attendees	Group to which attendees belonged
Resident	1	7	Group 3
		1	Group 1
	2	7	Group 2
	3	6	Group 3
		1	Group 1
	4	3	Group 1
		5	Group 2
	5	3	Group 1
		4	Group 3
	6	6	Group 1
	7[80]	1	Group 3
Business	1	1	Group 3
	2	1	Group 3
	3	1	Group 3
	4	1	Group 3
	5	1	Group 3
	Total	49	

Table 5-6: Total number of Focus Group / Interview attendees by Group and recipient type (main contracts or Voucher) for Group 1 and 2 attendees

Group	Main Contract	Voucher	Number of attendees by group at the time focus groups were undertaken
1	7	7	14
2	0	12	12
3	n/a	n/a	18 (resident) and 5 (business)
Total	7	19	49

5.5.8 Geographically, the areas represented by the attendees were:

- The Highlands and Islands (postcodes IV, PH, KW, ZE, HS)
- West Coast and Argyll (postcode PA)
- Central Belt (postcodes EH, KY, DD, G6, G7)
- North East (postcode AB)
- Borders and South (postcode DG)

5.5.9 As noted above, only five businesses attended, all of which were in Group 3 and did not therefore have a broadband connection. Comments relating to business benefits / disbenefits should therefore be considered in this context. The more limited participation by businesses is perhaps to be expected given the monetary costs associated with attendance for this group.[81]

[80] One resident was no longer able to attend their allocated focus group and therefore a one-to-one interview was delivered with this individual instead.

[81] Generally, businesses are less likely to take part in research as unlike the general public there is a direct cost associated with their involvement.

5.5.10 In terms of an industry breakdown, two of the businesses were hydroelectric stations, one was a sheep and oyster farm, and two were accommodation providers (one Airbnb and one hostel).

5.5.11 The focus groups were delivered virtually via Microsoft Teams and lasted up to one hour each. There were two researchers in attendance, one steering the discussion and one scribe.

5.5.12 In advance of the focus groups, separate Resident and Business Topic Guides were prepared. Rather than a script, these were used as a broad framework to help guide the discussions. As such, all topic areas were not necessarily discussed in each focus group but rather the discussions were allowed to unfold as per the interest and knowledge of the participants in each case.

5.5.13 The focus groups were recorded to ensure all comments were captured and the recordings were deleted once the material was analysed.

5.5.14 The findings from the focus groups / interviews are summarised in Chapter 8. All comments have been anonymised, and identifiable details removed, including exact location, sex, and age.

5.6 Equalities Assessment

5.6.1 Given the scope of the R100 programme and the potential for differential impacts across different groups in society, an Equalities Assessment was also undertaken as part of the research. This aimed to evaluate the scale and nature of the impacts of R100 in relation to the societal groups and criteria as defined within PSED, FSD and the Island (Scotland) Act 2018.

5.6.2 The assessment used an integrated impact assessment framework which included Equality Impact Assessment (EqIA), FSD assessment, and Island Communities Impact Assessment (ICIA) and included a scoping and assessment framing exercise to align the above impact assessment approaches to the R100 programme, the development of bespoke framing questions, and a desk-based assessment in accordance with the framing questions and assessment criteria for EqIA, FSD and ICIA.

5.6.3 The findings from the Equalities Assessment were incorporated into the literature review and research findings as set out in Chapters 6, 7, and 8. Key recommendations to help mitigate some of the negative equality impacts identified are summarised in Chapter 9.

6 Resident Survey

6.1 Overview

6.1.1 This chapter provides a summary of the responses received to the online residential survey. As set out in Chapter 5, the survey included separate sub sections covering each of the following groups:

- **Group 1:** households who have been provided with broadband via R100 and have taken up the connection
- **Group 2:** households who have been provided with broadband via R100 but have not taken up the connection
- **Group 3:** households who are scheduled to receive broadband via R100 but have not yet been connected

6.1.2 The residential survey included questions which were specific to the individual group as well as questions which were asked to all groups. This chapter initially focuses on the former, working through each group in turn, before a comparative section which reports the results of each group alongside one another to enable comparison between the responses.

6.1.3 As noted in Section 4.2, this research is being carried out during the R100 rollout and many of those benefitting from R100 have only experienced the improved connectivity for a relatively short period of time. As such, it will not capture all the benefits of the programme, with some benefits potentially taking longer to materialise.

6.2 Group 1 Survey Responses

Voucher and main contracts breakdown

6.2.1 Respondents to the survey were initially asked whether their household had applied to the IVS or SBVS. It was assumed that those who indicated that they had not applied to either were beneficiaries of the R100 main contracts. The figure below shows the breakdown of responses between the IVS, IBVS, and the main contracts.

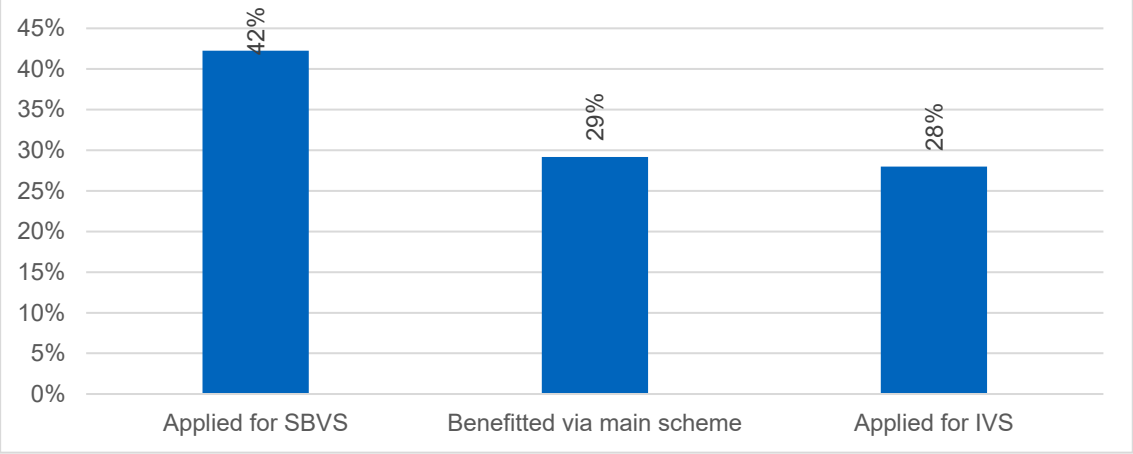


Figure 6-1: Breakdown between voucher and main contracts beneficiaries (n=334)

6.2.2 The majority of households in the sample (42%, n=141) had benefited from the SBVS, with 29% (n=98) benefiting from the main contracts, and 28% (n=94) benefitting from the IVS.

6.2.3 Of those who indicated that they had applied for the IVS, 79% (n=74) said that their broadband still used the same means of connection as was funded via the IVS, with 2% (n=2) stating that they subsequently applied for the SBVS and 19% (n=18) stating that their broadband was now provided by a different means of connection.

6.2.4 Of those who indicated they had applied for the SBVS, 88% (n=127) said that their broadband still used the same means of connection as was funded via the SBVS and 12% (n=17) stated that their broadband was now provided by a different means of connection.

Key Point: In contrast to the programme as a whole, over 70% of Group 1 households in the sample were voucher beneficiaries compared to just 29% who had benefitted via the main contracts. This is unsurprising given that voucher recipients have already actively engaged with the R100 programme and therefore are likely to be more receptive to the research.

Ease of voucher application process

6.2.5 Households who had applied to the IVS or SBVS were asked how they found the process of obtaining broadband via the voucher. The responses are shown in the figure below.

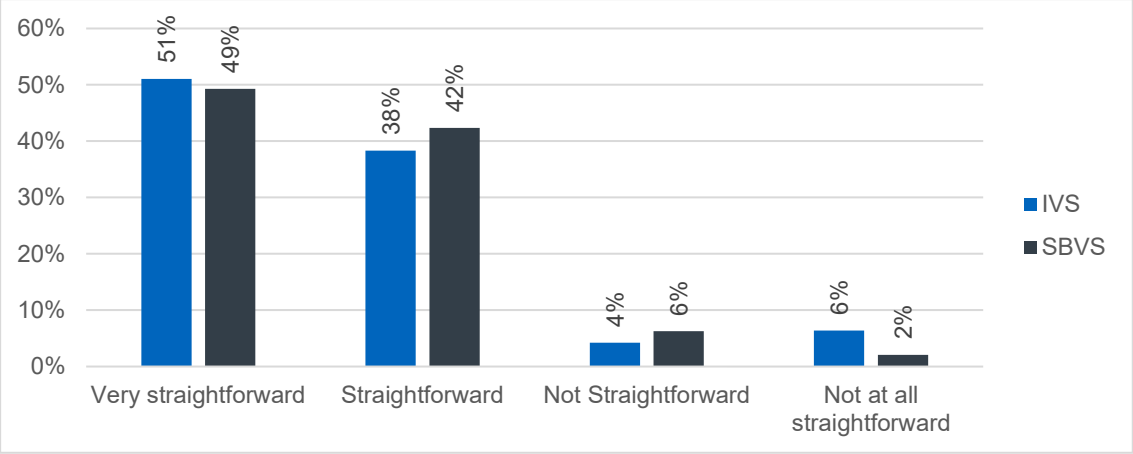


Figure 6-2: How did you find the process of obtaining broadband via the voucher? (n=238)

6.2.6 The majority of households in the sample (over 80% in each case) indicated that the application process was very straightforward or straightforward. However, 10% (n=10) of those applying to the IVS and 8% (n=12) of those applying to the SBVS stated it was not straightforward or not at all straightforward. Those indicating it was not straightforward or not at all straightforward were asked to provide further detail on their experience in an open text response. In the open text responses, issues with the provider and delays to the installation process were highlighted:

- *"I chose a company who would provide a satellite broadband solution on recommendation from a neighbour who had used them. However, there was a lot of back and forth with the operator who was wanting to charge me more than the value of the available voucher. Eventually, I did get a solution, covered by the voucher, but it was a long and complicated process." (IVS recipient, Aberdeenshire)*
- *"A provider was found and an initial survey carried out. The company then became very difficult to contact and eventually did not progress the scheme." (IVS applicant, Highlands)*
- *"…rather complicated and bureaucratic, installer missed five appointments [and the] technical possibilities were limited" (IVS recipient, Perthshire)*

6.2.7 Several respondents also highlighted a lack of information on the voucher scheme:

- *"It was very difficult to find out how to apply for the voucher. I asked BT, but they told me they did not deal with voucher applications. I eventually found a small company who sorted it out for me. Openreach engineers came to my property several times - different parts of the company did not seem to communicate with each other. The whole process took over a year." (SBVS recipient, Highlands)*

- *"I only found out about the scheme after contacting my local Councillor for help as we have very poor broadband connection where I live. Took me many goes to find someone who could help us. The information is not readily available or easily accessible." (SBVS recipient, Stirling)*

6.2.8 A number of households also made comments about being provided with incorrect and sometimes contrasting information about their situation and what they were eligible for:

- *"[I] applied and was knocked back. I was told I could get [a connection via] BT as they pass close by. BT wanted over £10,000 to connect me. I therefore had to reapply for voucher scheme. The total time taken to get connected was over 18 months" (IVS recipient, Argyll and Bute)*

- *"I applied for the voucher scheme in May 2024 but was told broadband is planned in my area for 2026 (2 years away). I contacted the provider, and they said I was too far from the main road, so it wouldn't be coming to my property. I informed the R100 people of this, but they still wouldn't give me the voucher." (IVS applicant, Aberdeenshire)*

- *"It was very confusing as I was in the correct area but wasn't approved as being in the correct area. The supplier then made some calls and got approval for me. It was never fully explained to me, but I was very grateful to finally have access to broadband. (SBVS applicant, Argyll)*

6.2.9 Comments were also made about it taking a long time to secure a supplier:

- "*Had to wait years to find a supplier" (SBVS recipient, Highlands)*

- *"Was difficult to find suppliers as some never got back to us and we had to have satellite and not 4G, so it was harder to find a supplier" (SBVS recipient, Aberdeenshire)*

Key Point: While the majority of households in the sample felt that the voucher application process was straightforward, nearly 20% highlighted difficulties including issues with providers, a lack of information on the voucher scheme, being provided with incorrect and contrasting information, and it taking a long time to secure a supplier.

About your current connection

6.2.10 Those who fell into one of the following two categories were then asked to provide details of their broadband connection and comment on their levels of satisfaction with and use of the connection:

- Group 1 households who were provided their connection via the main contracts

- Group 1 households who had applied to IVS or SBVS and stated that their current broadband used the same means of connection as was funded via the voucher (i.e. they had made no subsequent upgrade since applying to the voucher scheme)

6.2.11 The responses are reported alongside those from Group 2a and Group 3 in Section 6.5 below.

Life choices

6.2.12 Group 1 households were also asked a series of questions about how their broadband connection has affected their life choices. Respondents were first asked whether they lived at their property when Superfast Broadband (or quicker) was first installed (and therefore whether they experienced the improvement in their broadband speeds). In total, 90% (n=265) stated that they lived at the property and 10% (n=31) stated that they had recently moved.

Respondents who had recently moved to the property

6.2.13 Those households who had recently moved to the property were asked whether they would have moved if superfast broadband (or quicker) had not been available. In total, 42% (n=13) said they would not have moved, 35% (n=11) said they would have moved and 23% (n=7) stated that they did not know. It is noted that the sample size for this question is small and therefore it is difficult to draw firm conclusions.

Key Point: There is some evidence that R100 has removed a potential barrier for some when considering where to live.

Lived at property when broadband was improved

6.2.14 Those who stated that they lived at the property when broadband was installed were asked a series of questions about the impact of the improvement including the impact on:

- the nature of their work
- access to formal education opportunities,
- household travel
- the local community, including the level of community activities and the number of shops available locally

6.2.15 Respondents in this category were also asked about the positive / negative impacts of the enhancement. Each of these aspects are discussed in turn below.

Nature of work

6.2.16 Figure 6-3 shows the impact of the improvement in connectivity on the nature of respondents' work. The graph shows the percentage of respondents selecting each option – it is noted that respondents could select more than one response and therefore the proportions do not sum to 100%.

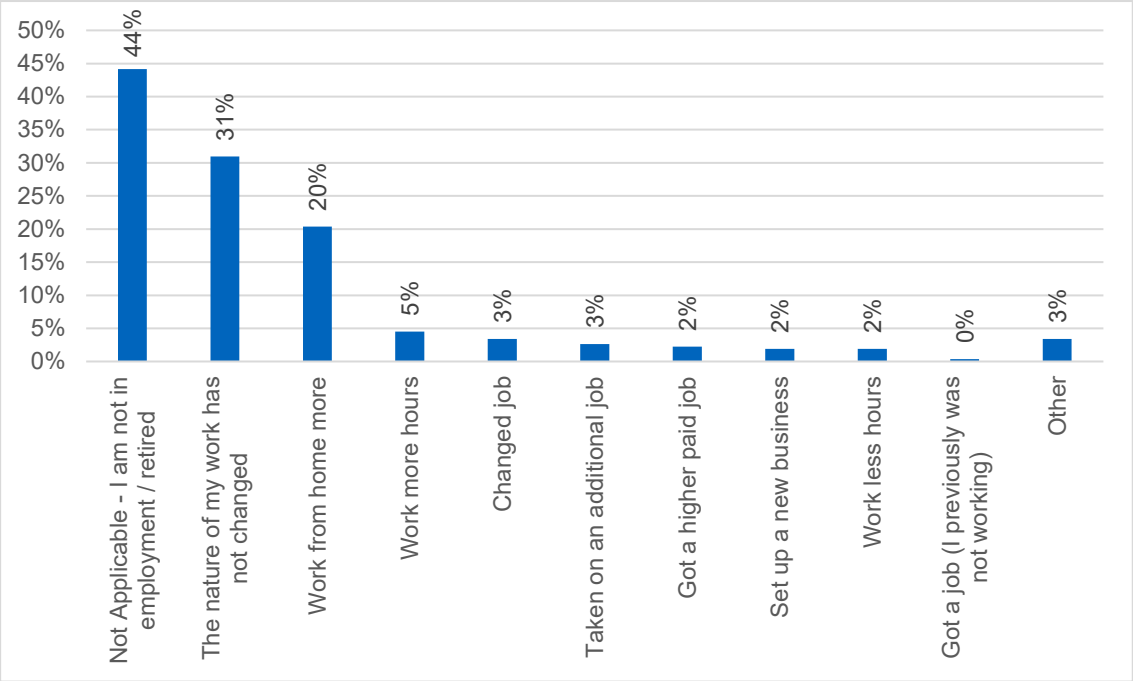


Figure 6-3: Has the nature of your work changed in any of the following ways as a result of the improvement in broadband provision at your property? (n=265 respondents)

6.2.17 In total, 44% (n=117) were not in employment, 31% (n=82) stated that the nature of their work had not changed and 25% (n=66) selected one of the other options indicating that the nature of their work had changed in some way. In total, 20% (n=54) stated that they now work from home more. Smaller numbers also selected work more hours (5%, n=12), changed job (3%, n=9) and taken on an additional job (3%, n=7).

6.2.18 In the open text responses, respondents emphasised the benefits in terms of work and employment, noting that the improved connection has enabled working from home; more efficient work practices, including Teams meetings and accessing secure systems; and enabled multiple users to use the connection at the same time. Freelancers and small business owners (e.g., videographers, coaches) also highlighted increased efficiency and fewer disruptions:

- *"Using TEAMS for work video calls with improved speeds **has allowed me to engage fully in discussion**. Previously the lag between when I spoke and when others actually heard me meant it was difficult to do." (Voucher / main contracts recipient, Aberdeenshire)*

- *"It has **greatly helped my everyday work experience**. Previously we received broadband through 4G, which was much slower and unreliable. Now, my connection is always fast enough and is very reliable, taking away a lot of inconvenience and frustration during my workday." (Voucher / main contracts recipient, Stirling)*

- *"It's really helped me with my work. I'm a freelance videographer and photographer. The higher speeds have really **helped with the speed of downloading stock footage and uploading my YouTube videos**. It also means that both my wife, who runs a coaching business and spends a lot of time on Zoom, and I **can use the internet at the same time** without fear of interrupting one another's activity." (SBVS recipient, Highlands)*

- *"My partner is a GP and previous instability of connection meant she would regularly be kicked out of health systems losing up to 2 hours of her workday which meant longer*

hours for her, inefficient work for her practice and patient frustration." (SBVS recipient, Aberdeenshire)

Key Point: R100 has allowed some people to make positive changes to how and where they work, removing a barrier to labour market efficiency.

Access to formal education opportunities

6.2.19 Respondents who lived at the property when broadband was installed were also asked whether the improvement in broadband had enabled anyone in the household to access formal learning opportunities which they previously could not access. Overall, 9% (n=25) said yes and 91% (n=240) said no. Those who indicated yes were asked to provide further details via an open text question. A range of courses were identified in the open text responses, including:

- **Formal Education:** Several individuals completed degrees, diplomas, or postgraduate studies (including master level qualifications and a PhD). Children completed National 5s, Highers, and university degrees, and accessed online tutoring.
- **Professional and Work-Related Training:** Respondents also completed various work-based courses and qualifications (e.g., Driver CPC, career long professional learning (CLPL), food hygiene, Alcohol Personal License (APLH), nursing, marketing, social media, and job-based training from employers). Online access enabled participation in previously inaccessible webinars and Zoom tutorials.
- **Other Training:** Respondents also mentioned community council meetings, mindfulness teacher training, holistic and wellbeing training, and Youth Advocacy and Support Services (YASS).

Key Point: R100 has allowed people to access a wide range of formal education and training opportunities which they would otherwise have been unable to access.

Household travel

6.2.20 Respondents who lived at the property when broadband was installed were also asked several questions on the impact of the improvements on their household's travel. The results are shown in Figure 6-4.

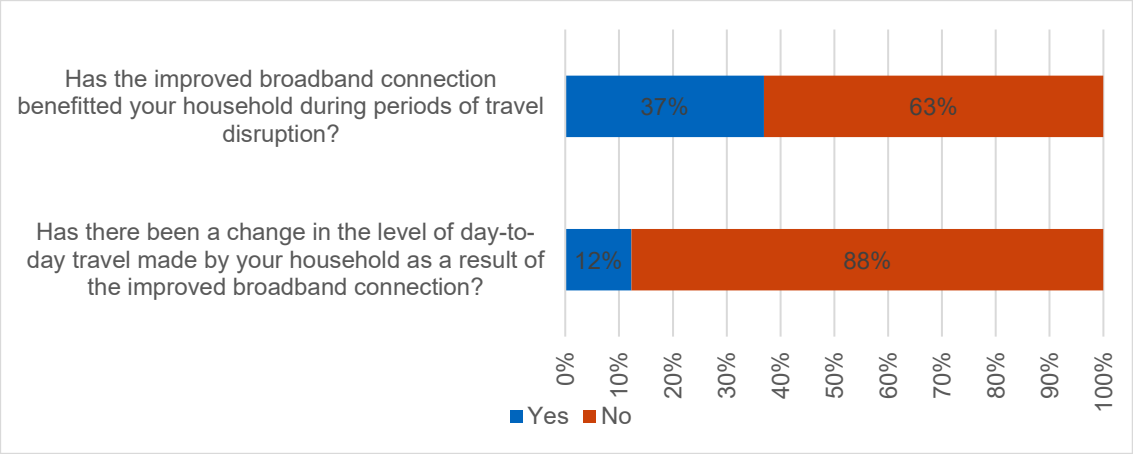


Figure 6-4: Impact of improved broadband on travel (n=260)

6.2.21 In total, 37% (n=96) of households said the improvement in broadband had benefitted their household in periods of travel disruption and 12% (n=32) said that the improved connection had resulted in a change in the level of day-to-day travel made by their household.

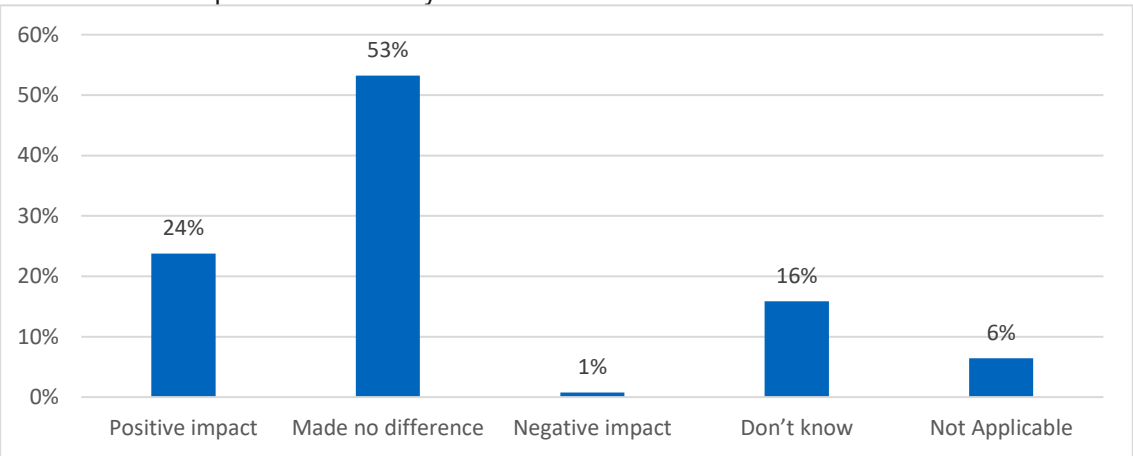
6.2.22 Households who indicated that there had been a benefit during disruption or a change in their level of day-to-day travel were asked to provide further details via an open text question should they wish. Respondents emphasised being able to access up to date travel information and public transport timetables, particularly during poor weather. A small number also noted being able to access local resident groups for information on local disruptions such as landslides.

6.2.23 Almost all of those who said there had been a change in their household's day-to-day travel said that their travel had reduced, with the majority emphasising this was a result of being able to work from home and smaller numbers noting that they now do their grocery shops / access services online. Several respondents also emphasised the benefit of being able to check public transport options before leaving the house, thereby reducing unnecessary trips. Just one respondent noted that their travel had increased slightly as a result of greater involvement in local activities.

Key Point: R100 has led to benefits for households during periods of travel disruption due to the availability of up-to-date travel information. The data also suggests that for some households the improvement has led to a reduction in day-to-day travel due to the ability to work from home, shop and access services online, and greater access to travel information.

Community impacts

Respondents who lived at the property when broadband was installed were also asked to provide an indication of the impact of the improvement on the level of community activities and the number of shops available locally.



6.2.24 Figure 6-5 and Figure 6-4 show the results of these questions.

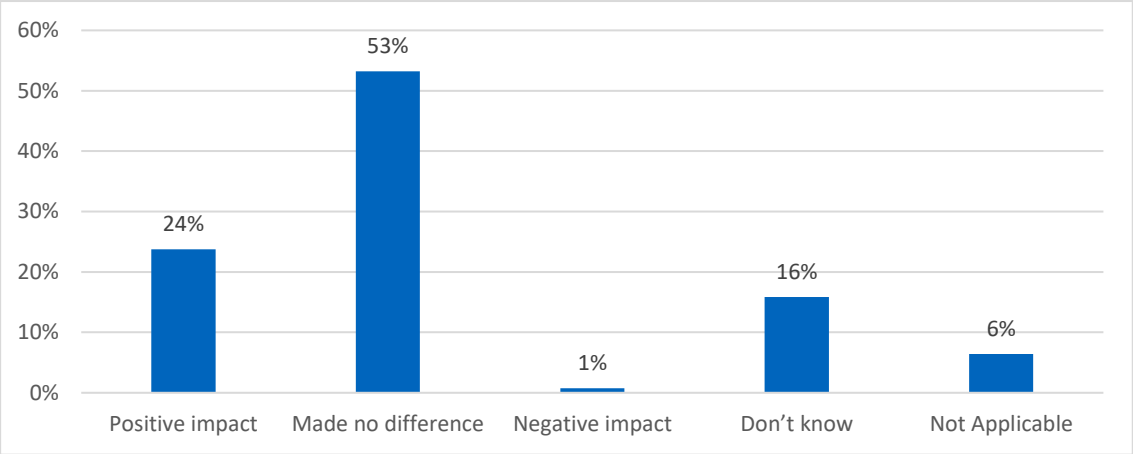


Figure 6-5: Has the improvement in broadband had a positive or negative impact on your local community in terms of the **level of community activities**? (n=264)

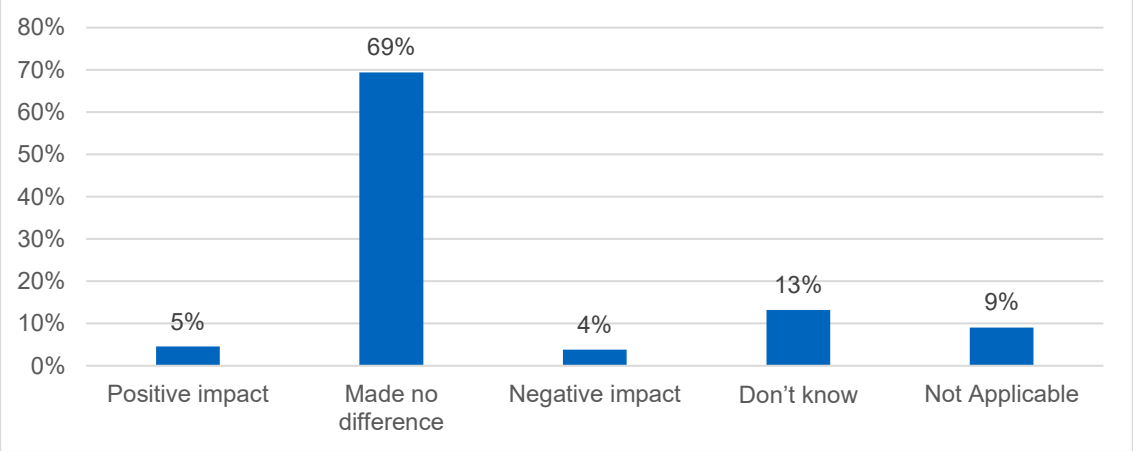


Figure 6-6: Has the improvement in broadband had a positive or negative impact on your local community in terms of **the number of shops available locally**? (n= 265)

6.2.25 While, in each case, the majority of respondents said that the improvement had made no difference, a proportion highlighted either a positive or negative impact, with:

- 24% (n=63) stating that there had been a positive impact on the level of community activities compared to just 1% (n=2) who said there had been a negative impact
- 5% (n=12) stating there had been a positive impact on the number of shops available locally compared to 4% (n=10) who said it had had a negative impact

6.2.26 Respondents were also asked to provide any further details of the positive or negative aspects of the impact on the community in an open text response should they wish. Several comments were made about the positive impact on community activities:

- *"Our whole area had such slow speeds, so now the community has the option to have fast internet it means **we can all access the things we need**, advertising of local events, news, road closures, traffic, shop closures, shop opening times, means **less time spent going to places** that cannot or do not have what you need, plus being able to see road conditions or road closures, accidents that have happened - as in areas to avoid." (SBVS recipient, Aberdeenshire)*

- *"There are **a lot more activities / events published / organised at the Village Hall**, and which are now also very well attended, because of the wider availability of communication. **Road closure information, bin service information, and access to local transport network / road closure information is now also much easier to access**." (SBVS recipient, Moray)*

6.2.27 The two respondents who noted that there had been a negative impact on the level of community activities referenced problems with their connection being unreliable rather than a direct impact on the community.

6.2.28 In the open text responses, a number of respondents highlighted the potentially negative impact on the number of shops available locally:

- *"Much more online shopping / less visits to the shops in town" (voucher / main contracts recipient, Dumfries and Galloway)*
- *"Availability of broadband leads to temptation to shop online not locally. We are in a use it or lose it situation in the village." (SBVS recipient, Highlands)*
- *"It's too easy to order online but then [there are] so few shops in South Ayrshire so does it matter" (main contracts recipient, South Ayrshire)*

Key Point: The data suggests that R100 has had a positive impact on the level of community activities in some areas. The impact on the number of shops available locally is less clear, with roughly equal proportions stating it has had a positive / negative impact on this aspect.

Positive / negative impacts

6.2.29 Respondents who lived at the property when broadband was installed were also asked whether the improvement in broadband had had a positive or negative impact on the range of aspects as shown in the table below.

Table 6-1: Has the improvement in broadband had a positive or negative impact on you in terms of any of the following? (n=264 to 265 depending on question)

	Positive impact	Made no difference	Negative impact	Don't know	Not Applicable
Keeping in touch with family and friends	63%	34%	1%	0%	3%
Feeling of connectedness to wider world	62%	33%	2%	1%	3%
My wellbeing	49%	45%	2%	1%	3%
Finding out about what is going on in the local area	47%	49%	1%	0%	3%
My ability to manage my finances	41%	54%	2%	1%	3%
Feeling of connectedness to the local community	35%	58%	1%	2%	4%
My own digital skills	33%	63%	2%	1%	2%
Taking part in activities locally	28%	65%	1%	1%	5%
My confidence using the internet	28%	66%	2%	0%	3%
Amount of free time / leisure time	22%	68%	3%	2%	5%
My physical activity levels	18%	74%	3%	1%	5%
My physical health	17%	76%	2%	1%	3%

6.2.30 Across all aspects, a higher proportion identified a positive impact than a negative impact.

6.2.31 The largest proportion of respondents selected a positive impact with respect to:

- **Keeping in touch with family and friends** – 63% (n=165) identified a positive impact compared to 34% who selected no difference and 1% who selected negative impact
- **Feeling of connectedness to wider world** – 62% (n=164) identified a positive impact compared to 33% who selected no difference and 2% who selected negative impact
- **Wellbeing** – 49% (n=130) identified a positive impact compared to 45% who selected no difference and 2% who selected negative impact

6.2.32 In the open text responses, respondents emphasised the social, mental and physical health and wellbeing benefits, noting that they are now better connected with family and friends as well as local community groups and classes:

- *"Without the improvements to the broadband speed, I would have felt very isolated during the pandemic. It was impossible to stream/make video calls/download software and updates prior to the improvements." (SBVS recipient, Highlands)*
- *"As well as typical personal and social use, **I have been able to connect with several community support and advocacy groups and become actively involved with charitable organisations helping disabled people**." (Voucher / main contracts recipient, Aberdeenshire)*
- *"We can have family trivia with other households, FaceTime to family in other parts of the world, we can read online, tutorials, guides, sports activities, local activities!" (SBVS recipient, Aberdeenshire)*
- *"Overwhelming benefit is **mental health improvement associated with wider connectivity to the outside world in terms of access to services, to information, to financial management etc**. - I would stress again, that as a rural dweller, this cannot be under-estimated!" (IVS recipient, Stirling)*
- *"Able to do more online exercise classes, work from home more often, find out more about what is going on locally, watch live church services, keep in touch by video call to family in USA" (SBVS recipient, Western Isles)*
- *"As a result of having superfast broadband speeds, **we have been able to access more information on local events, and therefore participate in things that we had previously not known about**" (SBVS recipient, Moray)*
- *"Faster speed allows me to access information more quickly or deal with household related issues in a timely manner. I can then spend the time saved on more pleasurable leisure activities like getting outside to walk, run or ride my bike." (voucher, main contracts recipient, Midlothian)*

6.2.33 As well as keeping in touch with family and friends and feeling more connected to the wider world, respondents also emphasised that the improvement had led to reduced frustration due multiple users being able to use the connection at the same time and being able to do things more efficiently:

- *"I think the main positive impact is that it has reduced the negative impact! The frustration of slow internet and constant buffering is mind numbing." (IVS recipient, Western Isles)*

- *"We now have access to streamed TV and films. More people can use the internet connection simultaneously in an efficient manner." (voucher / main contracts recipient, Aberdeenshire)*

- *"All members of the household are now able to be online all at the same time. Before (due to poor mobile signal), when someone needed to make a call over Wi-Fi - another person had to stop listening to music/streaming tv etc." (SBVS recipient, Edinburgh)*

- *"Less family strife. Everyone can do everything they want to on the internet at the same time. Even when children are home from university" (SBVS recipient, Highlands)*

6.2.34 Respondents also emphasised the benefits of being able to make video calls, use online streaming services and undertake online banking and bill payments:

- *"It makes a huge difference that we can jump onto video calls without worrying that we have the bandwidth to do it. It also means we can both do multiple activities concurrently without worry, such as video calls and streaming TV. We are also moving to streaming TV services as we can now run them effectively." (Voucher / main Contracts recipient, Scottish Borders)*

- *"Online banking and bill paying is so much easier than before" (IVS recipient, Highlands)*

- *"Can now participate with confidence in online video calls and share much larger (>1Gb) files." (SBVS recipient, Highlands)*

6.2.35 While a wide range of positive impacts were identified, a small number of respondents recorded **negative impacts**. An exploration of the open text responses from these respondents reveals that rather than a negative impact against the specific aspects covered in the question, the negative impacts were more general in nature, relating to the reliability / performance of the connection, the cost of the connection, or being locked into contracts despite being unhappy with the services. Examples of the open text responses provided under each of these headings are set out below:

General issues with the reliability / performance of the connection:

- *"Spent hours on the phone to [supplier name redacted] and had two engineer visits to no effect. It has been a total waste of money and time. I took on an extra job on the strength of faster and more reliable service and have not been able to work effectively using the service often having to resort to 4G to complete tasks / hold zoom meetings." (SVS recipient, Argyll and Bute)*

- *"Despite improved speed I think the reliability is as poor, or at times worse, than the previous system." (Main contracts recipient, Shetland)*

- *"New option has reduced quality of calls over Wi-Fi making working from home challenging" (SBVS recipient, Highland)*

- *"The solution was no better than my own setup, but I was promised faster speeds and better reliability" (SBVS recipient, Stirling)*

- *"It is impossible to watch an HD program as it will buffer leaving me and my family very angry and frustrated." (Main contracts recipient, Highlands)*

High cost of the connection, particularly compared to more urban areas:

- *"Price is becoming unaffordable now… £35 for most basic service which excludes maintenance. If it goes up much more, I'll be forced to disconnect the service" (SBVS recipient, Stirling)*
- *"The cost of having connections is very high each month and in current times can lead to month-to-month worries." (SBVS recipient, Aberdeenshire)*
- *"The cost [is a negative impact]! It is far too much for me to afford and I have no options but to stay with the current suppliers/providers." (IVS recipient, South Lanarkshire)*
- *"The negative impact is that my bill has surged." (Main contracts / voucher recipient, Argyll)*
- *"The only negative impact is the extra cost that has to be met for broadband compared to a more populated area" (Main contracts, Aberdeenshire)*

Being locked into contracts, even though services didn't meet expectations:

- "*Very disappointed we have gone from 4G Wi-Fi to satellite under the R100 voucher scheme and nothing has improved but we are tied into a contract" (SBVS recipient, South Ayrshire)*
- *"I'm not sure how we stand contractually about changing supplier now we are on a line of sight (LOS) signal." (SBVS recipient, Aberdeenshire)*

Key Point: A large proportion of respondents identified positive impacts with respect to keeping in touch with family / friends; feeling connected to the wider world and overall levels of wellbeing. A small number of respondents identified negative impacts due to ongoing issues with the speed and reliability of their connection.

Impact on those age 16 or under

6.2.36 All households were also asked via an open text question whether the improvement in broadband had had a positive or negative impact on anyone age 16 or under within the household, with those for whom the question was not applicable directed to leave the question blank. In total, 27 respondents (25% of the households with children in the sample) said that there been an impact.

6.2.37 In the responses a wide range of positive benefits were emphasised, including improved social connectivity with friends and family; increased entertainment options via streaming services; the ability to undertake online gaming; and being able to use multiple devices at the same time leading to reduced family stress. Several respondents noted that the connection had provided access to online learning, tutoring, schoolwork and educational resources with some noting that there were particular benefits for children with disabilities / autism as it enabled more independence and access to tailored resources.

- *"[My son] is able to access online tutoring for his upcoming national 5 exams, have online music lessons (bagpipes and guitar) and play his PS5 games with friends online as well as keeping in touch with grandparents overseas." (SBVS recipient, Western Isles)*
- *"It would be nearly impossible for our 15-year-old to complete her S4 schoolwork without the internet access we currently have." (SBVS recipient, Dumfries and Galloway)*
- *"Positive as daughter has autism and having better broadband means she can access more." (SBVS recipient, Aberdeenshire)*

- *"Yes, my son is disabled, and the faster more secure broadband has helped immensely." (SBVS recipient, Highlands)*

6.2.38 However, while the majority referenced positive benefits, some respondents noted that it had both positive and negative impacts, with broadband supporting learning opportunities but also leading to increased time spent on social media or gaming:

- *"Yes and no. More social media, game play too, but access to learning and tutorials, online help and items of interest/music/sports/booking online has all been positive!" (SBVS recipient, Aberdeenshire)*

- *"Mixed effect. Better opportunities for education and ability to find out information and do research more quickly; but also, an increase in the use of gaming and social media which can have considerable negative effects." (SBVS recipient, Edinburgh)*

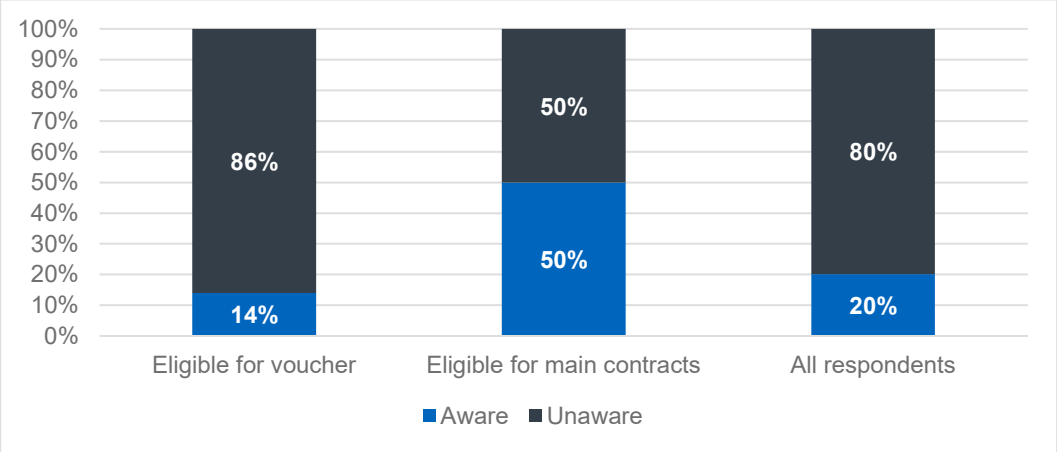
6.2.39 It should also be borne in mind that while improved connectivity can provide benefits for children's education, affordability of devices and contracts remains a key issue and acts to restrict take-up. There is therefore a risk of creating intra-community inequalities where children in better-off households are fully connected while their peers remain excluded.

Key Point: On the whole respondents emphasised the benefits of the improved connection for young people, including the positive benefits in terms of children's education. However, some respondents also highlighted the negative impacts associated with use of social media and gaming. In addition, it should be borne in mind that while improved connectivity can provide benefits, affordability of devices and contracts acts as a barrier to up-take for some groups resulting in intra-community inequalities.

6.3 Group 2 Survey Responses

Aware of the R100 / unaware of R100

6.3.1 Overall, 80% of Group 2 households were unaware of R100 prior to receiving the survey, with fewer households aware amongst those eligible for the voucher scheme (more than 85% unaware) compared to those eligible via the main contracts (50/50 split between those who were aware and those who were unaware of R100) (see



6.3.2 Figure 6-7).

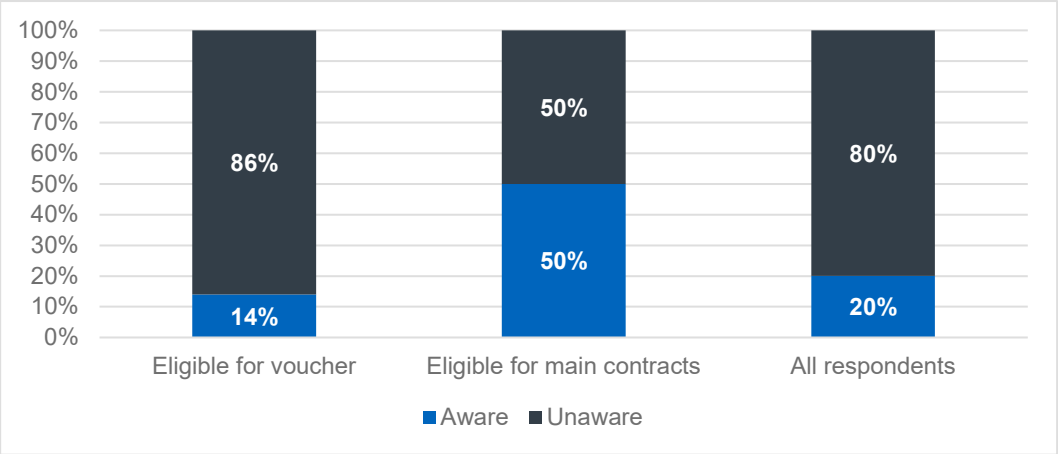


Figure 6-7: Awareness of R100 amongst those eligible for voucher / main contracts

Key Point: More than 85% of Group 2 households eligible for the voucher scheme and 50% of those eligible via the main contracts who responded to the survey were unaware of R100.

Current Connection

In total, 82% (n=155) of Group 2 households had a current home broadband connection compared to 18% (n=34) who did not (see figure below).

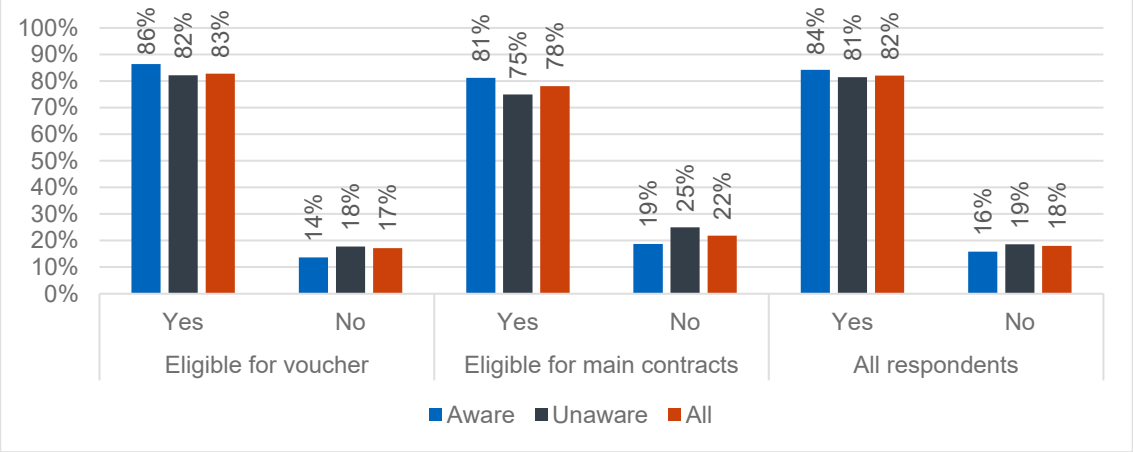


Figure 6-8: Do you currently have a home broadband internet connection at the property?

Key Point: The majority of Group 2 households responding to the survey (over 80%) had an existing broadband connection.

Respondents without a current broadband connection

How household accesses the internet

6.3.3 Those households who did not have a broadband connection were asked how their household typically accesses the internet. Overall, 91% (n=31) indicated that they used 3G, 4G, 5G connectivity on a smartphone, with 3% (n=1) using public access resources, and 6% (n=2) not using the internet (see Figure 6-9)

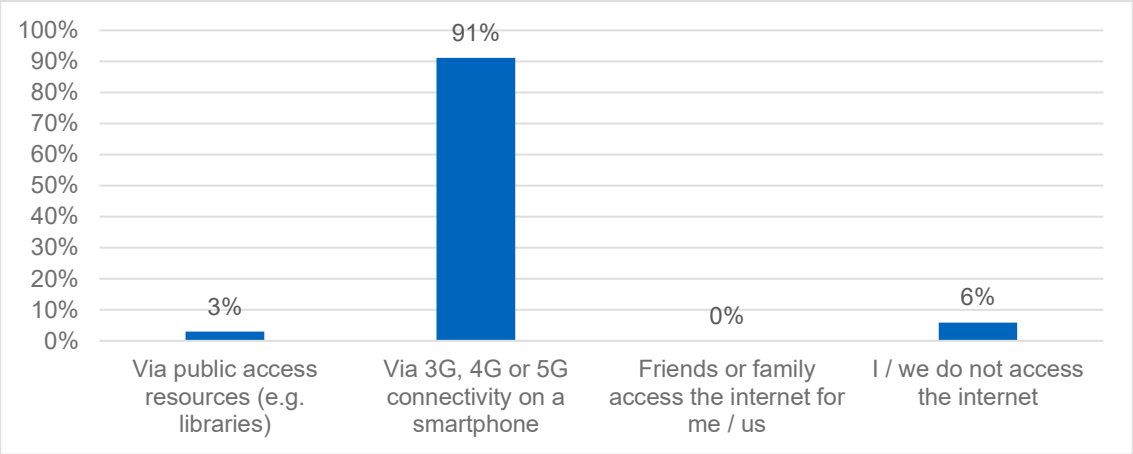


Figure 6-9: How do you access the internet? (n=34)

6.3.4 Respondents were then asked via open text responses what tasks their household typically uses the internet for and whether there are things their household is missing out on by not being able to access the internet more often. A wide range of uses of the internet were identified, including shopping, streaming, social media, gaming, healthcare, accessing news and information, video calls, accounting activities, and work and education. Respondents emphasised the difficulties of undertaking these tasks. Comments emphasised the difficulties associated with working from home, making video calls or streaming content:

- *"Everything we do on the Internet is difficult, and there are times we are not able to use it at all. I have had to go elsewhere to submit VAT returns when 4G has been down" (Group 2a respondents, Shetland)*
- *"Video calling is very temperamental so becomes very difficult to speak to loved ones. For work, I am unable to use conference room chats, I require moving to my parents' miles away for a meeting online." (Group 2a respondent, Highlands)*
- *"Streaming can be patchy. I had been looking at a homeworking opportunity but that proved to not be possible. I am also a musician / songwriter and collaboration online is currently not possible." (Group 2a respondent, Aberdeenshire)*
- *"Unable to watch movies or TV shows via any streaming services, also problems accessing videos as part of my master's course as well as work related topics" (Group 2a respondent, Shetland)*

Key Point: The majority of households in the sample who did not have a current broadband connection accessed the internet using 3G, 4G or 5G connectivity on a smartphone. Amongst this group, there was a desire to use the internet for a wide range of activities, but the lack of a fast and reliable connection was a significant barrier.

Likelihood of applying for a voucher / signing up to home broadband

6.3.5 Households who i) were unaware of R100 and ii) did not have a current broadband connection were firstly asked if they intend to apply for a voucher / upgrade their contract or sign up to a new contract now that they knew about the scheme. The responses are shown in the figure below.

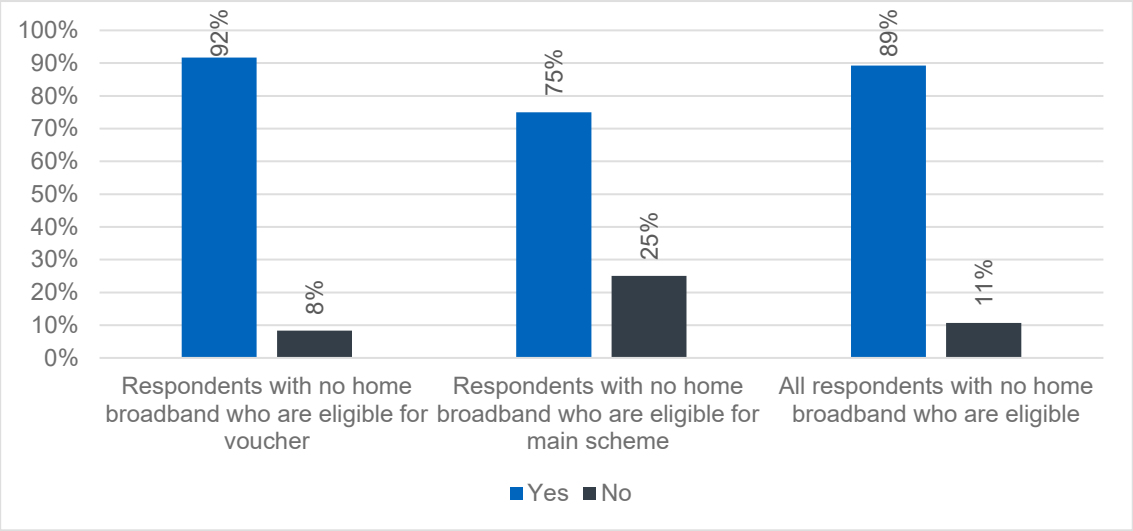


Figure 6-10: Respondents with no current home broadband connection - Now that you are aware of the Scottish Broadband Voucher Scheme, do you intend to apply for a voucher? / Now that you are aware of the R100 programme and the roll out of superfast (or quicker) broadband connections, will you upgrade your contract or sign up to a new contract?

6.3.6 In total, 89% (n=25) said they would apply for the scheme and 11% (n=3) said they would not.

6.3.7 Those that said they would not apply were then asked to what extent a range of factors explained their decision. Respondents without a home broadband connection who had indicated that they were aware of R100 were also asked this question. While sample sizes were small (n=5-9[82]), key issues raised included:

- the monthly cost of the broadband service being too high (n=9): two people identified as a major factor and three people identified as a minor factor
- prefer to use 3G, 4G or 5G mobile connection to access the internet (n=9): one person identified as a minor factor and one person identified as a major factor
- someone in the household has a disability and I / we are unable to afford the assistive technology needed to enable internet use (n=9): one person identified as a minor factor
- applying for the Scottish Broadband Voucher is too complicated (n=5): one person identified as a minor factor

Respondents with a current broadband connection

Likelihood of applying for a voucher / signing up to home broadband

6.3.8 Households who i) were unaware of R100 and ii) had a current broadband connection were firstly asked if they intend to apply for a voucher / upgrade their contract or sign up to a new contract now that they knew about the scheme. The results are shown in the figure below.

[82] While some options were asked of those eligible for the voucher and the main contracts, some options ('applying for a voucher is too complicated' and 'concerned that the SBVS is a scam') were only asked to those eligible for the voucher and therefore the sample size for these options is smaller.

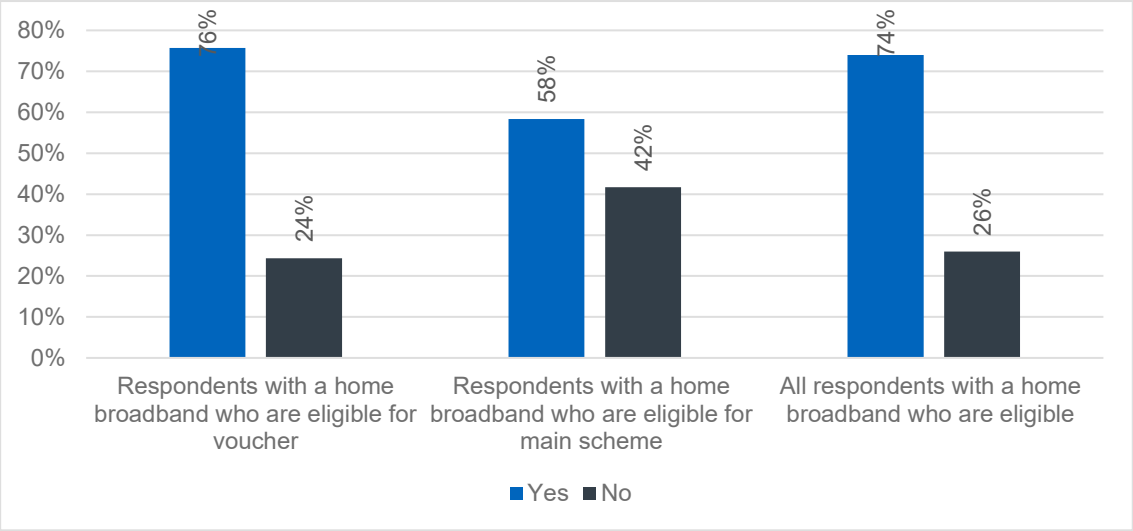


Figure 6-11: Respondents with a current home broadband connection - Now that you are aware of the Scottish Broadband Voucher Scheme, do you intend to apply for a voucher? / Now that you are aware of the R100 programme and the roll out of superfast (or quicker) broadband connections, will you upgrade your contract or sign up to a new contract?

6.3.9 In total, 74% (n=91) said they would apply for the scheme and 26% (n=32) said they would not.

6.3.10 Those that said they would not apply were then asked to what extent a range of factors explained their decision not to apply for a voucher or upgrade / sign up to a new contract. Respondents who had indicated they had a home broadband connection and were aware of R100 were also asked this question. The table below shows the responses received from both groups. Note, while some options were asked of those eligible for the voucher and the main contracts, some ('applying for a voucher is too complicated' and 'concerned that the SBVS is a scam') were only asked to those eligible for the voucher and therefore the sample size for these responses is smaller.

Table 6-2: To what extent do the following factors explain your household's decision not to apply for a Voucher or upgrade / sign up to a new contract

	Major factor	Minor factor	Not a factor	I don't know	Not applicable
It's too expensive to upgrade (n=64)	39%	11%	27%	17%	6%
Applying for a voucher is too complicated (n=46)	28%	17%	37%	11%	7%
Changing the contract is too complicated / stressful (n=64)	25%	16%	42%	8%	9%
Happy with the current speeds (n=64)	22%	25%	30%	6%	17%
Currently locked into a contract (n=64)	22%	19%	36%	6%	17%
Do not want someone coming to the house to set up the connection because of concerns around security / scams (n=64)	5%	8%	63%	5%	20%
Concerned that the Scottish Broadband Voucher Scheme is a scam (n=46)	4%	11%	61%	4%	20%

6.3.11 The key issues highlighted were:

- it's too expensive to upgrade – 39% identified as a major factor and 11% identified as a minor factor
- applying for a voucher is too complicated – 28% identified as a major factor and 17% as a minor factor
- changing the contract is too complicated / stressful – 25% identified as a major factor and 16% as a minor factor

Key Point: The data suggests that **a lack of awareness of R100 is a key barrier to take-up**, with 89% of households with a current connection who were previously unaware of R100 and 74% of those without a current connection who were previously unaware, stating that they intend to apply now that they know about the scheme. From an equality perspective, awareness gaps are particularly important for groups already less digitally engaged, including older adults, disabled people and low-income households. To help ensure R100 provides benefits for all groups in society a greater focus on awareness-raising activities which are both tailored and inclusive would be beneficial. Amongst those for whom awareness was not a barrier, key barriers included the cost of upgrading and the complications involved in applying for the voucher / upgrading the contract. These barriers align closely with known equality risks: low-income households, older people with low digital confidence, and disabled people who may require assistive technology.

About your current connection

6.3.12 Group 2 respondents who indicated that they had a current broadband connection were asked to provide details of their broadband connection and comment on their levels of satisfaction with, and use of, the connection. The responses are reported alongside those from Group 1 and Group 3 in Section 6.5 below.

6.4 Group 3 Survey Responses

Voucher and main contracts breakdown

6.4.1 Group 3 respondents to the survey were initially asked whether they were scheduled to receive broadband via SBVS or the main contracts. The figure below shows the breakdown of responses received.

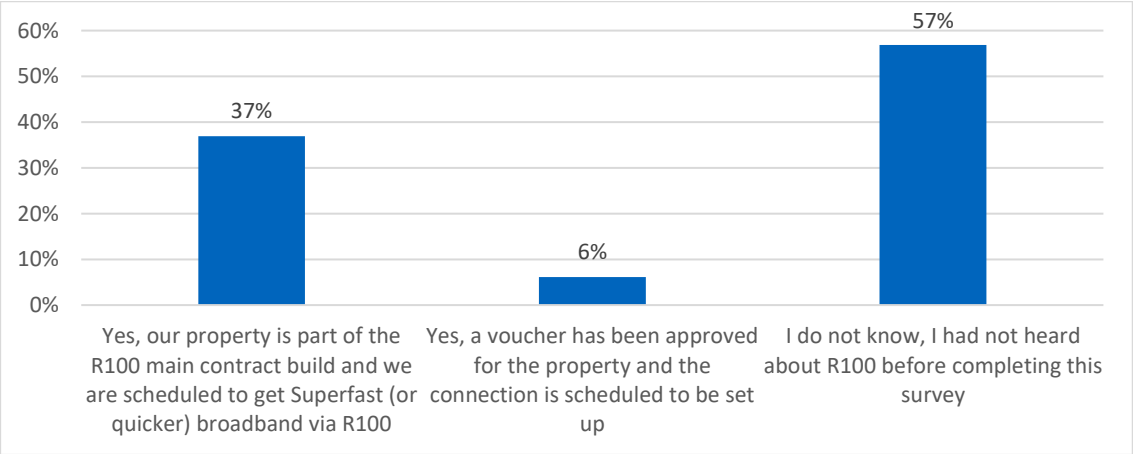


Figure 6-12: Our data indicates that your address is in the R100 main contract build plan and / or that a Scottish Broadband Voucher Scheme voucher has been approved for your property. Is this correct? (n=341)

6.4.2 In total, over half of respondents (57%, n=194) were unaware of R100, while 37% (n=126) confirmed that they were scheduled to get superfast broadband via the main contract and 6%

(n=21) said that a voucher had been approved but not yet set up. A high proportion of respondents being unaware of the scheme echoes the findings from the Survey 2 group.

Key Point: As with Group 2 respondents, the majority of Group 3 respondents in the sample were unaware of R100.

Current Connection

6.4.3 Respondents were then asked if they had a home broadband connection at the property. In total, 86% (n=294) said yes and 14% (n=47) said no.

Key Point: As with Group 2 respondents, the majority of Group 3 respondents in the sample had an existing broadband connection.

Respondents without a current broadband connection

6.4.4 Those who indicated that they did not have a broadband connection were then asked how their household typically accessed the internet. All those who responded (n=46) stated that they access the internet via 3G, 4G, or 5G connectivity on a smartphone.

6.4.5 Respondents were then asked what tasks their household typically uses the internet for and whether there were things their household was missing out on by not being able to access the internet more often. As with Group 2, a wide range of uses of the internet were identified, including shopping, streaming, social media, gaming, healthcare, accessing news and information, video calls, accounting activities, and work and education, with respondents emphasising the significant challenges of undertaking such activities without a reliable internet connection.

6.4.6 One respondent additionally identified the difficulties associates with independent living for an older relative:

- *"[We are] hugely affected ... The radio signal here is lousy, so my 96-year-old uncle cannot listen to many stations. Equipment that we could use to enable him to continue living safely and independently often relies on having efficient broadband. He only has very limited television channels. The mobile signal here is also poor, so internet is not even good on mobile networks. We basically live as if back in the 1980s." (Group 3 respondent, Aberdeenshire)*

6.4.7 While another emphasised the challenges in setting up a business without a reliable and fast connection:

- *"Having moved in during November 2024 we have tried two separate providers neither of whose equipment worked properly, we now have to use our mobile phones as hot spots for doing basic things like fill in this form, very inconvenient. As we are trying to set up a business and for the house even contacting the local council to register for things is proving a challenge." (Group 3 respondent, Perth and Kinross)*

Key Point: All those households without a current broadband connection accessed the internet using 3G, 4G or 5G connectivity on a smartphone. Amongst this group, there was a desire to use the internet for a wide range of activities, but the lack of a fast and reliable connection was a significant barrier.

Respondents with a current broadband connection

6.4.8 Group 3 respondents who indicated that they had a current broadband connection were asked to provide details of their broadband connection and comment on their levels of satisfaction

with, and use of, the connection. The responses are reported alongside those from Group 1 and Group 2 in Section 6.5 below.

6.5 Comparative Analysis

6.5.1 As set out in the introduction, this section focuses on the questions which were asked of all three groups or more than one group within the survey and reports the results of each group alongside one another to enable comparison between the responses. It includes sections covering:

- broadband connection – including type of connection, speed and current provider
- satisfaction with broadband connectivity
- household internet devices
- household use of broadband connection
- degree of working from home
- wellbeing
- views on neighbourhood and community

6.5.2 It is noted that while all Group 1 respondents were asked questions about their current connection, only those respondents in Groups 2 and 3 who indicated that they had a current broadband connection were asked these questions. The direct comparison therefore overestimates the broadband connectivity of those in Group 2 and 3 as it does not include those who do not have an existing connection.

Broadband connection

Type of connection

6.5.3 Respondents in Group 1 and those in Group 2 and 3 who indicated that they had a current home broadband connection were asked to indicate how their current connection is provided. The results are shown in the figure below.

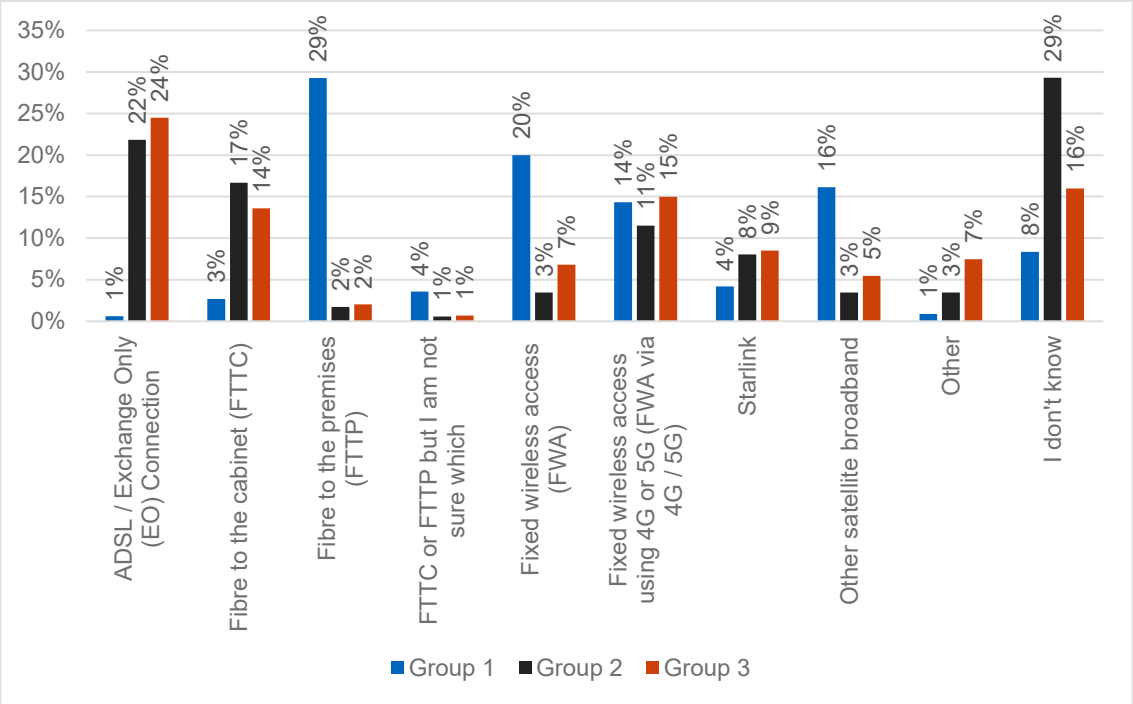


Figure 6-13: Do you know how your current broadband connection is provided? (Group 1 n=335, Group 2 n=175, Group 3 n=294)

Key Point: As may be expected, amongst Group 1 respondents, the most common response was FTTP, followed by FWA whilst amongst Group 2 and Group 3 respondents, the most common responses were ADSL, FTTC, FWA and Starlink.

Speed of current connection

6.5.4 Group 1, 2 and 3 respondents were also asked to provide the speed of their current connection. The responses are shown in the figure below. It is noted that not all respondents provided a response.

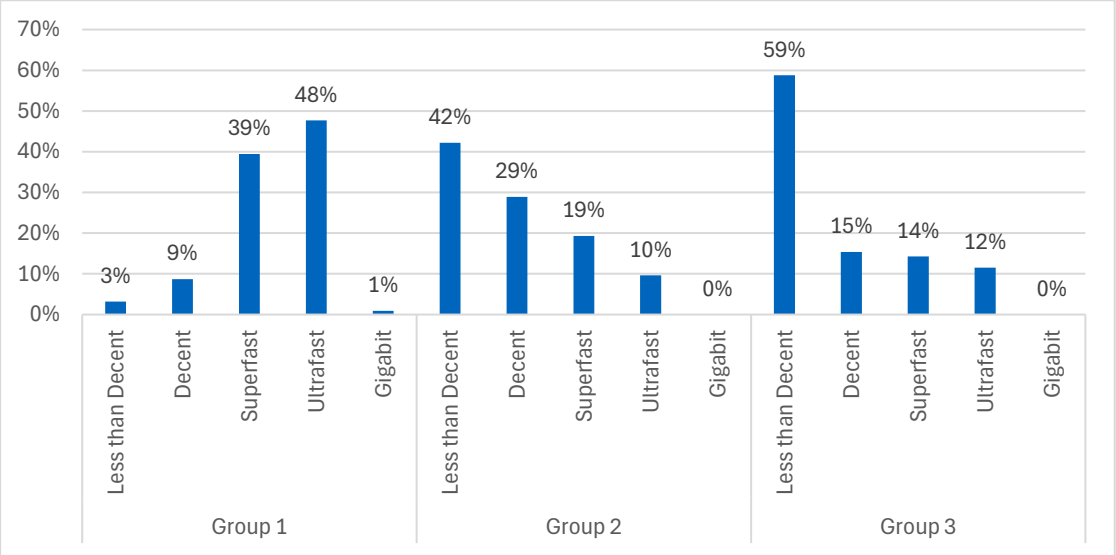


Figure 6-14: If you know it, please specify the download speed of the current broadband contract at your property. This means the download speed delivered to the property which can be found in the contract - this is typically in the name of the broadband package (Group 1 n=218, Group 2 n=83, Group 3 n=182)

6.5.5 While 88% of those in Group 1 who responded stated that they had superfast broadband speeds or quicker, just 29% of those in Group 2 and 26% of those in Group 3 achieved this speed of broadband connection.

Key Point: Group 1 respondents generally benefit from higher speeds than those in Group 2 and Group 3.

Current provider

6.5.6 Respondents were also asked to provide the name of their current broadband provider. The results for Group 1, Group 2 and Group 3 are shown in Figure 6-15, Figure 6-16, and Figure 6-17 respectively. It is noted that not all respondents provided a response.

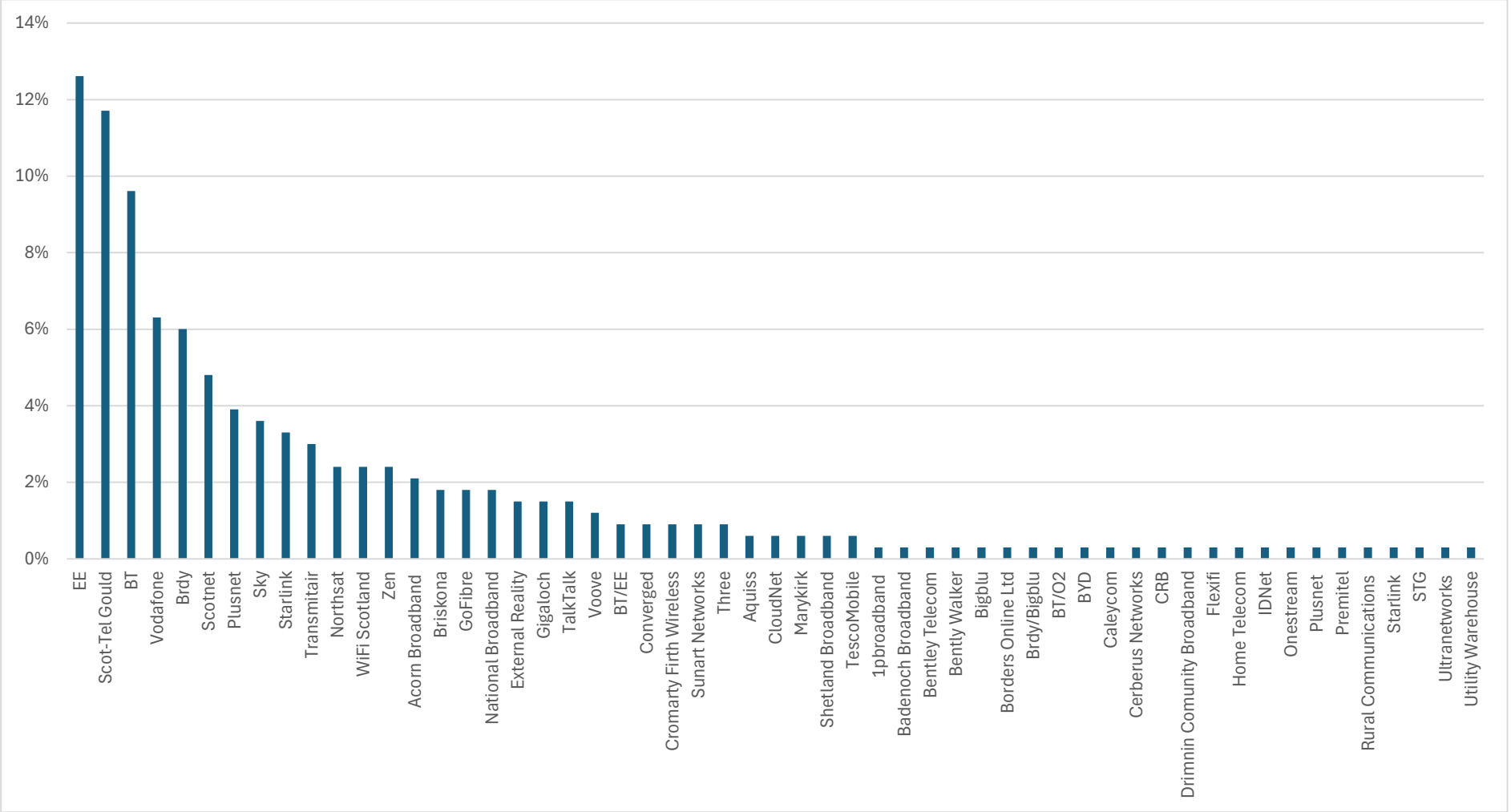


Figure 6-15: Who is the current provider? (Group 1 n=333)

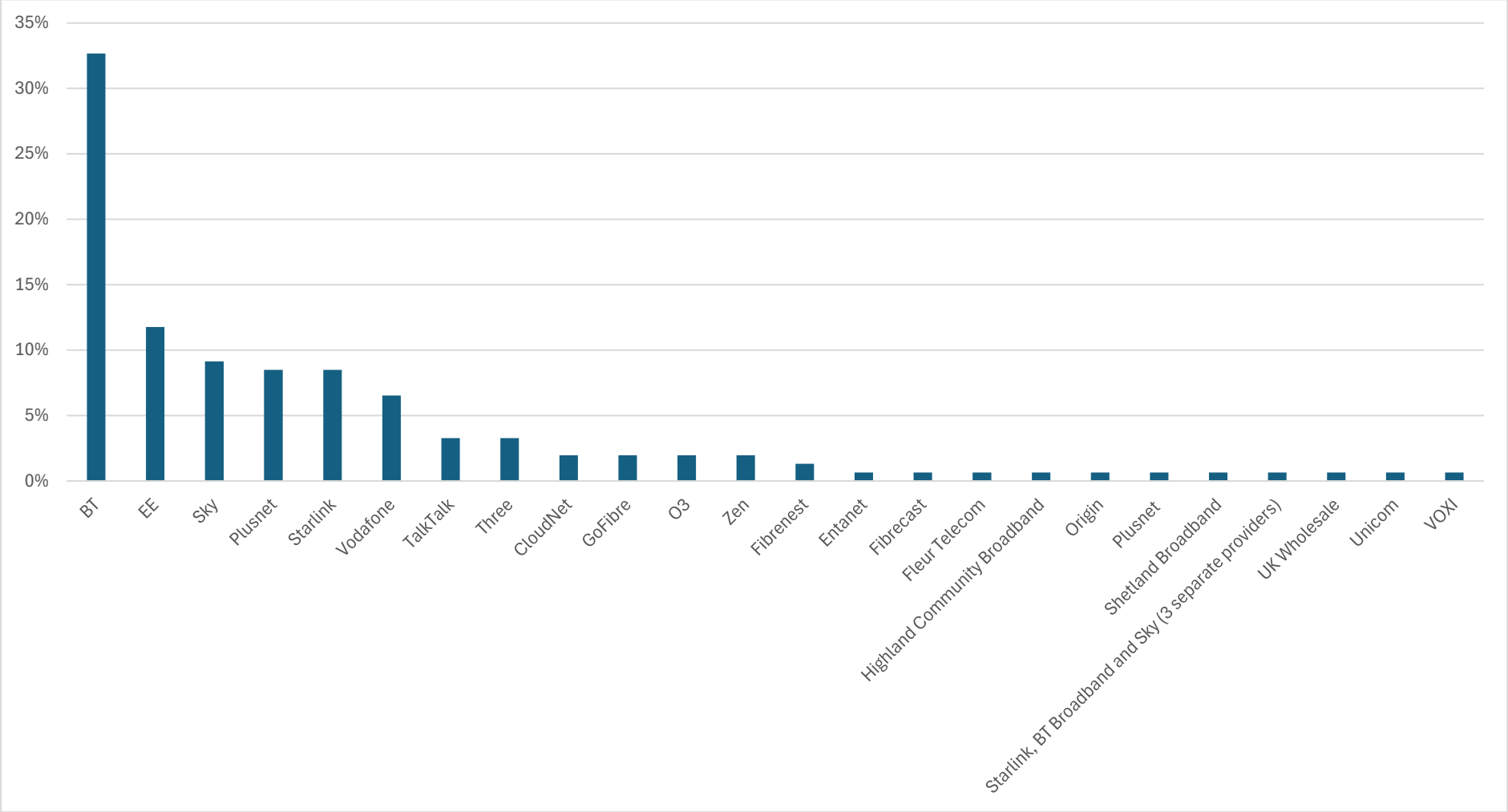


Figure 6-16: Who is the current provider? (Group 2 n=153)

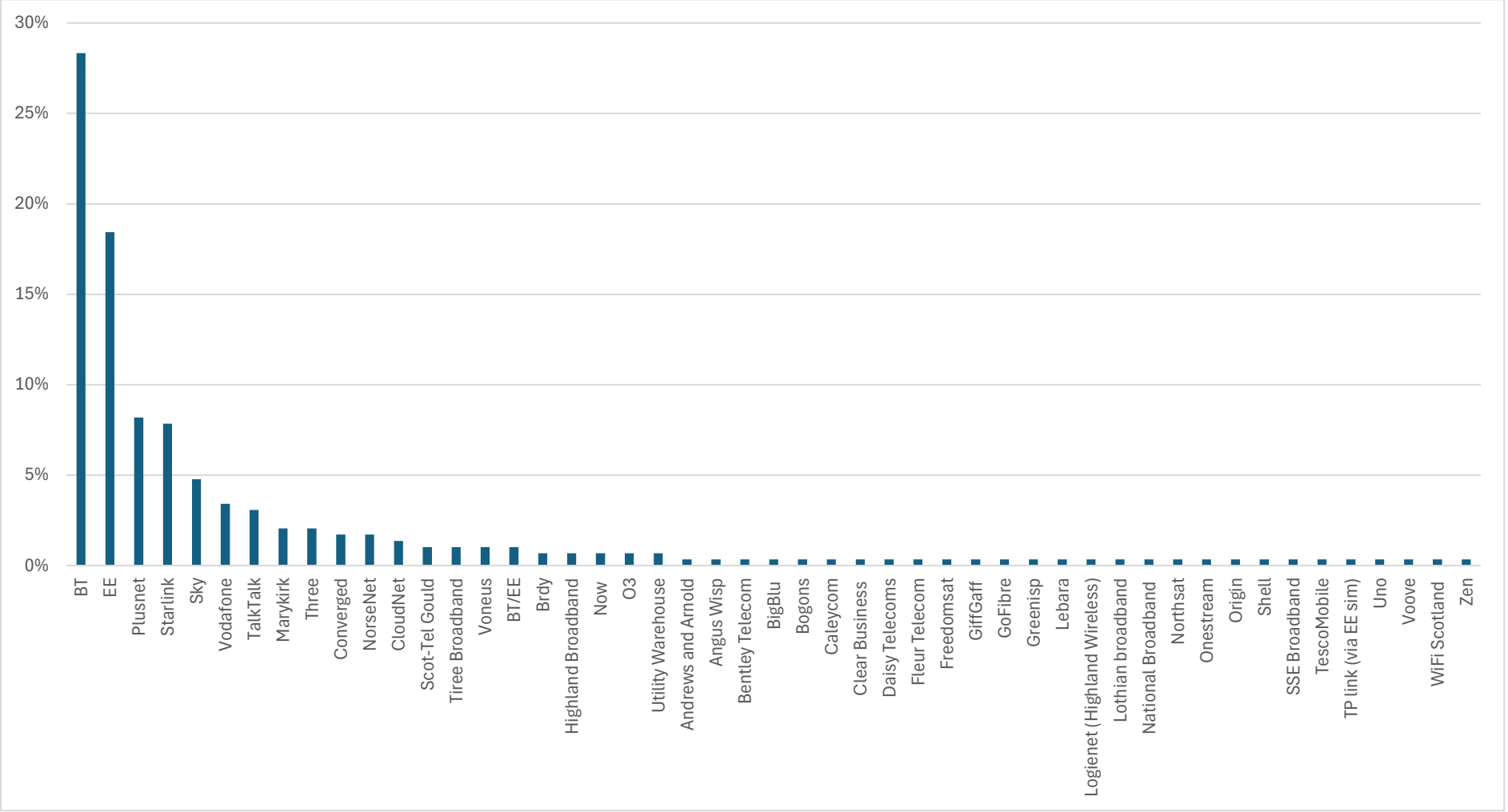


Figure 6-17: Who is the current provider? (Group 3 n=293)

6.5.7 Across all three groups, a similar set of providers dominate, including BT, EE, PlusNet, Starlink, Sky, and Vodafone. Group 1 respondents benefit from a wider range of providers. It is also notable that Starlink features in all three groups (albeit in smaller numbers in Group 1) with a proportion of businesses / organisations opting to pay for a satellite solution due to the importance of a reliable connection.

Key Point: A similar set of providers dominate all three groups with Group 1 properties benefitting from a wider range of providers than Group 2 and Group 3 properties.

Satisfaction with broadband connectivity

6.5.8 The figures below show levels of satisfaction with the speed, reliability, and value for money of broadband connectivity amongst Group 1, Group 2, and Group 3 respondents.

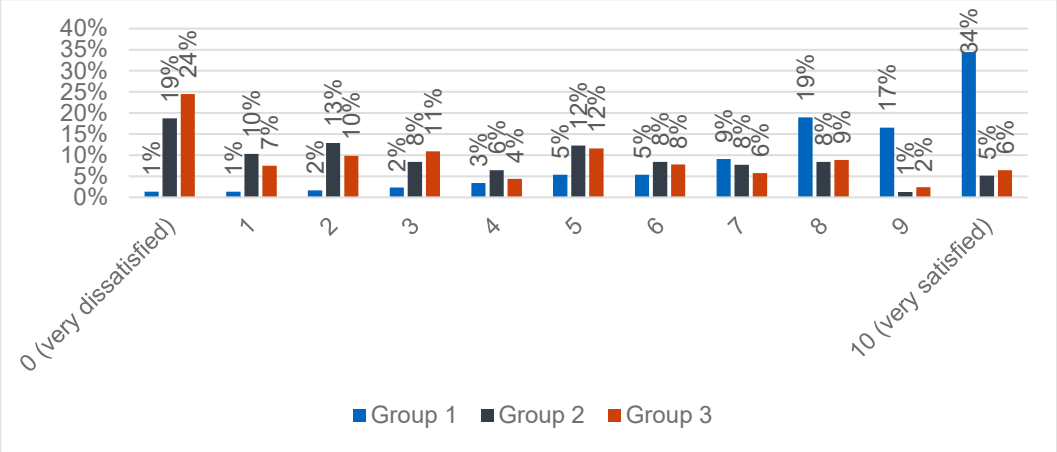


Figure 6-18: On a scale of 0 to 10, how satisfied are you with the speed of your broadband connection?

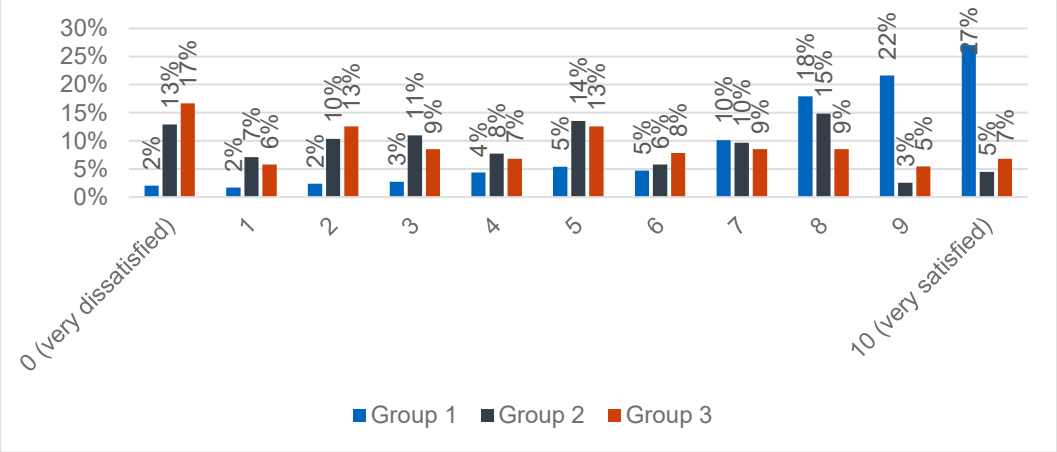


Figure 6-19: On a scale of 0 to 10, how satisfied are you with the reliability of your broadband connection?

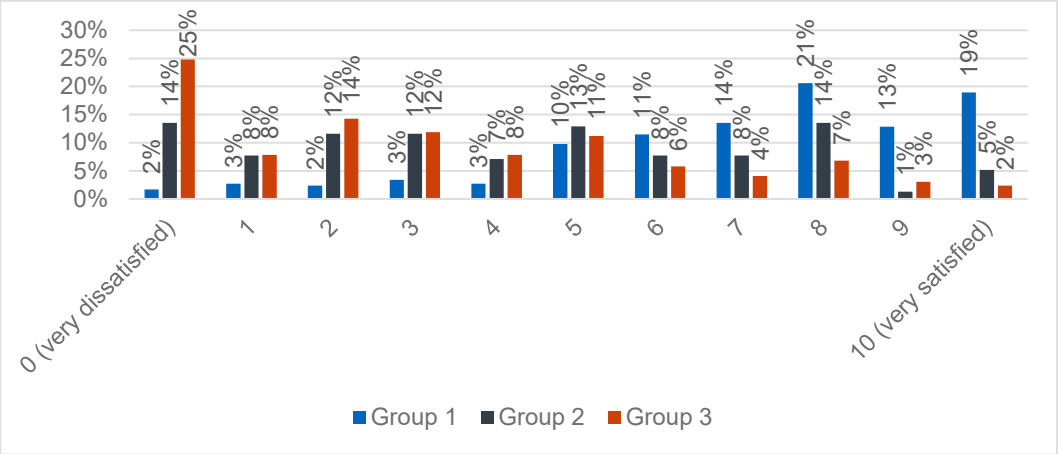


Figure 6-20: On a scale of 0 to 10, how satisfied are you with the value for money of your broadband connection?

6.5.9 While sample sizes are small and therefore a note of caution is needed when interpreting the results, the data suggests that across all three measures, Group 1 respondents have higher levels of satisfaction:

- 70% (n=207) of Group 1 respondents rated their satisfaction with the speed of their connection as 8 or above, compared to 15% (n=23) of Group 2 respondents and 18% (n=52) of Group 3 respondents
- 67% (n=197) of Group 1 respondents rated their satisfaction with the reliability of their connection as 8 or above, compared to 22% (n=34) of Group 2 respondents and 21% (n=61) of Group 3 respondents
- 52% (n=155) of Group 1 respondents rated their satisfaction with the value for money of their connection as 8 or above, compared to 20% (n=31) of Group 2 respondents and 12% (n=36) of Group 3 respondents

6.5.10 Amongst Group 1 respondents, those provided with connectivity via the main contracts had higher levels of satisfaction with both the speed and reliability of their connection than those provided with connectivity via IVS or SBVS whereas satisfaction with cost was more similar across the groups.

6.5.11 Amongst Group 3 respondents, satisfaction with value for money is very low, with over a quarter of respondents stating that they are very dissatisfied with this aspect.

6.5.12 While satisfaction amongst Group 1 was higher, a number of comments were made in the open text response regarding both the unreliability of some satellite and mobile based solutions and the higher cost compared to other locations and being locked into one provider:

- *"The cost of £46 per month for this speed of broadband is not value for money. Locally in 300MB fibre optic broadband is available for less than half this price, and at no cost to the household to install. Yet 4 miles away, I have no access to fibre broadband so no access to the broadband market, I am stuck with just one provider." (Group 1 respondent, Aberdeenshire)*

Key Point: Group 1 households have higher levels of satisfaction with speed, reliability and value for money than those in both Group 2 and Group 3. Amongst Group 1 respondents, those provided with connectivity via the main contracts had higher levels of satisfaction with both the speed and reliability of their connection than those provided with connectivity via IVS or SBVS

Household internet devices

6.5.13 Respondents were asked to indicate which smart devices their household uses. The figure below shows the percentage of households in the sample with each smart device.

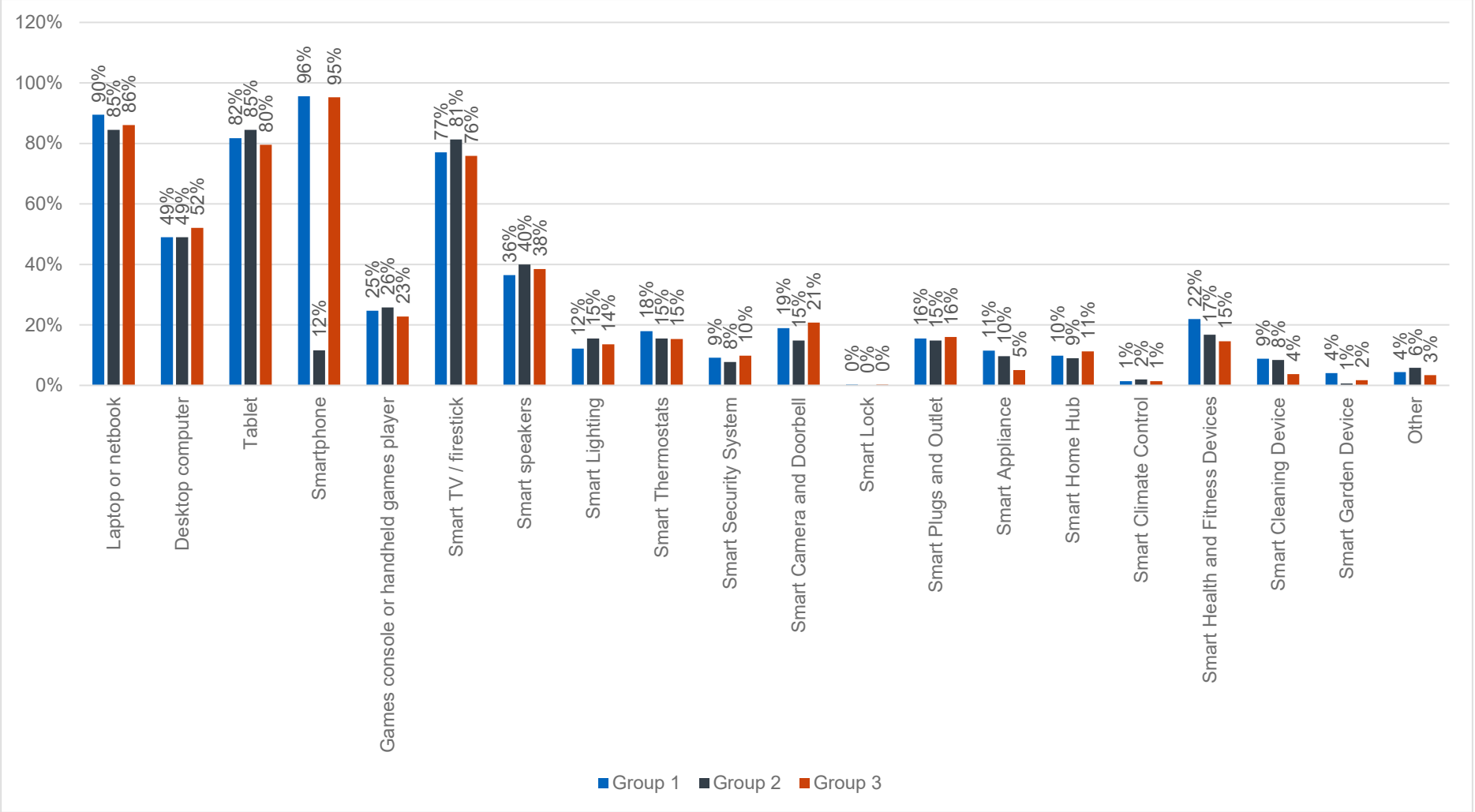


Figure 6-21: Percentage of households with each smart device (Group 1 n=296, Group 2 n=155, Group 3 n=294)

6.5.14 Overall, the most popular devices were laptops, tablets, smartphones, and smart TVs / firesticks. Ownership of smart devices was slightly higher amongst Group 1 respondents although the differences are marginal. In general, households with children tended to have more smart devices than households without children.

Key Point: Households owned a wide range of household smart devices with the most popular devices being laptops, tablets, smartphones, and smart TVs / firesticks.

Household use of broadband connection

Overall

6.5.15 Figure 6-22 shows the frequency with which households in each group use their current broadband connection. Across all three groups, frequency of use is high, with marginal differences between the groups.

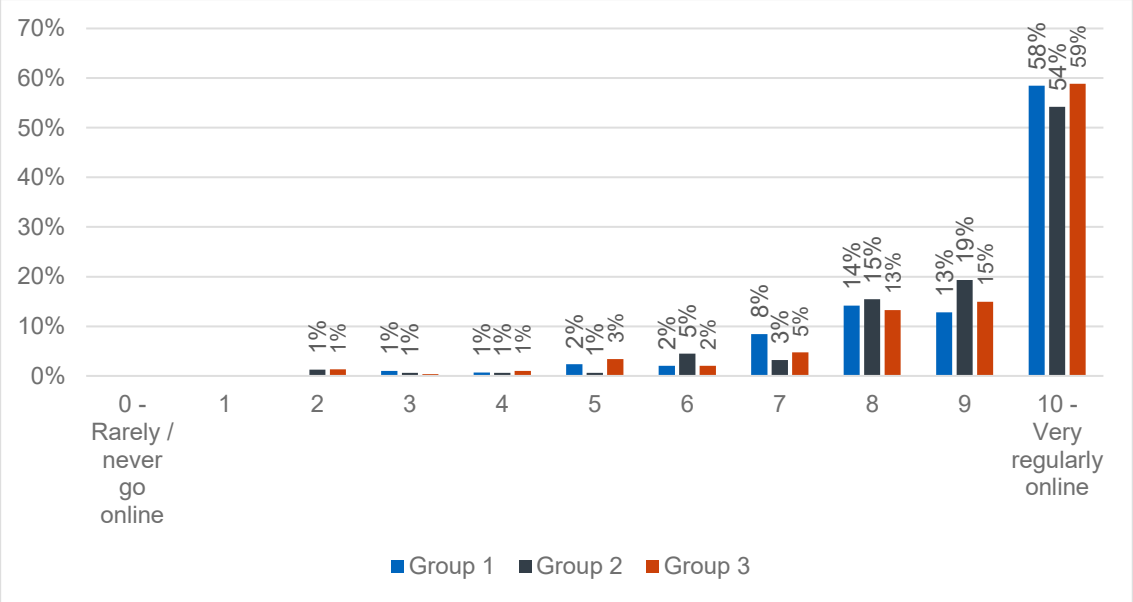


Figure 6-22: What number from 0 to 10 best describes your household's use of the internet, where 0 means 'rarely / never goes online', and 10 means 'very regularly online for social media or messaging, watching online videos, finding information online and so on'?

Key Point: Households across all three groups use their current broadband connection at a high frequency, emphasising the importance of connectivity for a range of household activities.

Use by activity

6.5.16 As well as providing an indication of their overall use, respondents were also asked to provide an indication of the frequency with which their household use their current connection for a range of activities, including household admin, activities relating to employment and education, entertainment activities, social media and messaging, shopping, and health related activities. The results are shown in Figure 6-23 to Figure 6-28, with a summary of the findings for each activity provided in the bullet points below the graphs.

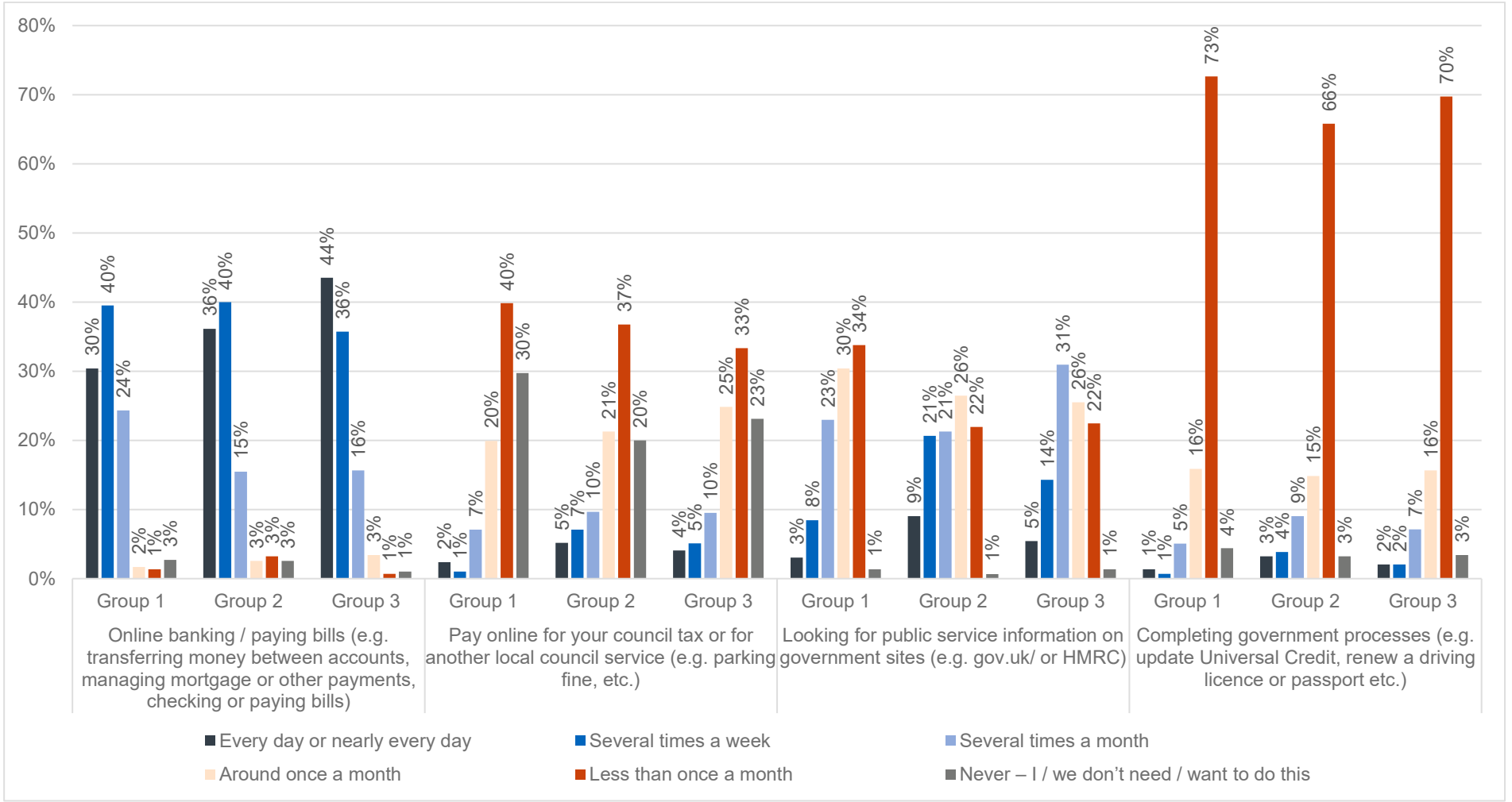


Figure 6-23: How frequently does your household undertake household admin using your home broadband?

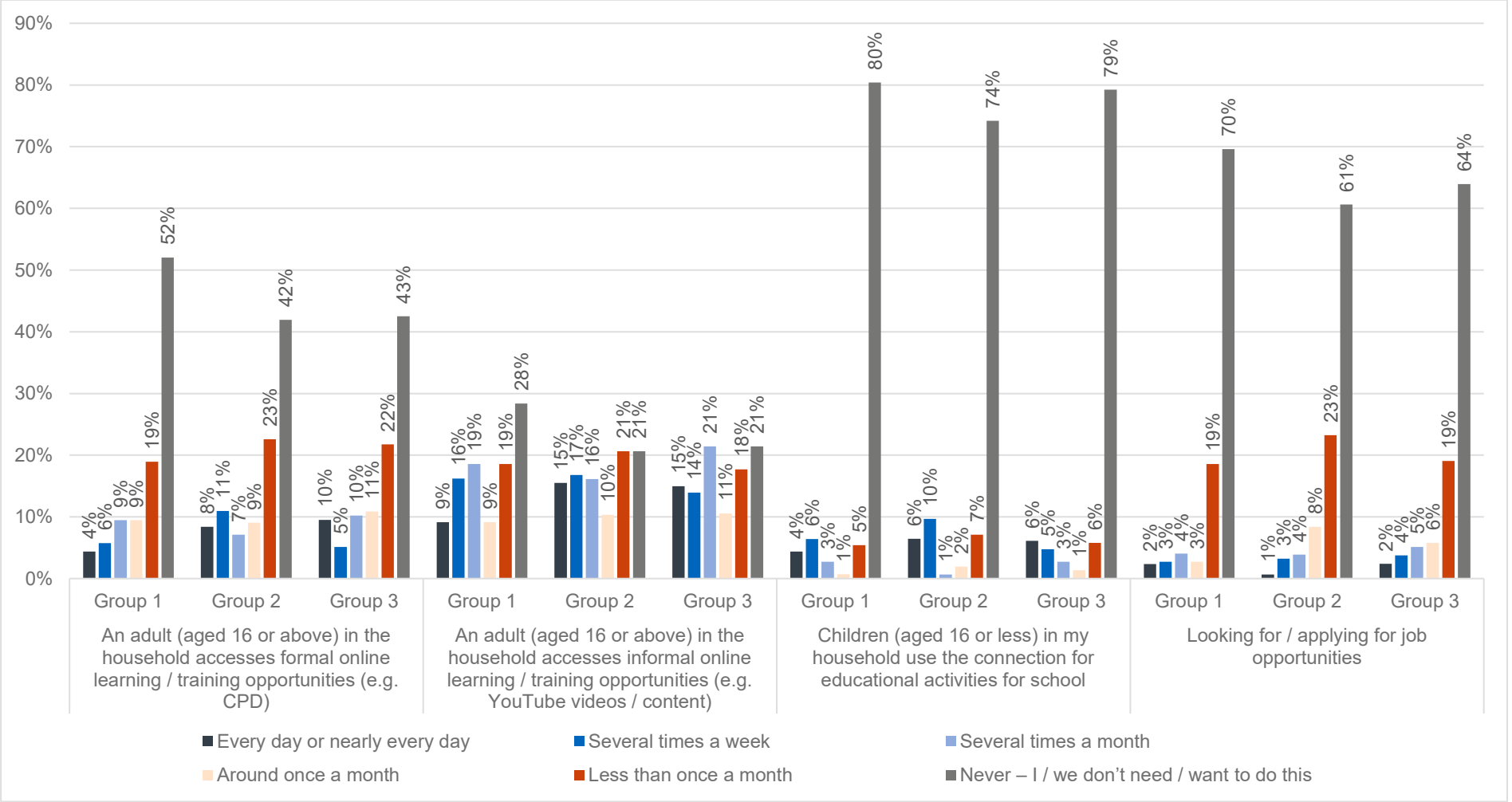


Figure 6-24: How frequently does your household undertake activities relating to employment and education using your home broadband?

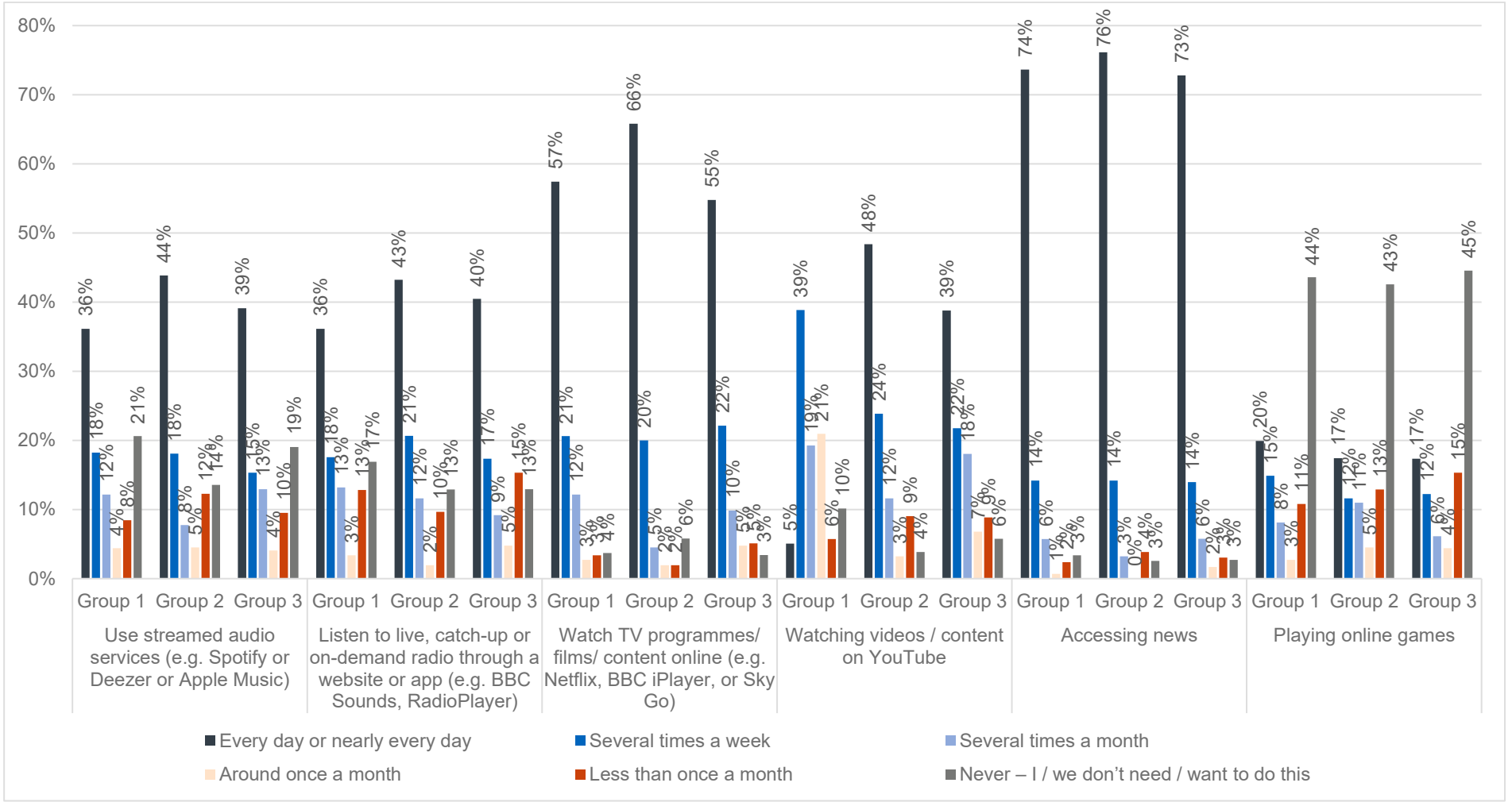


Figure 6-25: How frequently does your household undertake entertainment activities using your home broadband?

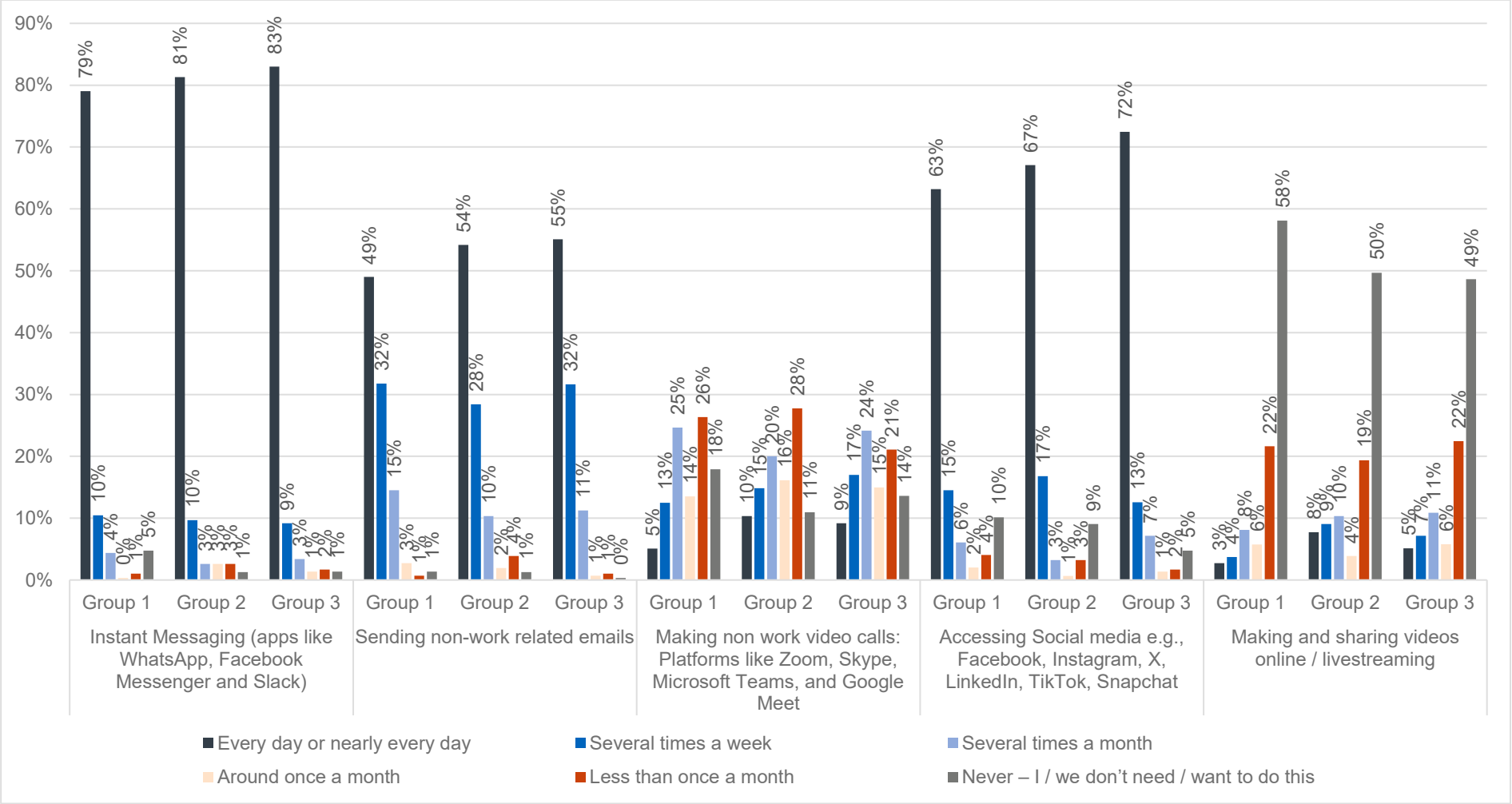


Figure 6-26: How frequently does your household undertake social media and messaging activities using your home broadband?

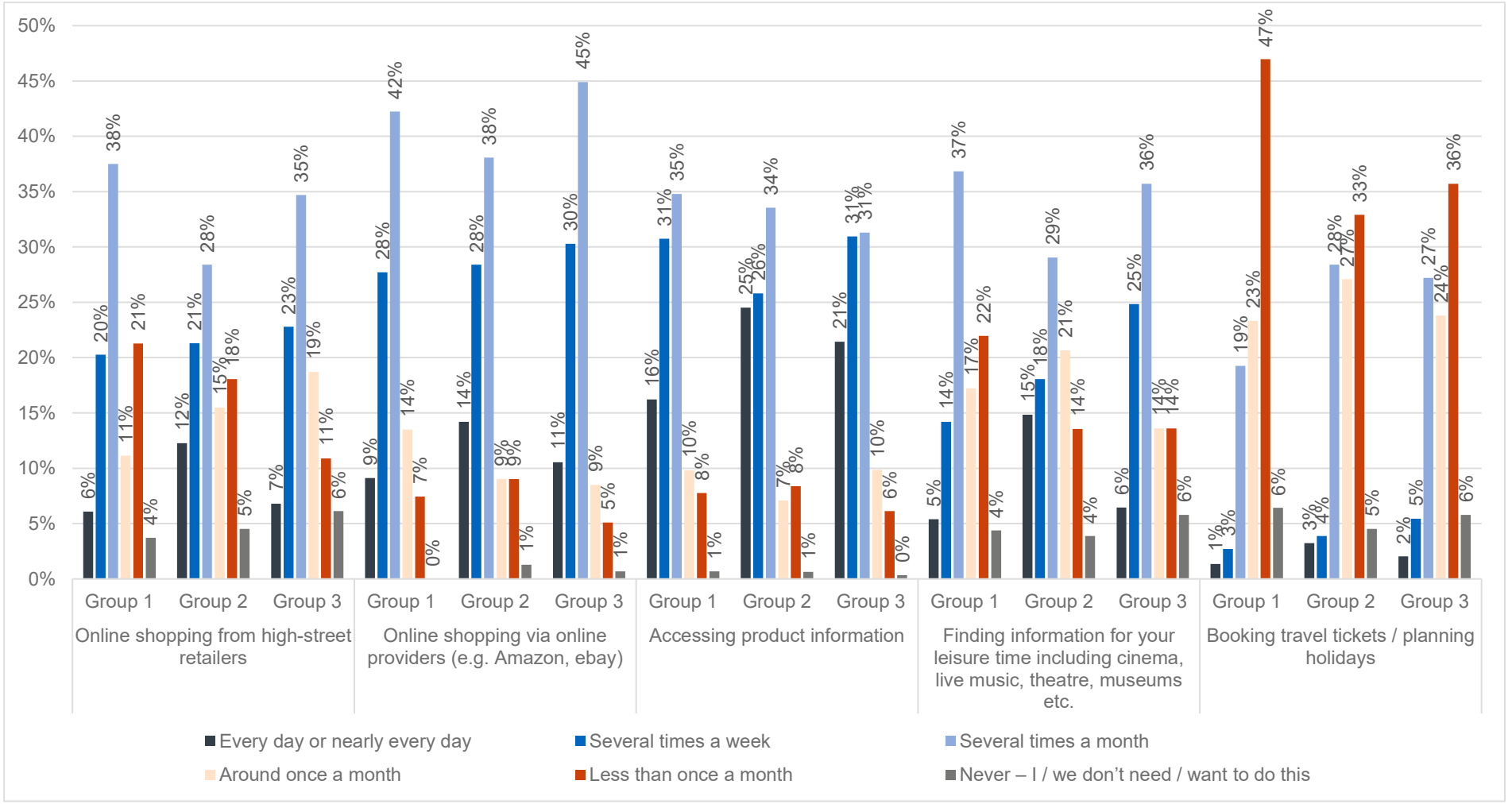


Figure 6-27: How frequently does your household undertake shopping related activities using your home broadband?

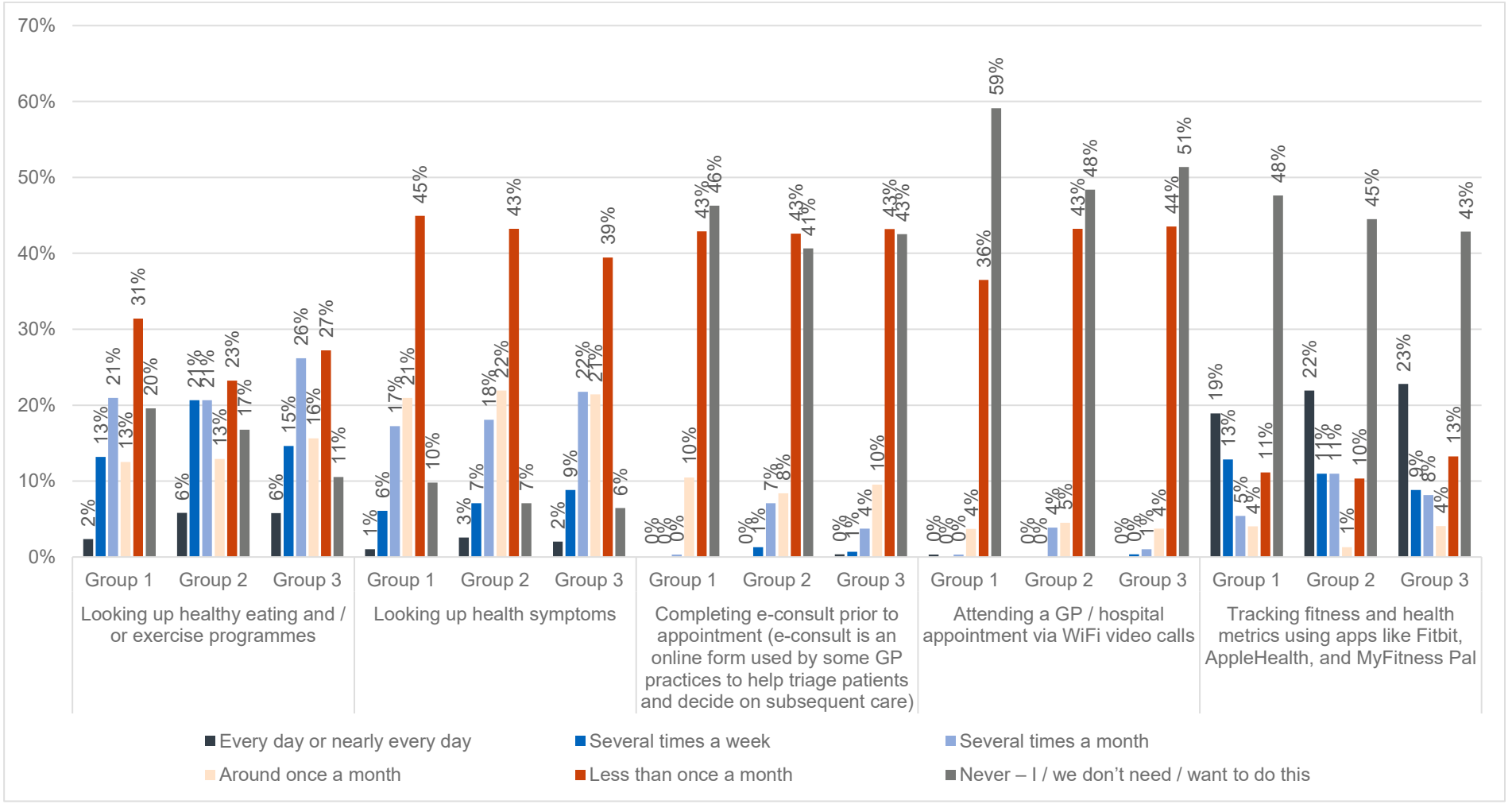


Figure 6-28: How frequently does your household undertake health related activities using your home broadband?

Household admin

- Over 70% of households in each group undertake online banking / bill paying on at least a weekly basis, with around 30% doing so daily
- While paying online bills, looking for public service information and completing government processes are undertaken less regularly, almost all respondents across all three groups do these activities online

Activities relating to employment and education

- More than 10% of households in each group access adult formal online learning / training opportunities and over 30% access informal adult training courses at least weekly
- Use of the connection by children for educational activities was high – with over 10% of Group 1, 16% of Group 2 and 11% of Group 3 using the connection for this purpose on at least a weekly basis – the higher proportions amongst Group 2 likely reflects the higher proportion of households with children in the Group 2 sample.

Entertainment activities

- Across all groups use of the connection for entertainment purposes was high
- In total, over 70% of households in each group stated that they accessed news on a daily basis
- Watching TV programmes / online content was also frequently undertaken with 57% of those in Group 1, 66% in Group 2 and 55% in Group 3 doing so on a daily basis
- Using streamed audio services, listening to live, catch up or on demand radio was undertaken slightly less frequently with over a third in each group doing so on a daily basis
- In total, 20% of those in Group 1 and 17% in Group 2 and Group 3 respectively played online games on a daily basis with rates higher amongst those households with children

Social media and messaging

- In total, around 80% of households in each Group used the connection for instant messaging (such as WhatsApp, Facebook Messenger and Slack) on a daily basis and over 60% in each group used social media e.g. Facebook, Instagram etc daily
- 18% of those in Group 1, 25% in Group 2 and 26% in Group 3 used the connection to make non work video calls on at least a weekly basis, highlighting the importance for out of work connections to family and friends
- While using the connection to make and share videos online / livestream was less frequent, around 20% in each Group did this at least several times a month

Shopping

- Across all groups, use of the connection for shopping was high underlining the general growth in online shopping, even in areas where connectivity is more limited
- Rates of online shopping via online providers (e.g. Amazon, eBay) were higher than rates of online shopping from high street retailers, emphasising the growth and dominance of the former

Health related activities

- While the connection was used fairly frequently for tracking fitness and health metrics and looking up and looking up health symptoms and healthy eating / exercise programmes, smaller numbers used e-consult and or virtual GP / hospital appointments. This may reflect the more limited availability of such services in areas where connectivity has traditionally been poorer.

Key Point: Across all activities, frequency of use is fairly similar across all groups, highlighting the importance of internet connectivity for a range of day-to-day activities regardless of the level of connectivity.

Extent to which current connection provides for the needs of the household

6.5.17 Respondents were also asked whether the speed and reliability of their current connection allowed their household to do everything it wants to do online. The results are shown in the figure below.

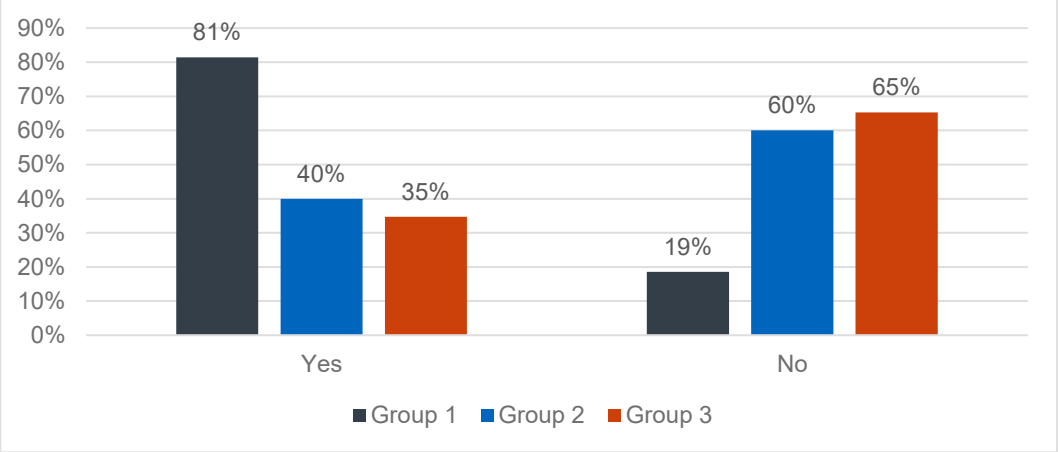


Figure 6-29: Does your current broadband speed and reliability allow your household to do everything it wants to do online? (Group 1 n=296, Group 2 n=155, Group 3 n=294)

6.5.18 Over 80% (81%, n=241) of Group 1 households were able to do everything they wanted to do online using their connection. In contrast just 40% of Group 2 and 35% of Group 3 households were in this category.

6.5.19 Amongst Group 2 and Group 3, there was a desire to be able to use the internet for all activities and for there to be parity with urban areas, with many feeling 'stuck' as a result of there being no viable providers or technologies:

- *"We'd like to do what every town / city dweller can do…we are the forgotten areas and its hopeless" (Group 3 respondent, Highlands)*
- *"We'd like to use it like anyone else in the country who has superfast broadband" (Group 3 respondent, Aberdeenshire)*

6.5.20 Respondents noted that slow speeds and poor reliability make everyday tasks using the internet challenging and frustrating. A wide range of activities were identified which respondents currently cannot do and would like to be able to do including using multiple devices at the same time; streaming TV/movies; working from home; video calling; online banking; shopping and using online government services, and support for smart devices such as security systems and health monitoring.

6.5.21 Several respondents noted that they were unable to do advance their careers in the way that they wish as a result of their poor connection:

- *"There are two of us in the household and we have to take turns streaming shows or audio. If one of us has a Zoom call, the other has to not use the internet ...* ***One of us has the opportunity to teach online but has not been able to pursue*** *[that]* ***both because of the disruption to the household but also because of the unreliability of the connection****." (Group 3 respondent, Highlands)*

- *"I would like to be able to livestream to platforms like Twitch and create videos for YouTube as an extra source of income…****I would like to do contract work from home or run a small business from home, but the Internet speed and reliability precludes this too****." (Group 3 respondent, Glasgow)*

6.5.22 Entrepreneurs, freelancers and creative professionals also noted challenges due to upload and sync delays and being unable to use cloud services effectively.

- *"I am a photographer. Uploading my photos to Facebook, means that everything that is connected to the internet has to be shut down. Sometimes it can take me 5 hrs or more to upload 40 small photos!" (Group 3 respondent, Aberdeenshire)*

6.5.23 Respondents also noted issues with education and learning with students unable to upload projects and difficulties joining conferences online:

- *"We have to hot spot from our phones in order to upload college projects to a portal as the upload speed is max 0.5m/bs and cannot handle media uploads." (Group 3 respondent, Aberdeenshire)*

- *".. it has proven* ***impossible to present research live at international conferences*** *because audio and video at the same time is a nightmare. Pre-recording presentations, compressing them into zip files to email them to the conference secretary prior to the day (with upload still taking ages) is ineffective and costs time… It is also suboptimal having to ask other participants at conferences and/or presentations to switch off their own cameras and present their slides with audio only." (Group 3 respondent, Orkney)*

6.5.24 Several respondents also noted safety issues, particularly around emergency call buttons being unreliable.

- *"I need a good signal for my emergency call button to work. Age related issues." (Group 3 respondent, Highlands)*

- *"As I do not get a mobile phone signal in or around my property, I rely on Wi-Fi calling in the event that my landline fails (currently on day 18 of no landline following the storm on 24th January 2025) (Group 3 respondent, Highlands)*

6.5.25 One respondent with autism also referenced that the lack of support services locally means they have a strong reliability on internet-based provision, and this can cause significant distress when the connection goes down:

- *"Our internet regularly goes down, … and if there's no internet, we can't do anything -- and being on an island in the middle of the North Sea, the internet is a lifeline service! Additionally, I am autistic and due to the lack of support services available locally, all of the support and tools that enable me to function require an internet connection to use, so when the connection is down, I sit here for days on end crying in distress with nobody to help me." (Group 3 respondent, Orkney)*

6.5.26 While satisfaction amongst Group 1 respondents was higher, several Group 1 respondents stated that their household could not do everything online. A number of respondents highlighted difficulties with reliability, noting frequent dropouts, particularly during poor weather, and inconsistent performance across the day. Some users noted that despite the upgrade, they had not seen any improvement in performance while others were critical of the timings in terms of R100 rollout and the lack of information on delivery dates:

- *"4G service works well outwith peak holiday times but **during school holidays the speed slows** dramatically." (Group 1 respondent, Highlands)*
- *"**Speed and bandwidth are degraded in poor weather** and can drop off massively when the cell network is busy with frequent dropouts. It is normally **far slower at night** when people are at home than during the day when people are at work." (Group 1 respondent, Aberdeenshire)*
- *"Use of laptop can be **very slow in the school holidays,** and we can't watch online TV on Saturdays and Sundays" (Group 1 respondent, Aberdeenshire)*
- *"We upgraded to Brdy and the Scottish Government broadband in order to get better connection and download speeds, but **it doesn't seem any better than the previous copper wire connection** using the telephone internet from TalkTalk" (Group 1 respondent, Aberdeenshire)*
- *"Fixed wireless is inherently unreliable due to weather/interference etc… we really need the stability and performance of an FTTP connection. Of particular concern are the **constantly slipping dates for providing us with an FTTP connection under R100**, and for the most part, **a total lack of information and transparency** with regard to timescales for this." (Group 1 respondent, Stirling)*

Key Point: Group 1 households were considerably more satisfied with their broadband connection and its ability to meet household needs than those in Group 2 and Group 3. However, while more satisfied, a number of Group 1 respondents still experience challenges with connectivity.

Degree of working from home

6.5.27 Group 1 respondents and Group 2 and Group 3 respondents with an existing broadband connection were also asked to indicate the extent to which they and the other adults over the age of 18 who they live with work from home. The figure below shows the results of this question for each group, with the percentage representing the proportion of all adults in the sample.

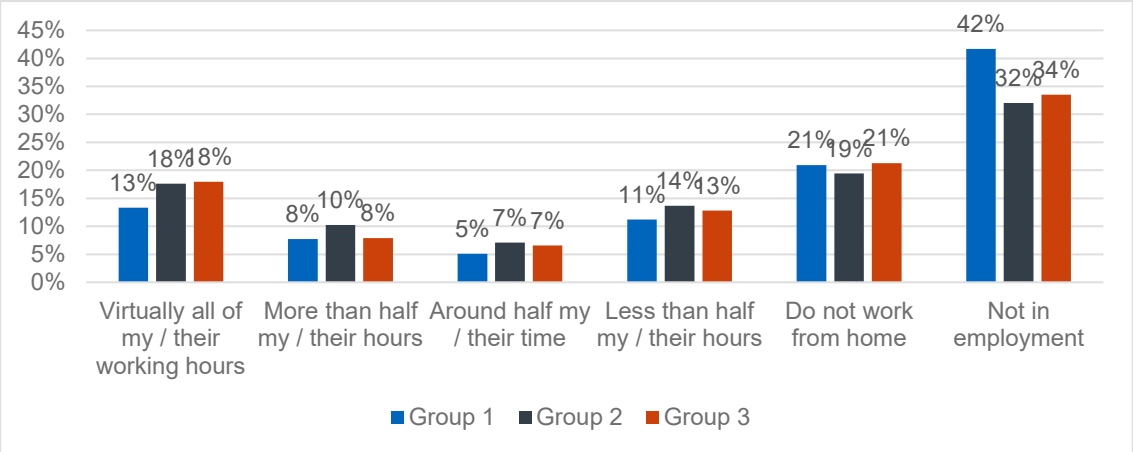


Figure 6-30: Combined results for survey questions directed at single person households “”Please indicate the extent to which you work from home”) and multi person households (“Including yourself, for each adult (18 plus) in your household, please indicate the extent to which they work from home?”)

6.5.28 Across all three groups a high proportion of respondents worked from home for at least some of their contracted hours. In contrast to what may be expected, a higher proportion of those in Group 2 and Group 3 stated that they worked from home than those in Group 1. This contrasts with many of the open text responses which focused on the benefit of now being able to work from home (Group 1) and the challenges of working from home (Group 2 and 3). It is noted that smaller sample sizes and a higher proportion of those in Group 1 not being in employment may account for some of the differences.

Key Point: Across all three groups a high proportion of respondents worked from home for at least some of their contracted hours. In contrast to what may be expected and the comments in the open text responses, a higher proportion of those in Group 2 and Group 3 stated that they worked from home than those in Group 1.

Wellbeing

6.5.29 As discussed in Section 3.6, there is much discussion in the literature on the ability of improved digital connectivity to improve levels of both individual and community wellbeing. However, capturing wellbeing benefits is particularly challenging, in part because wellbeing cannot be directly quantified or monetised as is the case with economic benefits and there are a diverse range of factors which influence wellbeing, making it difficult to isolate the impact of R100.

6.5.30 To help identify wellbeing impacts, the survey replicated the questions on personal well-being included within the UK’s Annual Population Survey (APS)[83]. Respondents were asked one question covering each of the four measures of personal wellbeing[84], as follows:

- **Life satisfaction** - Overall, how satisfied are you with your life nowadays?
- **Feeling the things done in life are worthwhile** - Overall, to what extent do you feel that the things you do in your life are worthwhile?
- **Happiness** - Overall, how happy did you feel yesterday?
- **Anxiety** - Overall, how anxious did you feel yesterday?

6.5.31 As with the APS, respondents were asked to rate their wellbeing on a scale between “0 - not at all’ to “10 - completely”.

6.5.32 Personal wellbeing is reported in the APS as both average means and thresholds, with the latter defined as set out in Table 6-3.

Table 6-3: Office for National Statistics personal wellbeing thresholds[85]

Life satisfaction, worthwhile, happiness	Ratings	Anxiety	Ratings
Low	0 to 4	Very Low	0 to 1
Medium	5 to 6	Low	2 to 3

[83] see https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingintheukqmi

[84] These four aspects are well established in the literature and are often referred to as the Office for National Statistics four aspects of personal wellbeing or the ONS4

[85] https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingintheukqmi

Life satisfaction, worthwhile, happiness	Ratings	Anxiety	Ratings
High	7 to 8	Medium	4 to 5
Very High	9 to 10	High	6 to 10

6.5.33 Figure 6-31 summarises the overall results to the four wellbeing questions as defined above by group and Table 6-4 compares the average mean wellbeing scores between the Group 1 and Group 2 / 3 surveys. In the table, in addition to the mean score in each case, the corresponding APS threshold as defined above is also shown in brackets.

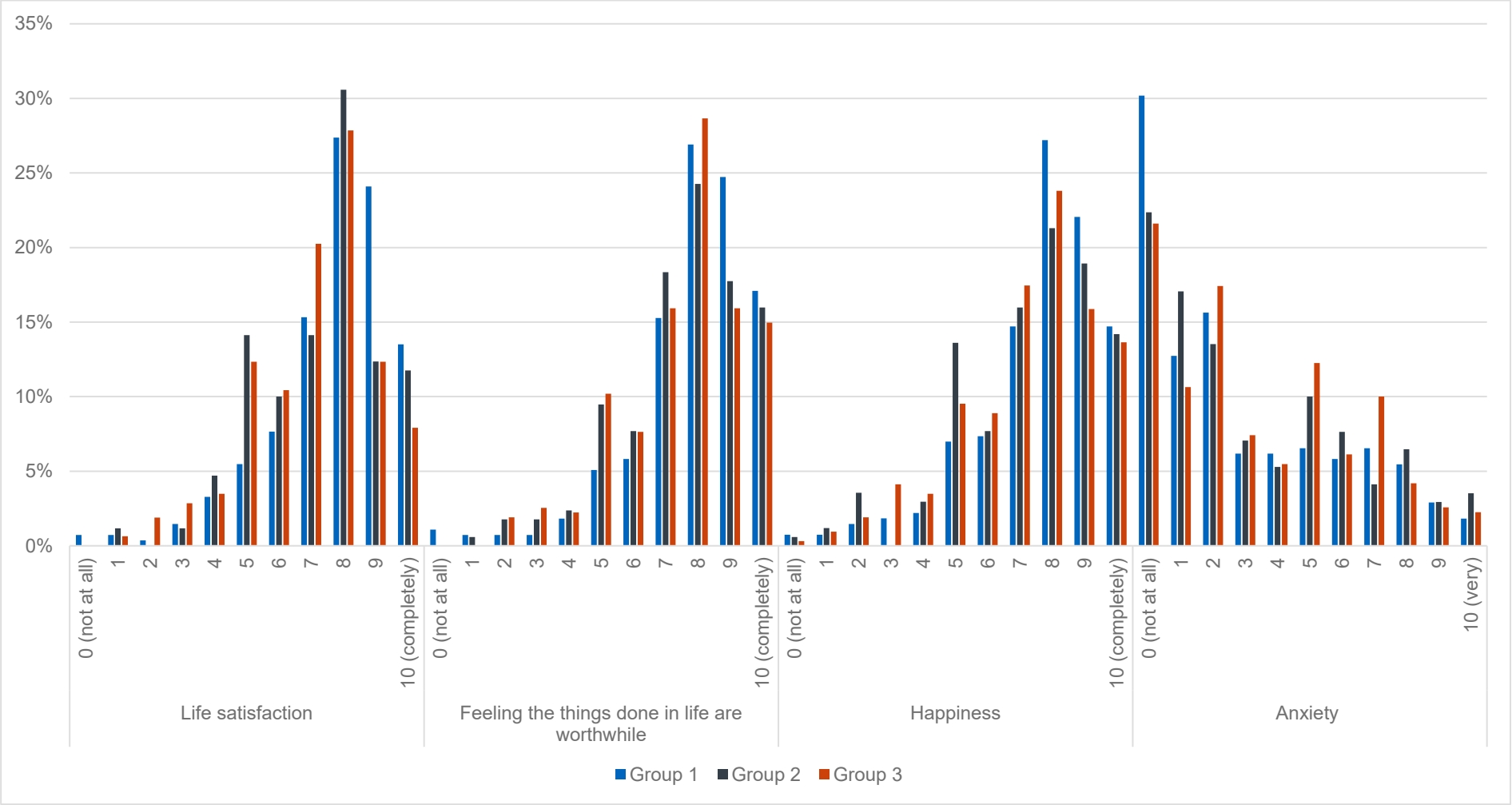


Figure 6-31: Group 1 responses to the questions covering the four measures of wellbeing (Group 1 n=272 to 275, Group 2 n=169-170, Group 3 n=310-316 depending on question)

Table 6-4: Average mean wellbeing score and corresponding Annual Population Survey threshold for the Group 1, Group 2 and Group 3 surveys

Wellbeing	Group 1	Group 2	Group 3	Group 1 / Group 2 difference	Group 1 / Group 3 difference
Overall, how satisfied are you with your life nowadays?	7.7 (High)	7.3 (High)	7.1 (High)	0.4	0.6
Overall, to what extent do you feel that the things you do in your life are worthwhile?	7.9 (High)	7.5 (High)	7.5 (High)	0.4	0.4
Overall, how happy did you feel yesterday?	7.6 (High)	7.3 (High)	7.2 (High)	0.3	0.4
On a scale where 0 is “not at all anxious” and 10 is “completely anxious”, overall, how anxious did you feel yesterday?	2.9 (Low)	3.2 (Low)	3.4 (Low)	0.3	0.5

6.5.34 Overall, wellbeing is relatively high across all three groups, with the highest levels amongst those in Group 1. This corroborates earlier findings, with nearly 50% of Group 1 respondents having noted that the improved connection had a positive impact on their wellbeing. There are a wide range of factors which influence wellbeing however, it is difficult to directly attribute the differences between the groups above to the R100 Programme.

Key Point: Those in Group 1 had higher wellbeing scores than those in Group 2 and 3, although given the wide range of factors affecting wellbeing, it is difficult to directly attribute the differences to R100.

Views on neighbourhood and community

6.5.35 Respondents were also asked several questions about their neighbourhood and community. The results are shown in the figure below.

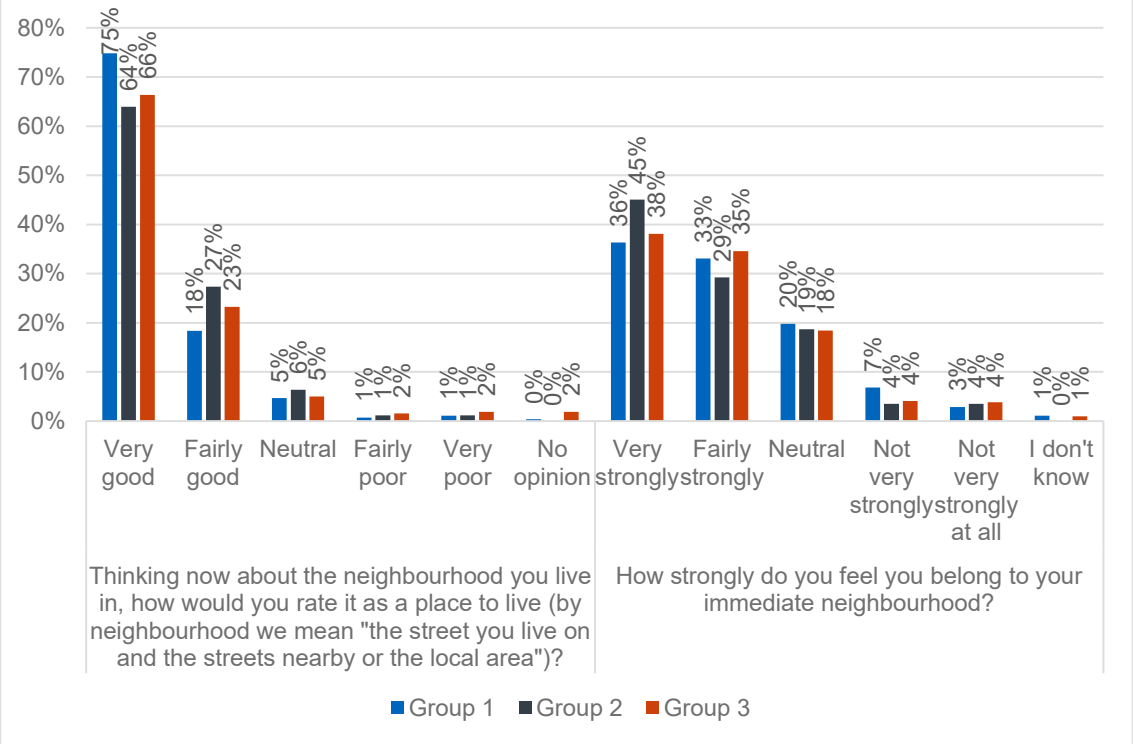


Figure 6-32: Thinking now about the neighbourhood you live in, how would you rate it as a place to live (by neighbourhood we mean "the street you live on and the streets nearby or the local area")? (Group 1 n=278; Group 2 n=172, Group 3 n=318) / How strongly do you feel you belong to your immediate neighbourhood? (Group 1 n=278; Group 2 n=171, Group 3 n=315)

6.5.36 Across all three groups, the majority of respondents in the sample rated their community as either ‘very good’ or ‘fairly good’ as a place to live. Most respondents also felt a sense of belonging to their local community with around 70% of respondents in each group stating that they feel they belong to their community either ‘very strongly’ or ‘fairly strongly’. While there are slight differences amongst the groups, the differences are marginal and therefore it is difficult to attribute any improvement associated with the delivery of R100.

Key Point: Respondents generally felt positively about their community and had a strong sense of belonging to it, however differences between the groups were marginal and therefore it is difficult to attribute any improvement to R100.

7 Business Survey

7.1 Overview

7.1.1 This chapter provides a summary of the responses received to the online business / organisation survey. As with the residential survey, the business survey included separate sub sections covering each of the following groups:

- **Group 1:** those who have been provided with broadband via R100 and have taken up the connection.
- **Group 2:** those who have been provided with broadband via R100 but have not taken up the connection
- **Group 3:** those who are scheduled to receive broadband via R100 but have not yet been connected

7.1.2 The survey also included questions which were specific to the individual group as well as questions which were asked to all groups or more than one group. The chapter initially focuses on the former, working through each group in turn, before a comparative section which reports the results of each group alongside one another to enable comparison between the responses.

7.1.3 It is noted that the sample sizes for the business / organisation survey were relatively small in comparison to the residential survey and therefore a note of caution is needed when interpreting the results.

7.2 Group 1 Business / Organisation Responses

Voucher and main contracts breakdown

7.2.1 Respondents to the survey were initially asked whether they had applied to the IVS or SBVS. It was assumed that those who indicated that they had not applied to either were beneficiaries of the R100 main contracts. The figure below shows the breakdown of responses between the IVS, IBVS, and the main contracts.

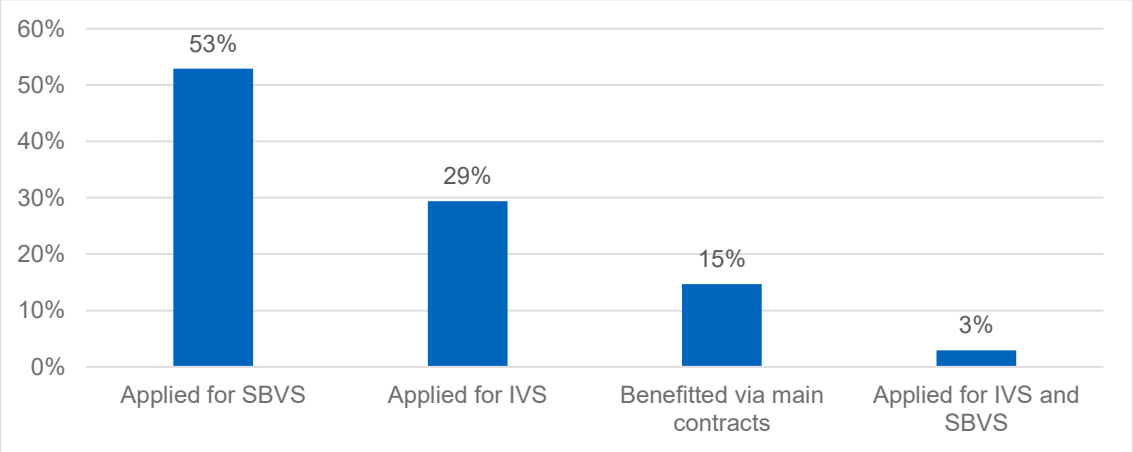


Figure 7-1: Breakdown between voucher and main contracts beneficiaries (n=34)

7.2.2 The majority of businesses / organisations in the sample (53%, n=18) had benefited from the SBVS, with 29% (n=10) benefiting from the IVS, 15% (n=5) benefitting from the main contracts, and one business / organisation (3%) applying for both the IVS and the SBVS.

7.2.3 Of those who indicated that they had applied for the IVS, nine (82%) said that their broadband still used the same means of connection as was funded via the IVS, with one stating that they subsequently applied for the SBVS and one stating that their broadband was now provided by a different means of connection.

7.2.4 Of those who indicated they had applied for the SBVS, 18 (95%) said that their broadband still used the same means of connection as was funded via the SBVS and one stated that their broadband was now provided by a different means of connection.

Key Point: In contrast to the overall programme, over 80% of Group 1 business / organisation in the sample were voucher beneficiaries compared to just 15% who had benefitted via the main contracts. This echoes the results of the resident survey and likely reflects the fact voucher recipients have already actively engaged with the R100 programme and therefore are potentially more receptive to the research.

Ease of voucher application process

7.2.5 Those who applied to the IVS or SBVS were asked how they found the process of obtaining broadband via the voucher (see Figure 7-2).

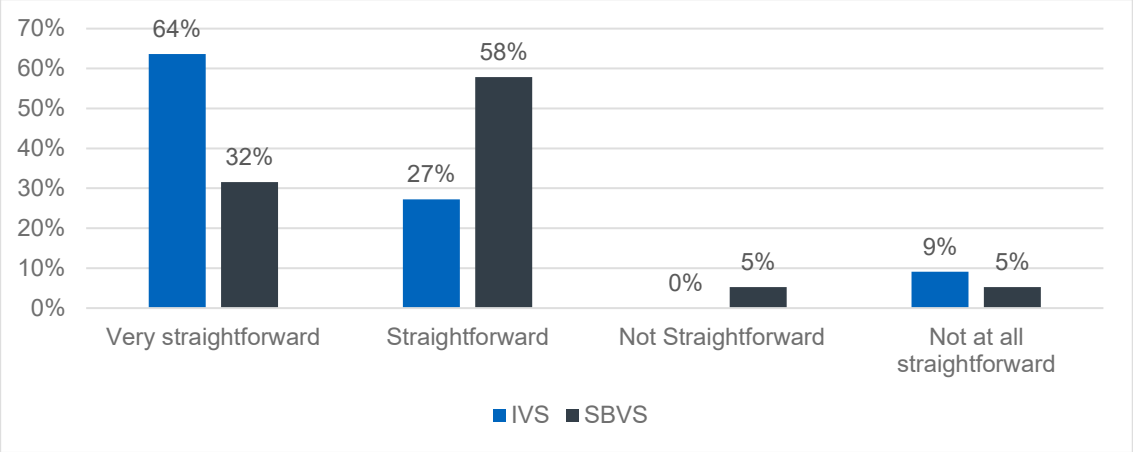


Figure 7-2: How did you find the process of obtaining broadband via the voucher? (n=35 – one respondent applied for both and is therefore counted twice)

7.2.6 As with the residential sample, the majority of businesses / organisations in the sample (over 80% in each case) indicated that the application process was very straightforward or straightforward. In total, three businesses / organisations (one IVS applicant and two SBVS applicants) stated it was 'not straightforward' or 'not at all straightforward'. In the open text responses provided by these respondents, a lack of awareness of the scheme, online material being too technical, difficulties in securing help when needed, and the importance of individualised help provided by Aberdeenshire council were highlighted:

- IVS applicant – *"It took a while to find out there was a list of installers to use. I had problems all through installation and didn't manage to get any help".*
- SBVS applicant – *"I knew nothing of the R100 programme or vouchers and would not have had any idea of where to find this information. Additionally, the information on the R100 website was confusing and cluttered. I was advised of the programme and given tailored advice on the connectivity solutions available for our premise by the Digital Engagement Team at Aberdeenshire Council. If it wasn't for their support, I wouldn't have done anything".*
- SBVS applicant – *"I knew nothing about the voucher scheme, and hadn't seen or heard anything about it, until I happened to attend a local community meeting at which an officer*

from Aberdeenshire Council was in attendance, presenting on digital connectivity support. He talked about the voucher scheme and advised that my properties were eligible because there was no plan to install fibre broadband. The officer from Aberdeenshire Council did heaps of work to look at my current connection and pull together information on all the different solutions that I could use the voucher for. If he hadn't done that, I'd have had no idea where to even start. All the stuff online about the voucher was jargon heavy, and not straightforward about how it actually worked".

7.2.7 A lack of awareness of R100 was also identified through the Group 2 and 3 survey responses and is discussed further below.

Key Point: As with the residential survey, the majority of business / organisation respondents felt that the voucher application process was straightforward. However, a small number of respondents highlighted difficulties including a lack of awareness, online material being too technical, and difficulties in securing help when needed.

Importance of superfast broadband to business operation

7.2.8 All Group 1 business / organisation respondents were asked to indicate how important superfast broadband is to the operation of their business / organisation. As shown in Figure 7-3, all of the respondents rated the availability of superfast broadband as important with the majority of respondents (69%, n=22) selecting '10-very important'.

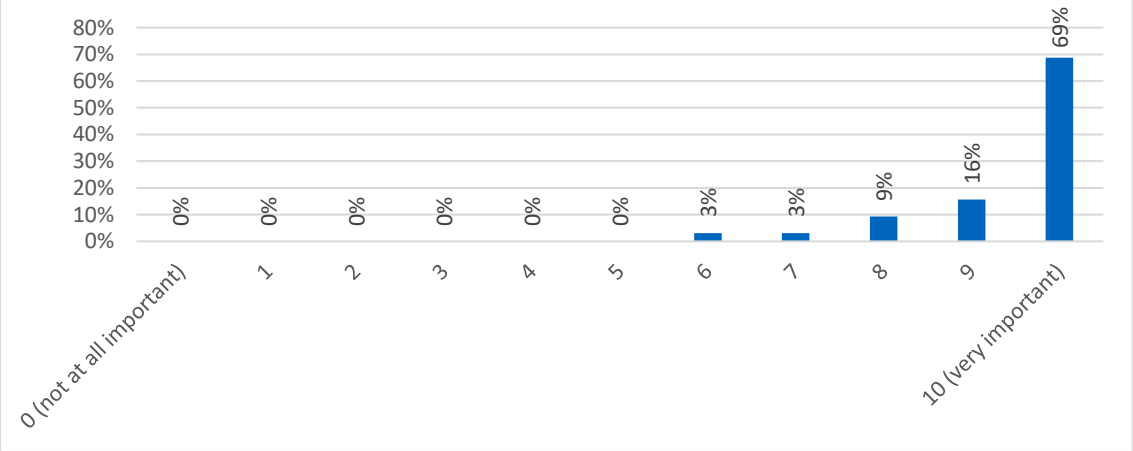


Figure 7-3: How important is superfast broadband to the operation of your business / organisation? Please indicate on a scale of 0 to 10 where 0 means 'not at all important' and 10 means ' very important' (n=32)

Key Point: All of the business / organisation respondents stated that superfast broadband was important to the operation of their business / organisation, with most stating it was very important.

Impact of broadband connectivity on business decisions, activities and performance

Impact of broadband on decision to move to businesses / organisation premises / start business / organisation at current location.

7.2.9 In total, 91% (n=29) of Group 1 businesses / organisations stated that they had been based at their current premises when superfast broadband (or quicker) was first installed. Two businesses / organisations said they had recently moved to their current address, and one said they had recently started the business / organisation. This group was asked whether they would have made these decisions if superfast broadband (or quicker) had not been available and all three respondents indicated that they would not.

Key Point: There is some evidence that the availability of broadband has contributed to the setting up and operation of some businesses in the areas affected. However, sample sizes are small and therefore it is difficult to draw any firm conclusions.

Impact of broadband on business activities

7.2.10 Group 1 business / organisation respondents were also asked to indicate whether the improvement in broadband had had a positive or negative impact on a range of business / organisation activities. The responses are shown in the table below.

Table 7-1: Has the improvement in broadband had a positive or negative impact on any of the following business / organisation activities? (n=29)

	Positive impact	Made no difference	Negative impact	I don't know	Not applicable
Accounting and financing activities	66%	21%	0%	0%	14%
Accessing online networks and storage	66%	14%	3%	0%	17%
Selling products or services, including online bookings/ tickets	59%	14%	3%	0%	24%
Promotional activities, including via social media	52%	21%	3%	0%	24%
Staff / volunteer training	38%	34%	0%	0%	28%
The digital skill of your staff / volunteers	34%	41%	3%	0%	21%
Your net zero commitments	31%	41%	0%	3%	24%
Market research	31%	34%	0%	0%	34%
Communicating with staff volunteers	31%	31%	3%	0%	34%
Staff / volunteer retention	17%	45%	0%	0%	38%
Staff / volunteer recruitment	10%	48%	0%	0%	41%

7.2.11 The largest positive impacts were associated with:

- Accounting and financing activities (66%, n=19 positive impact)
- Accessing online networks and storage (66%, n=19 positive impact)
- Selling products or services, including online bookings / tickets (59%, n=17 positive impact)

7.2.12 A negative impact was recorded against several of the activities. This was a result of one business / organisation. In their open text response, the following explanation was provided:

"The 'Superfast' improved speed initially obtained was not sustained. A transmitter mast was subsequently damaged and has never been repaired. EE says that it will cost too much to repair. The speed is slower now that it was using a phone line for broadband" (Commercial business and SBVS recipient, Highlands)

7.2.13 Businesses / organisations who recorded a positive impact against the activities were also invited to provide further comment via an open text response. The comments received referenced the benefits in terms of accounting and bookkeeping, the ability to make calls, and the ability to work from home (with resultant carbon and cost savings in terms of travel):

- *"Accounting has been easier, making and taking payments and uploading and downloading has improved greatly." (SBVS recipient, Highlands)*

- *"Having a faster broadband connection **just makes everything easier**. From stock management, to bookkeeping and accounting, as well as being able to call customers and suppliers now through Wi-Fi calling or the digital calls." (Commercial business and SBVS recipient, Aberdeenshire)*

- *"My business has been able to **make full use of all digital online services** since superfast broadband became available. This was **vital during COVID-19 years**, as it was the difference between being able to operate some business activities remotely and keep revenue coming into the business. Without that my business could not have survived." (Commercial business and SBVS recipient, Scottish Borders)*

- *"In order to run a consultancy from rural Aberdeenshire, the enhanced broadband **enables us to work from home** without flying to Somerset!" (Commercial business and SBVS recipient, Aberdeenshire)*

7.2.14 One business / organisation also emphasised the benefits in terms of providing broadband for visitors, while another emphasised the benefits in terms of monitoring farm activities:

- *"Able to **provide superfast broadband to guests** which is expected by most people these days." (Commercial business and SBVS recipient, Highlands)*

- *"We solely use the broadband for camera **monitoring of cattle and sheet sheds** on the farm." (Commercial business, SBVS recipient, Argyll and Bute)*

7.2.15 While recognising the significant benefits, several businesses / organisations also noted some negative aspects associated with reliability and higher costs:

- *"Unreliability causes outages. **Every time there is a squall, the broadband drops out** - and squalls are pretty common in Shetland!" (Commercial business and IVS recipient, Shetland)*

- *"Hardware needs to be switched off approximately every 14 days then left for a time to re-set and switched back on. This is the aspect that de-values the whole system. Hardware outages are never welcome especially when the router doesn't come back on. **Sometimes we can wait 24hours for the box to re-set**" (Commercial business and SBVS recipient, Aberdeenshire)*

- *"The only negative aspects have been **the need to seriously invest in a much more significant infrastructure** (high speed networks and Wi-Fi) to take full advantage of the high-speed broadband service. This has resulted in a significant **increase in electrical base load and energy use** just at the time the energy crisis started to bite!" (Commercial business and SBVS recipient, Scottish Borders)*

Key Point: The data suggests that the delivery of a broadband connection via R100 has provided a range of positive benefits for business activities. Unreliability does however continue to be an issue for some recipients.

Impact of broadband on business / organisation performance

7.2.16 In addition to business activities, respondents were also asked to indicate whether the improvement in broadband had had a positive or negative impact on business performance. The responses are shown in the table below.

Table 7-2: Has the improvement in broadband had a positive or negative impact on any of the following aspects of business / organisation performance? (n=29)

	Positive impact	Made no difference	Negative impact	I don't know	Not applicable
Productivity	76%	10%	3%	0%	10%
Business performance / the performance of our organisation	69%	24%	3%	0%	3%
Innovation	52%	31%	3%	0%	14%
Turnover	41%	38%	3%	0%	17%
The number of customers / visitors to our promises	38%	34%	3%	0%	24%
Range of products / services provided	34%	45%	3%	3%	14%
Cost of supplies	34%	45%	3%	0%	17%
Access to new markets	31%	45%	3%	0%	21%

7.2.17 The largest positive impacts were associated with:

- Productivity (76%, n=22 positive impact)
- Business performance / the performance of our organisation (69%, n=20 positive impact)
- Innovation (52%, n=15 positive impact)
- Turnover (41%, n=12 positive impact)

7.2.18 One business / organisation selected 'negative impact' across all performance aspects. This respondent is the same respondent as referred to above.

Key Point: The data suggests that the delivery of a broadband connection via R100 has provided a range of positive benefits in terms of business performance, including improved productivity, innovation and higher turnover.

Impact of broadband on supplies / raw materials

7.2.19 Group 1 businesses / organisations were also asked whether there had been any change in where they get supplies / raw materials since the improvement in broadband connectivity. The majority of respondents (72%, n=21) stated that there had been no significant change, with two respondents stating that they now use more local suppliers and two respondents stating that they now use suppliers based further afield.

Key Point: The data suggests that the availability of broadband has a minimal impact on supplies / raw materials, although it may be the case that this is a longer-term impact.

About your current connection

7.2.20 Group 1 businesses / organisations were also asked to provide details of their broadband connection and comment on their levels of satisfaction with, and use of, the connection. The responses are reported alongside those from Group 2 and Group 3 in Section 7.4.10 below.

7.3 Group 2a Business / Organisation Responses

7.3.1 In total, 16 responses were received to the Group 2 survey. All of these were from businesses / organisations who were eligible for the voucher but had not taken it up. There were no

responses from business / organisations who were eligible for the main contracts but had not taken up the connection. The section below therefore focuses on the former only. Given the sample size, a note of caution must be taken when interpreting the results.

Aware of the R100 / unaware of R100

7.3.2 Of the 16 responses received, 19% (n=3) were aware of the SBVS and 81% (n=13) were unaware. In the open text responses, one respondent queried why they had not been made more aware of the scheme:

- *"Why did I not know about the voucher scheme? Where and when was it advertised? Did a home leaflet drop done in areas known to have poor broadband connection?" (Commercial Business, East Ayrshire)*

Key Point: As with the residential sample, the majority of Group 2 businesses / organisations in the sample were unaware of the voucher scheme.

Current connection

7.3.3 Respondents were asked if they had a current broadband connection at the business / organisation. In total, 13 (81%) had a connection and 19% (n=3) did not.

Key Point: As with the residential sample, the majority of Group 2 businesses / organisations in the sample (over 80%) had an existing broadband connection.

Respondents without a current broadband connection

How business / organisation accesses the internet

7.3.4 Those who indicated that they did not have a broadband connection were asked how their business / organisation typically accesses the internet. Of the three businesses / organisations in this category, one said they did not access the internet, one said they accessed the internet via a satellite connection, and one did not respond.

7.3.5 Businesses / organisations were also asked what activities they use the internet for and whether there were things their business / organisation was missing out on by not being able to access the internet more often. Two responses were received as follows:

- *"We use satellite internet, but it is very expensive, and we would be interested in broadband internet." (Commercial business, Highlands)*
- *"The rental cabin that is the core of the business [is] advertised as not having a broadband connection." (Commercial business, Highlands)*

Likelihood of applying for a voucher / signing up to home broadband

7.3.6 Businesses / organisations who indicated that they i) were unaware of R100 and ii) did not have a current broadband connection were firstly asked if they intended to apply for a voucher / upgrade their contract or sign up to a new contract now that they knew about the scheme. Of the three respondents in this category, one said they would apply for the scheme, one said they would not, and one did not reply.

7.3.7 The business / organisation who said they would not apply was then asked to what extent a range of factors explained their decision. The respondent without a home broadband connection who had indicated that they were aware of R100 was also asked this question. Overall, one respondent selected 'happy to use the internet elsewhere' as a major factor, one

selected 'no need to go online / not interested' as a major factor and one respondent selected 'monthly cost of a broadband service is too high' as a minor factor.

Key Point: A number of reasons why those without an existing broadband connection may not have signed up to R100 are identified via the data, including a lack of awareness, not needing to go online / having no requirement for a connection, and the high monthly cost of broadband connectivity. It is noted however, that sample sizes are small and it is therefore difficult to draw any firm conclusions.

Respondents with a current broadband connection

Likelihood of applying for a voucher / signing up to home broadband

7.3.8 Businesses / organisations who indicated that they i) were unaware of R100 and ii) had a current broadband connection were firstly asked if they intended to apply for a voucher / upgrade their contract or sign up to a new contract now that they knew about the scheme. Of the 10 organisations / businesses in this category, seven said they would apply for the scheme and three said they would not.

7.3.9 Those that said they would not apply were then asked to what extent a range of factors explained their decision not to apply for a voucher or upgrade / sign up to a new contract. Businesses / organisations who had indicated they had a home broadband connection and were aware of R100 were also asked this question. Overall, two businesses / organisations selected 'applying for a voucher is too complicated' as a major factor and two businesses / organisations selected 'too expensive to upgrade' as a major factor.

7.3.10 From an equality perspective, sole traders and family-run businesses may face additional barriers to accessing R100 due to administrative capacity and more limited awareness. This could result in reduced competitiveness for such businesses, exacerbating rural economic inequalities.

Key Point: The data suggests that amongst those with an existing broadband connection, a lack of awareness of R100 is a key barrier to take up, with 7/10 respondents who were previously unaware, stating that they intend to apply now that they know about the scheme. While sample sizes are small, amongst those for whom awareness was not a barrier, the complicated nature of the application and the expense involved in upgrading were provided as reasons. From an equality perspective, these issues may be more prevalent amongst smaller businesses which may exacerbate rural economic inequalities.

About your current connection

7.3.11 Respondents who indicated that they had a current broadband connection were also asked to provide details of their broadband connection and comment on their levels of satisfaction with, and use of, the connection. The responses are reported alongside those from Group 1 and Group 3 in Section 7.4.10 below.

Group 2a and Group 3 - Positive / negative aspects of current connection.

Group 2a and Group 3 respondents who had a current broadband connection were asked to indicate whether they agreed or disagreed with a series of statements on how their current broadband connection impacts them. Due to the small sample sizes, rather than reporting the responses separately for Group 2a and 3, the results for each group have been combined and are discussed in Section 0.

7.4 Group 3 Business / Organisation Responses

Voucher and main contracts breakdown

7.4.1 Group 3 respondents to the survey were initially asked whether they were scheduled to receive broadband via SBVS or the main contracts. The figure below shows the breakdown of responses received.

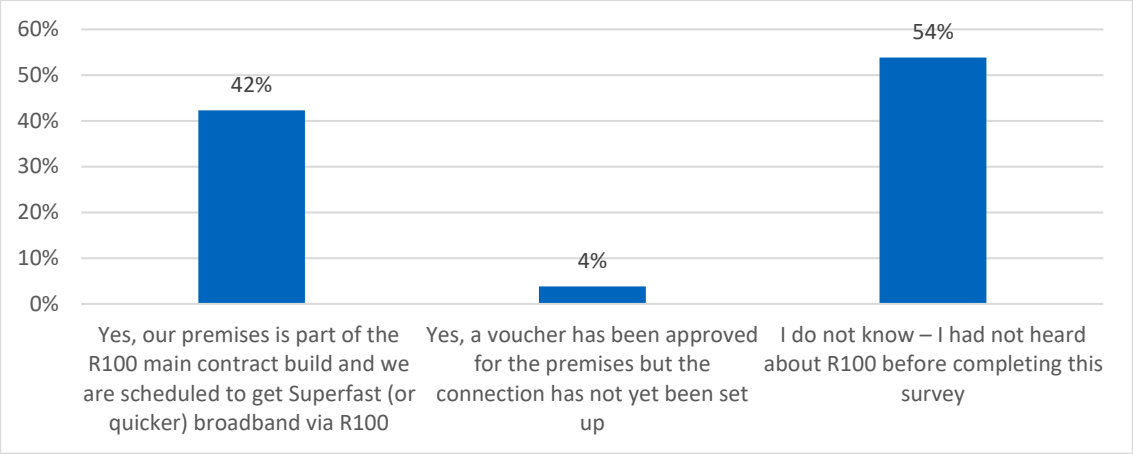


Figure 7-4: Our data indicates that your address is in the R100 main contract build plan and / or that a Scottish Broadband Voucher Scheme voucher has been approved for your premises. Is this correct? (n=26)

7.4.2 In total, over half of respondents (54%, n=14) were unaware of R100, while 42% (n=11) confirmed that were scheduled to get superfast broadband via the main contract and one respondent said that a voucher had been approved but not yet set up. A high proportion of respondents being unaware of the scheme echoes the findings from Survey 2a above.

Key Point: As with the residential response and the Group 2a business / organisation response, the majority of Group 3 business / organisation respondents in the sample were unaware of R100.

Current Connection

7.4.3 Respondents were asked if they had a current broadband connection at the premises. In total, 73% (n=19) said yes and 27% (n=7) said no.

Key Point: As with the residential response and the Group 2a business / organisations, the majority of Group 3 business / organisations in the sample had an existing broadband connection.

Respondents without a current broadband connection

How business / organisation accesses the internet

7.4.4 Those who indicated that they did not have a broadband connection were asked how their business / organisation typically accesses the internet. All seven respondents stated that they access the internet via 3G, 4G, or 5G connectivity on a smartphone.

7.4.5 Respondents were then asked what tasks they typically use the internet for and whether there were things their business / organisation was missing out on by not being able to access the internet more often. All seven respondents provided tasks for which they use the internet. These included marketing (including via social media), accounting, maintenance, emails, Teams meetings, supply purchases / communications with suppliers, bookings and

communication with customers, and information and research. One respondent also noted that they use the internet to manage a hydroelectric station and one referenced undertaking Scottish Government reporting relating to agriculture online.

7.4.6 In terms of things businesses / organisations miss out on by not having a connection, the following was referenced:

- *"Our **guests do not book the cottage** because there is no internet." (Commercial business, Dumfries and Galloway)*
- *"We **cannot efficiently run our renewable electricity generating business** without broadband, as we have automation and remote operation upgrades waiting to be commissioned." (Commercial business, Perth and Kinross)*
- *"We are **unable to plan our expansion** or offer new services to clients as Openreach do not engage or communicate in any way whatsoever." (Commercial business, East Ayrshire)*

7.4.7 Businesses / organisations were also given an opportunity to provide any other comments. A range of comments were provided, with several noting the poor reliability / speeds of mobile connections and the difficulties this presents:

- *"The 4G coverage here is very poor and sometimes I have to wait until I go into town to get a proper signal." (Commercial business, South Ayrshire)*
- *"Not only is there no internet but the mobile service is often poor as well." (Commercial business, Dumfries and Galloway)*

7.4.8 Several respondents also noted the difficulties they have experienced in trying to secure a connection previously:

- *"We were connected up to satellite broadband … and it worked for a grand total of one day. They were unable to resolve and cancelled the contract. .... Phone signal is very poor in the area ... We are left with nothing and in cases have to go off the farm to carry out banking and taking payments. Any help greatly appreciated." (Commercial business, Easy Ayrshire)*
- *"We were missed on the Broadband installation; we contacted the installer but were told that it was too hard/too late. There is an issue with our address." (Commercial business, Perth and Kinross)*

Key Point: All those in the Group 3 sample who did not have an existing broadband connection, stated that they used the internet via 3G, 4G, or 5G connectivity on a smartphone and each identified specific business tasks for which use of the internet was a requirement. This is in contrast to the Group 2 sample, some of whom stated they did not use the internet / had no need for it (although it is noted that the sample sizes in each case are small). Businesses / organisations also identified things they were missing out on as a result of their lack of connection, including visitors choosing not to stay because of a lack of Wi-Fi; operating more inefficiently due to a lack of automation; and an inability to expand operations / offer new services.

Respondents with a current broadband connection

About your current connection

7.4.9 Group 3 respondents who indicated that they had a current broadband connection were asked to provide details of their broadband connection and comment on their level of satisfaction

with, and use of, the connection. The responses are reported alongside those from Group 1 and Group 2a in Section 7.4.10 below.

Group 2a and Group 3 - Positive / negative aspects of current connection.

7.4.10 Group 2a and Group 3 respondents who had a current broadband connection were asked to indicate whether they agreed or disagreed with a series of statements on how their current broadband connection impacts them. Due to the small sample sizes, rather than reporting the responses separately for Group 2a and 3, the results for each group have been combined and are discussed in Section 0.

7.5 Comparative Analysis

7.5.1 As set out in the introduction, this section focuses on the questions which were asked of all three groups or more than one group within the survey and reports the results of each group alongside one another to enable comparison between the responses. It includes sections covering:

- broadband connection – including type of connection, speed and current provider
- satisfaction with broadband connectivity
- business / organisation use of broadband connection
- extent to which broadband connection provides for the needs of the business / organisation
- staff ability to meet digital technology needs of the business / organisation
- Group 2a and Group 3 – positive / negative aspects of current connection

7.5.2 It is noted that while all Group 1 respondents were asked questions about their current connection, only those respondents in Groups 2 and 3 who indicated that they had a current broadband connection were asked these questions. The direct comparison therefore overestimates the broadband connectivity of those in Group 2 and 3 as it does not include those who do not have an existing connection.

Broadband connection

Type of connection

7.5.3 Respondents in Group 1 and those in Group 2a and 3 who indicated that they had a current home broadband connection were asked a series of questions about their current connection. Figure 7-5 below shows the type of connection used by those in each group.

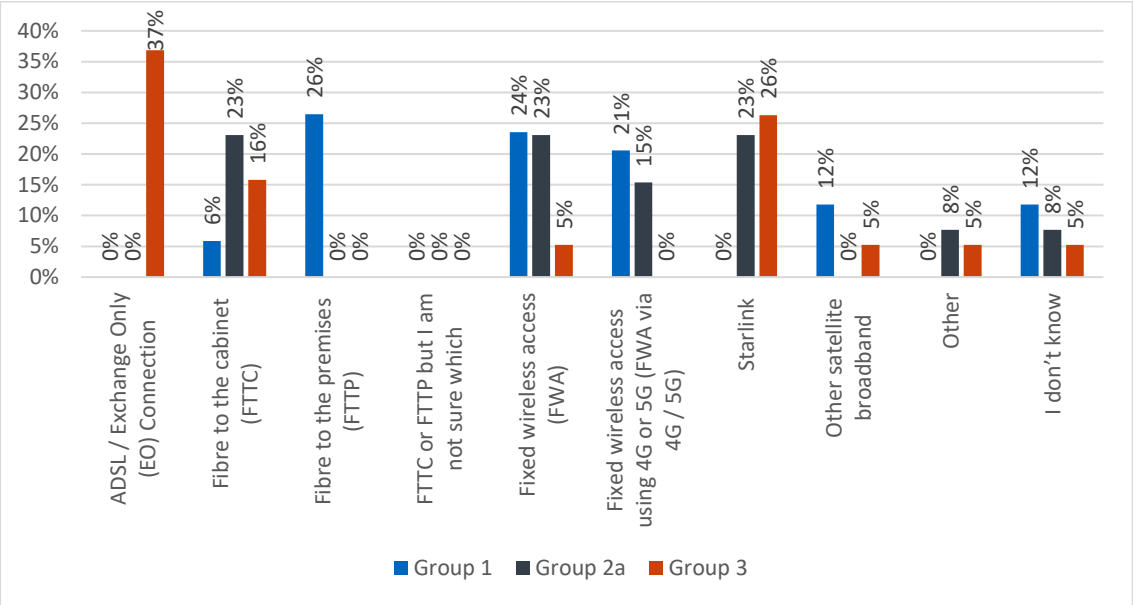


Figure 7-5: Do you know how your current broadband connection is provided? (Group 1 n=34, Group 2 n=13, Group 3 n=19)

7.5.4 Amongst Group 1 respondents, the most common response was FTTP, followed by FWA. Amongst Group 2 respondents, FTTC, FWA and Starlink were the most common responses. In contrast, ADSL was the most common response amongst Group 3 respondents, followed by Starlink.

Key Point: The majority of Group 1 business / organisations in the sample have an FTTP or FWA connection whereas amongst Group 2a business / organisations in the sample there is a higher proportion of FTTC and Starlink and amongst Group 3 business / organisations in the sample, there is a higher proportion of ADSL and Starlink.

Speed of current connection

7.5.5 Group 1, 2a and 3 respondents were also asked to provide the speed of their current connection. The responses are shown in Figure 7-6. It is noted that not all respondent's provided a response.

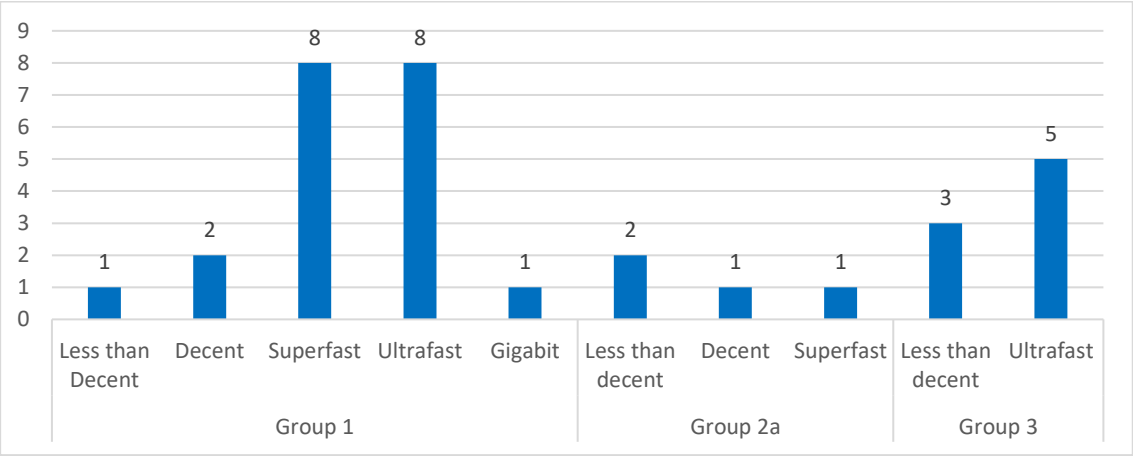


Figure 7-6: If you know it, please specify the download speed of the current broadband contract at your business / organisation. This means the download speed delivered to the premises which can be found in the contract - this is typically in the name of the broadband package (Group 1 n=20, Group 2 n=4, Group 3 n=8)

Key Point: While given the sample sizes, it is difficult to draw any firm conclusions, as would be expected Group 1 speeds do appear to be higher than those in Group 2a and Group 3.

Current provider

7.5.6 Respondents were also asked to provide the name of their current broadband provider. The results are shown in Figure 7-7. It is noted that not all respondents provided a response.

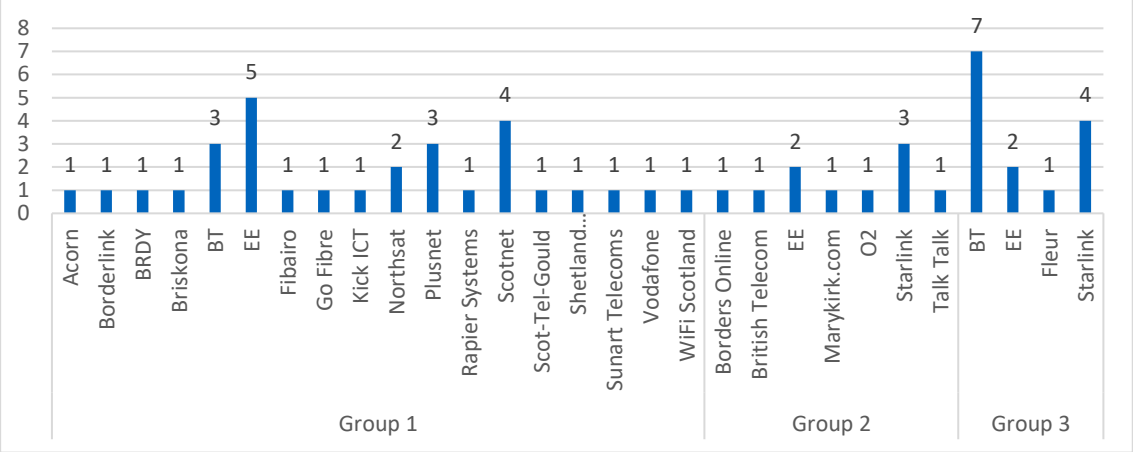


Figure 7-7: Who is the current provider? (Group 1 n=30, Group 2 n=10, Group 3 n=14)

7.5.7 While the sample size is small and therefore difficult to draw firm conclusions, Group 1 businesses / organisations appear to benefit from a wider range of providers. It is also notable that Starlink features in Group 2 and Group 3, with a proportion of businesses / organisations in these groups opting to pay for a satellite solution due to the importance of a reliable connection.

Key Point: Group 1 businesses / organisations appear to benefit from a wider range of providers than those in Group 2a and Group 3.

Satisfaction with broadband connection

7.5.8 The figures below show levels of satisfaction amongst Group 1, Group 2 and Group 3 respondents with the speed, reliability and value for money of their current connection.

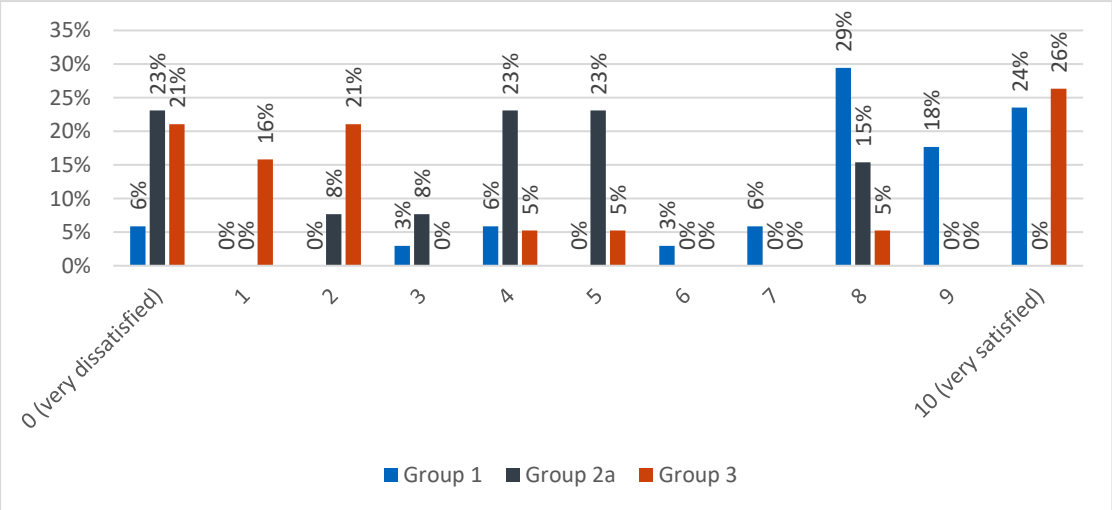


Figure 7-8: Business Survey - on a scale of 0 to 10, how satisfied are you with the speed of your broadband connection? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

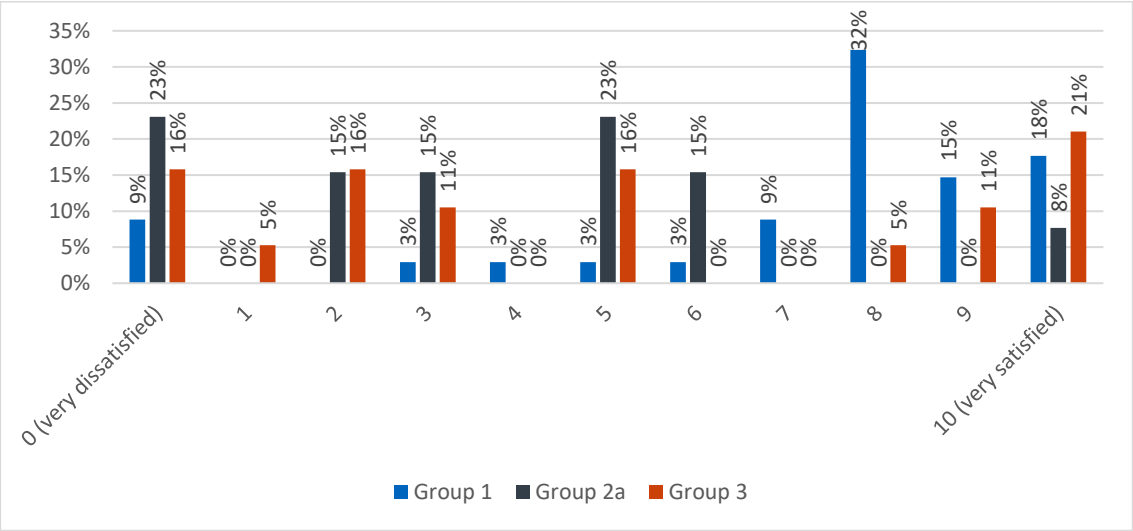


Figure 7-9: Business Survey - on a scale of 0 to 10, how satisfied are you with the reliability of your broadband connection? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

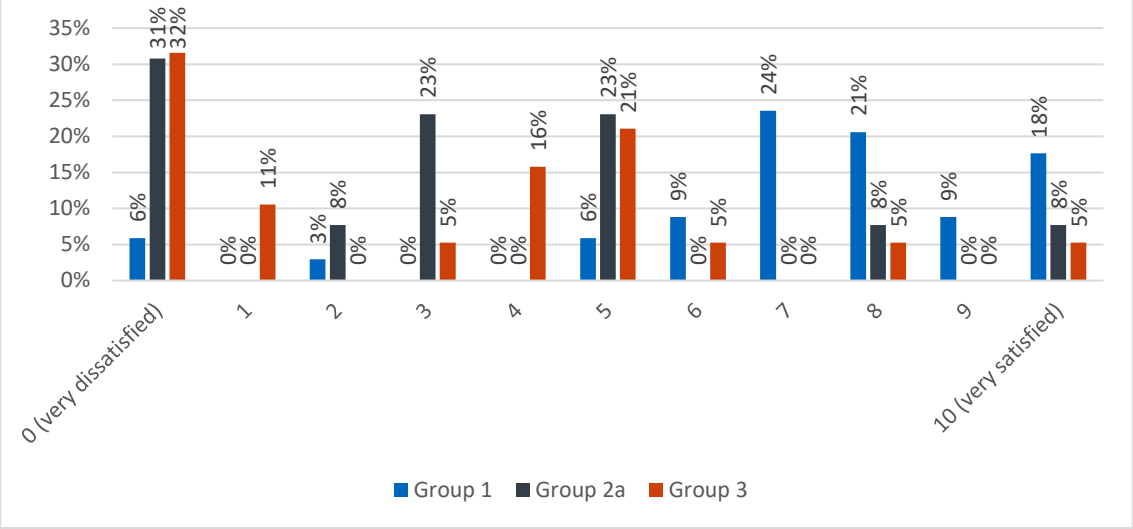


Figure 7-10: Business Survey - on a scale of 0 to 10, how satisfied are you with the value for money of your broadband connection? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

7.5.9 While sample sizes are small and therefore a note of caution is needed when interpreting the results, the data suggests that across all three measures, Group 1 respondents have higher levels of satisfaction:

- 71% (n=24) of Group 1 respondents rated their satisfaction with the speed of their connection as 8 or above, compared to 15% (n=2) of Group 2a respondents and 32% (n=6) of Group 3 respondents
- 65% (n=24) of Group 1 respondents rated their satisfaction with the reliability of their connection as 8 or above, compared to 8% (n=1) of Group 2a respondents and 37% (n=7) of Group 3 respondents
- 47% (n=24) of Group 1 respondents rated their satisfaction with the value for money of their connection as 8 or above, compared to 15% (n=2) of Group 2a respondents and 10% (n=2) of Group 3 respondents

7.5.10 With respect to value for money, as discussed above, a number of Group 2 and Group 3 respondents have opted for to pay for more expensive options (such as Starlink and other satellite-based connections) as a result of a lack of more reasonably priced alternatives which is likely to impact their satisfaction on this measure. A number of comments were made to this effect within the open text responses:

- *"Our current broadband is Starlink, which is great and does everything we need our business broadband connection to do. However, our fixed broadband connection, which is FTTC on the Openreach network, is woeful and is not fit for purpose, hence our move to Starlink. The issue is that we are paying far above the typical rates for a business broadband service, because of the rural nature of our business, and the systemic lack of infrastructure improvements to the broadband network." (charity / community organisation, scheduled voucher / main contract, Aberdeenshire)*

- *"Starlink works well but it's really quite expensive." (Commercial business, scheduled voucher / main contract, Perth and Kinross)*

7.5.11 The high cost of such options also restricts their availability, with many likely to be unable to afford such solutions and as such are at higher risk of digital exclusion.

Key Point: Group 1 business / organisations have higher levels of satisfaction with speed, reliability and value for money than those in both Group 2a and Group 3. While some of the latter have resorted to higher cost solutions such as satellite, these are high-cost options.

Business / organisation use of broadband connection

Overall use

7.5.12 Figure 7-11 shows the frequency with which businesses / organisations in Group 1, 2a and 3 use their current broadband connection. Across all three groups, frequency of use is high, with the highest rates amongst Group 2a respondents, although it is noted that the sample size for this group is small which may be impacting the results.

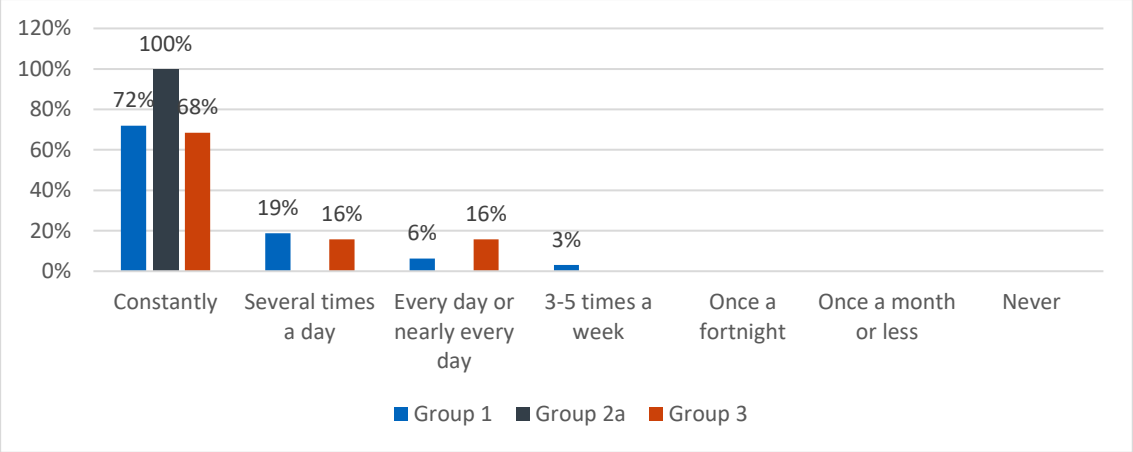


Figure 7-11: How frequently does your business / organisation use the current broadband connection? (Group 1 n=34, Group 2 n=13, Group 3 n=19)

Key Point: Businesses / organisations across all three groups use their current broadband connection at a high frequency, emphasising the importance of connectivity for business activities and performance.

Use by business activity.

7.5.13 As well as providing an indication of their overall use, businesses / organisations were also asked to provide an indication of the frequency with which they use their current connection for a range of business activities. The results are shown in Figure 7-12 to Figure 7-23, with a summary of the findings for each activity provided in the bullet points below the graphs.

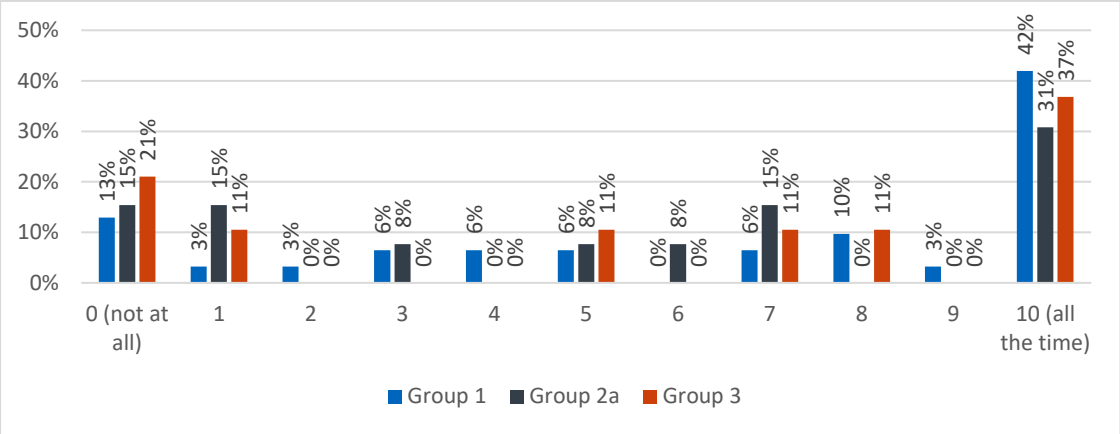


Figure 7-12: To what extent does your business / organisation use the broadband connection for selling / providing products or services, including online bookings/ tickets? (Group 1 n=31, Group 2 n=13, Group 3 n=19)

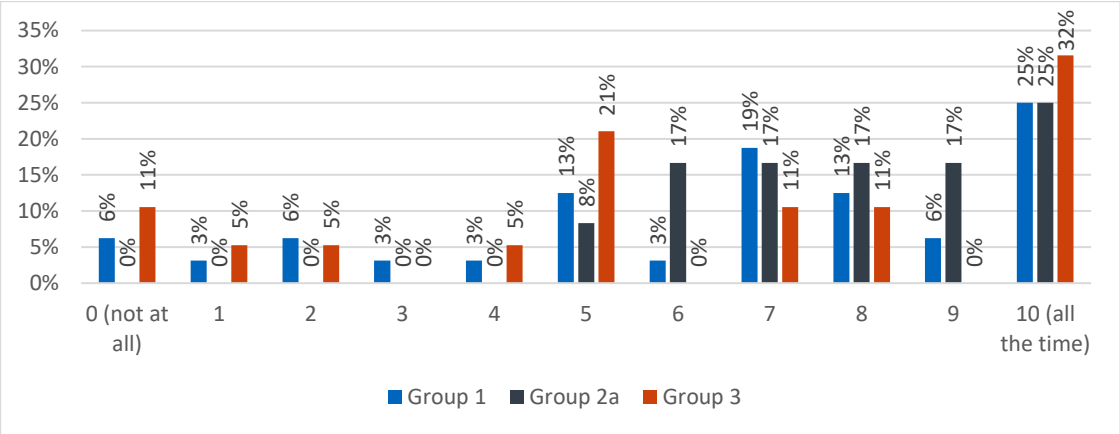


Figure 7-13: To what extent does your business / organisation use the broadband connection for procuring / purchasing supplies? (Group 1 n=32, Group 2 n=12, Group 3 n=19)

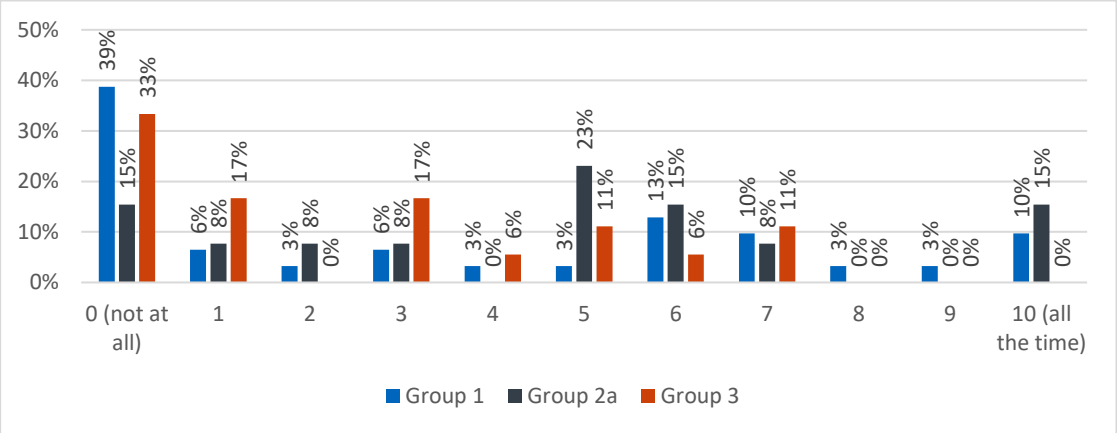


Figure 7-14: To what extent does your business / organisation use the broadband connection for market research? (Group 1 n=31, Group 2 n=13, Group 3 n=18)

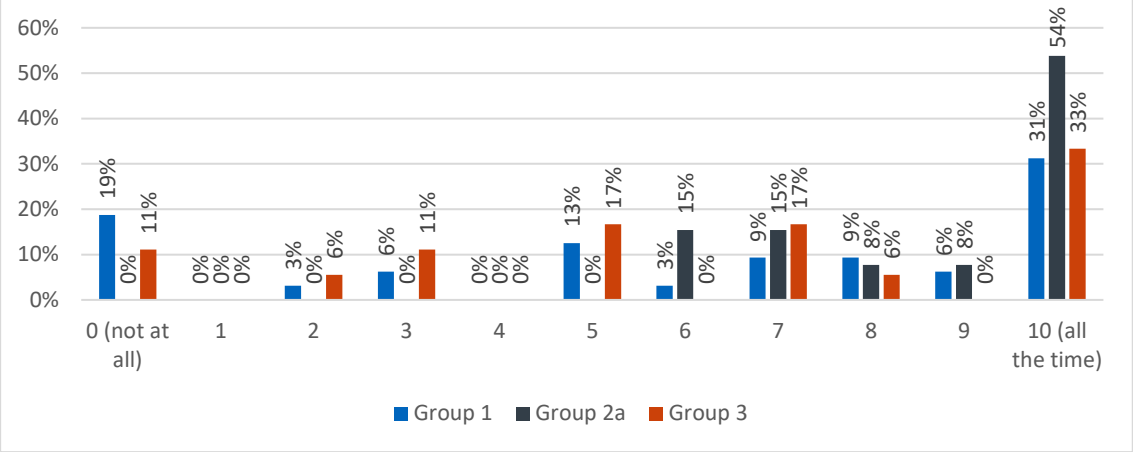


Figure 7-15: To what extent does your business / organisation use the broadband connection for accounting and financing activities? (Group 1 n=32, Group 2 n=13, Group 3 n=18)

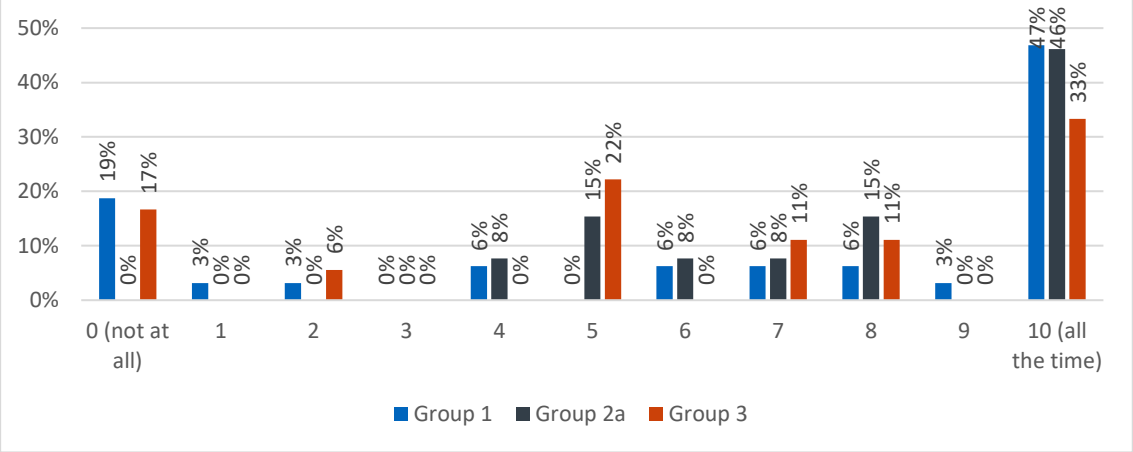


Figure 7-16: To what extent does your business / organisation use the broadband connection for accessing online networks and storage? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

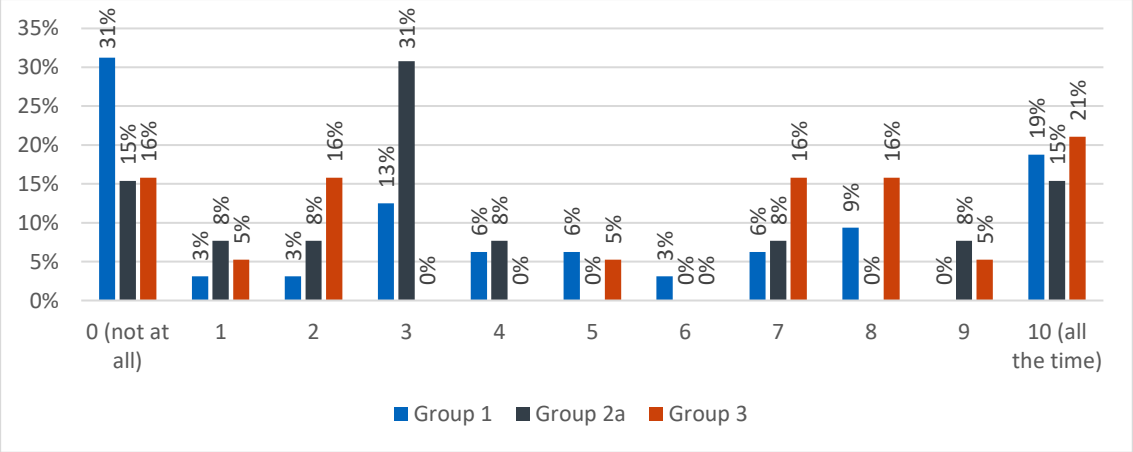


Figure 7-17: To what extent does your business / organisation use the broadband connection for promotional activities, including via social media? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

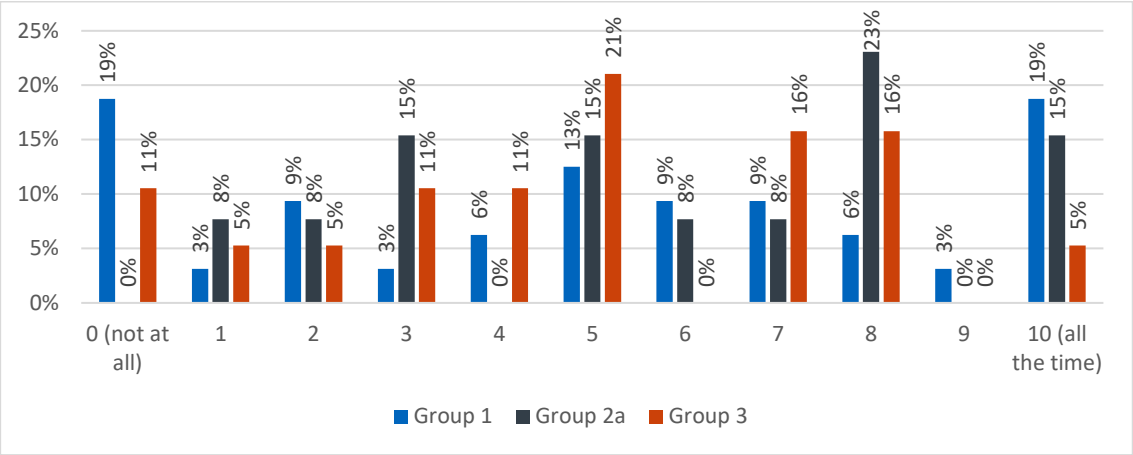


Figure 7-18: To what extent does your business / organisation use the broadband connection for video conferencing / Zoom / Teams calls? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

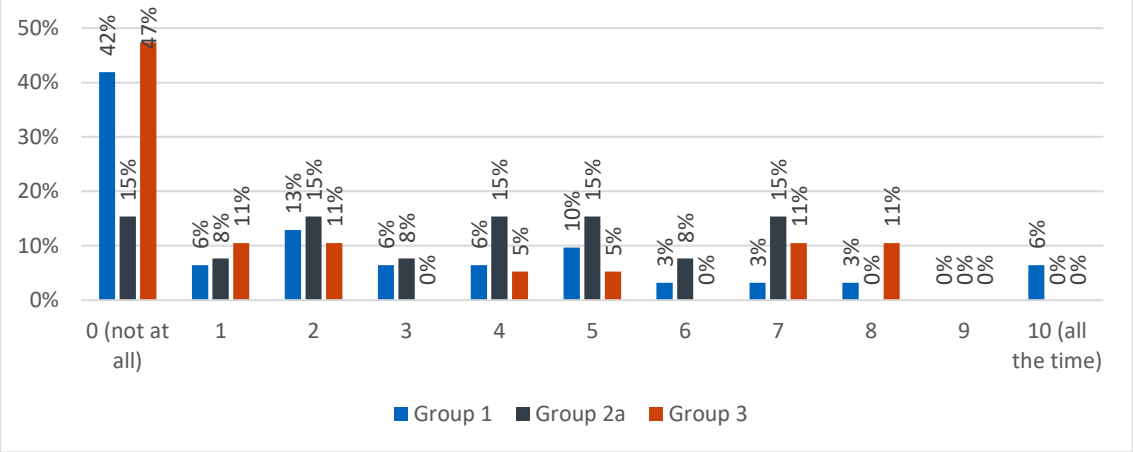


Figure 7-19: To what extent does your business / organisation use the broadband connection for staff / volunteer recruitment? (Group 1 n=31, Group 2 n=13, Group 3 n=19)

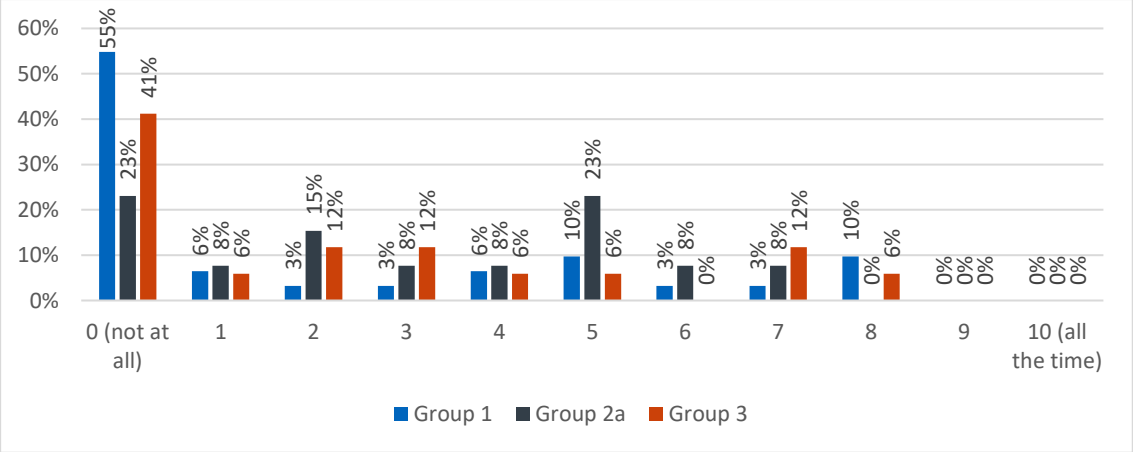


Figure 7-20: To what extent does your business / organisation use the broadband connection for staff / volunteer retention? (Group 1 n=31, Group 2 n=13, Group 3 n=17)

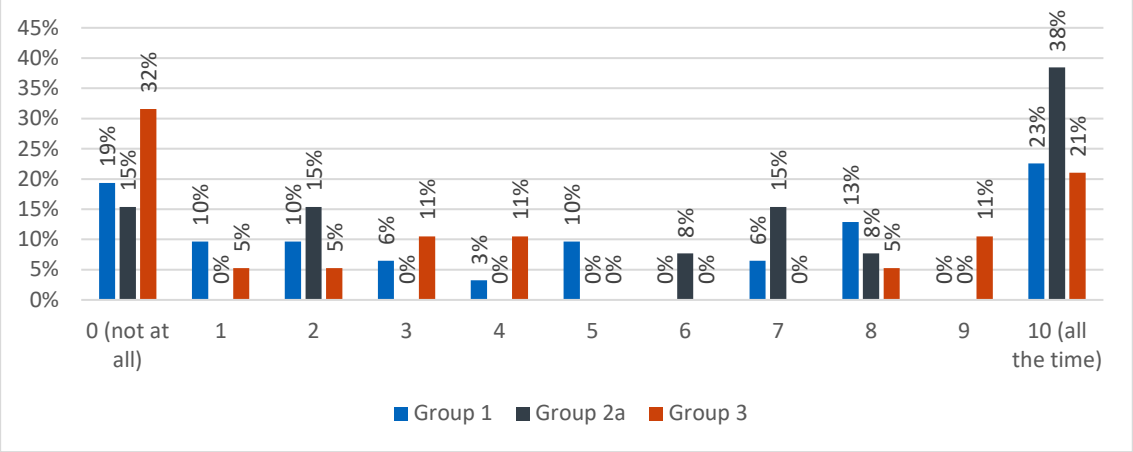


Figure 7-21: To what extent does your business / organisation use the broadband connection for communicating with staff / volunteers? (Group 1 n=31, Group 2 n=13, Group 3 n=19)

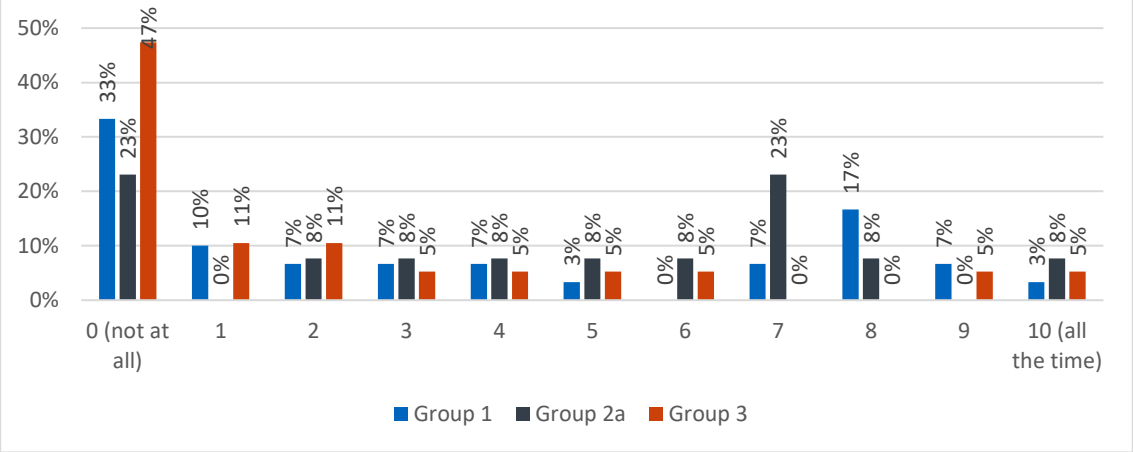


Figure 7-22: To what extent does your business / organisation use the broadband connection for staff / volunteer training? (Group 1 n=30, Group 2 n=13, Group 3 n=19)

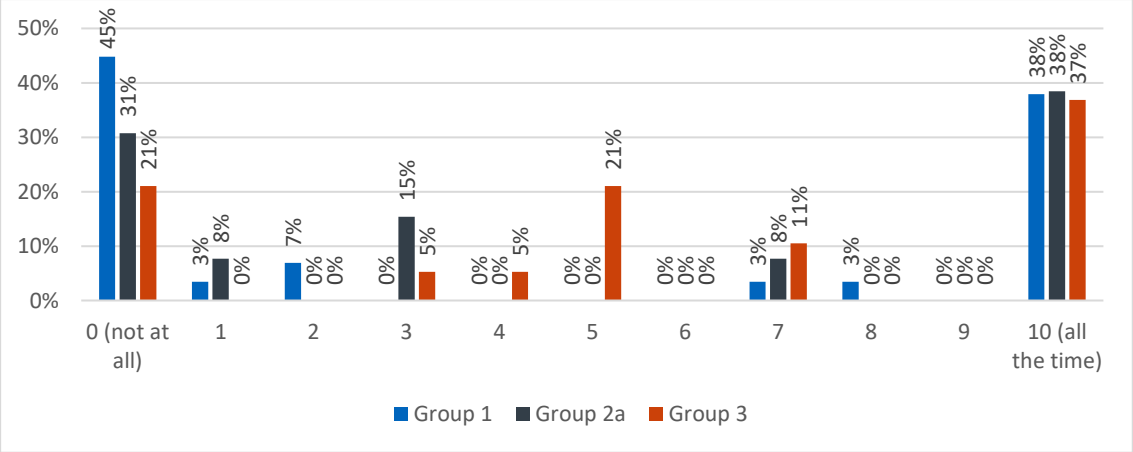


Figure 7-23: To what extent does your business / organisation use the broadband connection for to provide Wi-Fi to customers / visitors that visit your premises? (Group 1 n=29, Group 2 n=13, Group 3 n=19)

7.5.14 The data suggests:

- The activities for which businesses / organisations used their connection most frequently included ‘accessing online networks and storage’, ‘procuring / purchasing supplies’,

'accounting and finance activities' and 'selling / providing products or services, including online bookings/ tickets'

- The activities for which organisations / businesses used their connection least frequently included 'staff / volunteer recruitment' and 'staff volunteer / retention', and 'market research' – with regard to the former, this is likely a result of the frequency with which this activity is undertaken

- In general, the frequency of use was similar across Group 1, 2a and 3, albeit some groups undertook some of the activities more frequently than others. Given the sample sizes, however, it is difficult to draw any firm conclusions between the groups.

Key Point: Businesses / organisations use their connection for a wide range of purposes across all three groups.

Extent to which current connection provides for the needs of the business / organisation

7.5.15 Businesses / organisations were also asked whether the speed and reliability of their current connection allowed their business / organisation to do everything it wants to do online. The results are shown in Figure 7-24.

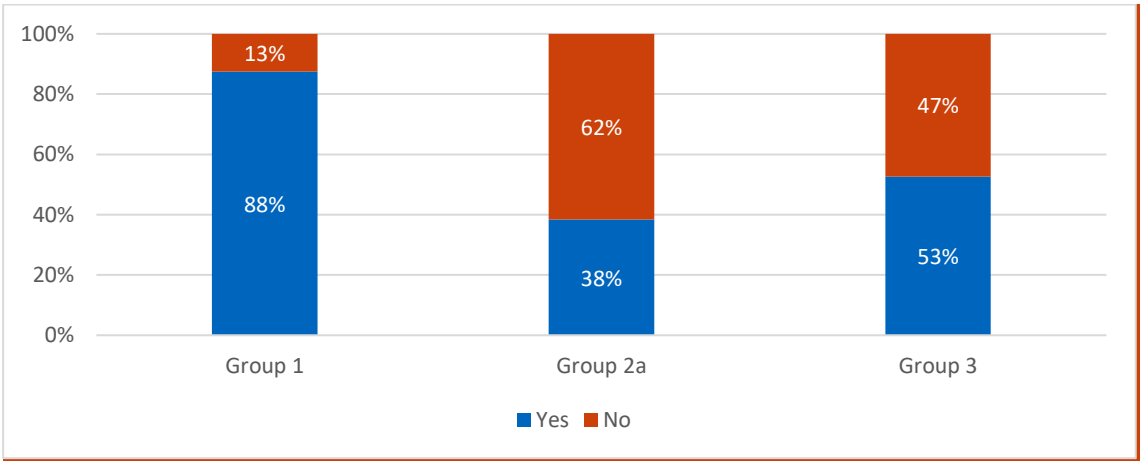


Figure 7-24: Does your current broadband speed and reliability allow your business / organisation to do everything it wants to do online? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

7.5.16 The majority of Group 1 business / organisations in the sample (88%, n=28) said that that their connection enabled their business / organisation to do everything it wants to do online. This compares to just 53% (n=10) of those in Group 3 and 38% (n=5) of those in Group 2.

7.5.17 Those who indicated their business / organisation was not able to do everything it wants to do were then asked what their business / organisation would like to be able to do which it cannot.

7.5.18 Businesses / organisations in Group 2 and Group 3 highlighted a range of aspects, including undertaking business tasks more quickly and productively; having a reliable and consistent connection; undertaking video conferencing and online calls; and undertaking data transfer tasks and using multiple devices at the same time.

- *"The slow speed of our broadband connection often means that the computer has to wait while the broadband catches up.* ***We would like to make our production systems more efficient, but we cannot because our broadband provision is so hopelessly slow****." (Commercial business, Group 2, Aberdeenshire)*

- *"Lack of speed and bandwidth make many **online tasks much slower** that should be the case, and the general user experience much poorer than would be the case with superfast broadband." (Commercial business, Group 2, Fife)*

- *"Not waste so much time waiting for things to connect" (Commercial business, Group 3, Argyll and Bute)*

- *"**Access information at speed**, download files, video conferencing etc. Most of what are now considered to be **standard business practices**." (Commercial business, Group 3, Perth and Kinross)*

- *"Have a **reliable service that is fast enough for everyday living**. The service we have relies on just one supplier, it is **expensive and is often down for days at a time**, with no reduction in charge." (Commercial business, Group 3, Perth and Kinross)*

- *"Connectivity is **very poor limiting online video conferencing**. In large meetings [it] frequently cuts out and you have to reconnect." (Commercial business, Group 2, East Ayrshire)*

- *"[We would like to] have a **reliable telephone connection** and be able to make voice calls." (Commercial business, Group 2, Scottish Borders)*

- *"Get **internet access consistently** on a daily and hour by hour basis. It is totally inefficient and unreliable." (Commercial business, Group 3, Aberdeenshire)*

- *"We **cannot reliably fill in any online form**. The broadband drops frequently. "Booking anything via internet is unreliable. Safer to go into Stranraer and use library." (Commercial business, Group 3, Dumfries and Galloway)*

- *"I need to **transfer 3D CAD data** to and from remote servers at reasonable speed." (Commercial business, Group 3, Argyll and Bute)*

- *"**Upload file, documents and pictures**. Have a more stable connection. Use multiple devices at the same time." (Commercial business, Group 3, Dumfries and Galloway)*

7.5.19 Several Group 2 and 3 respondents also highlighted the need to provide a good connection for visitors:

- *"Be able to access faster internet … **our clients look for fast internet** and may choose to go elsewhere if we cannot provide it." (Commercial business, Group 2, Orkney)*

- *"I would like to be able to t**ell guests to our commercial property that fully efficient broadband is available**." (Commercial business, Group 3, Argyll and Bute)*

7.5.20 While satisfaction amongst Group 1 businesses / organisations was higher, several Group 1 respondents stated that their business could not do everything online. A number of respondents highlighted difficulties with speed and reliability:

- *"The speed is OK, but the reliability is not good enough to move on to VOIP telephones. The **unreliability also causes problems for visitors** e.g. in streaming TV or films." (Commercial business and IVS recipient, Shetland)*

- *"**Run zoom calls at a rate in which it doesn't lag**. We are often unable to do large data transferals on the current connection too." (Commercial business, main contracts recipient, East Lothian)*

- *"Connect at the speed provided when the initial connection was made. A signal transmitter was damaged a year ago resulting in reduced signal and EE refuse to fix it.*

*The **current broadband signal is slower than it was before superfast was rolled out**. The money spent has therefore been entirely wasted on providing a worse service than previously existed by phone line" (Commercial business and SBVS recipient, Highlands)*

7.5.21 One Group 1 voucher recipient also noted that her connection was poorer compared to others in her neighbourhood who had benefited from the main contracts:

- *"Have a superfast broadband connection. Fibre has been installed in my neighbourhood but not to me, because I used the voucher scheme" (Commercial business and IVS recipient, Aberdeenshire)*

Key Point: Group 1 businesses / organisations were more content with their broadband connection and its ability to meet the needs of their business / organisation.

Staff ability to meet digital technology needs of the business / organisation.

7.5.22 Respondents were also asked about the digital skills of their staff. The results are shown in Figure 7-25.

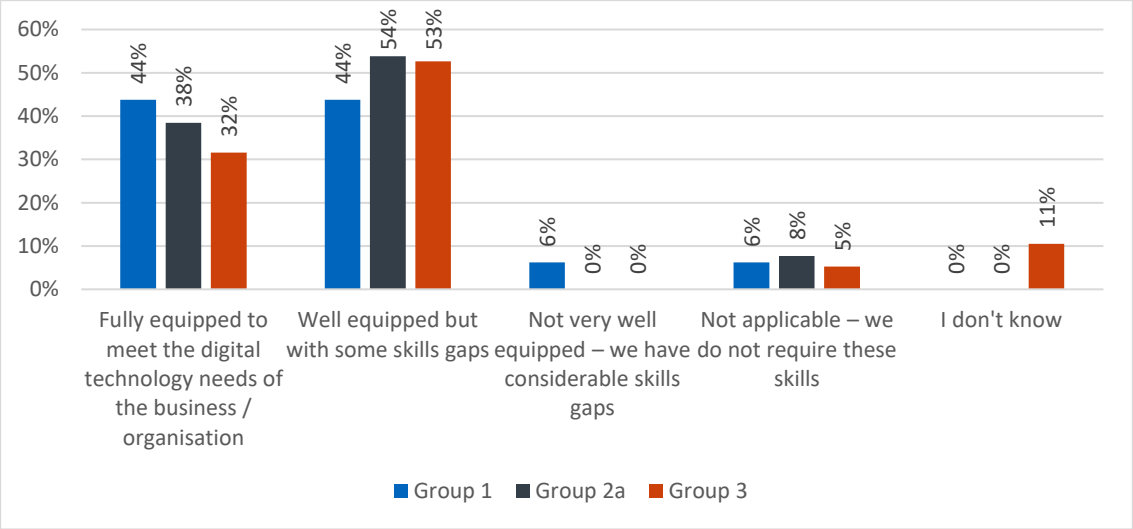


Figure 7-25: How well equipped are those who work / volunteer at your business / organisation to meet the digital technology needs of the business / organisation? (Group 1 n=32, Group 2 n=13, Group 3 n=19)

7.5.23 The data suggests that staff are generally well equipped in terms of digital skills with staff in Group 1 businesses / organisations marginally better equipped than those in Group 2a and Group 3 businesses / organisations. This may in part stem from the enhanced connectivity provided. However, given the small sample sizes and various factors which may influence digital skills, it is difficult to draw any firm conclusions.

Key Point: Staff are generally well equipped in terms of digital skills.

Group 2a and Group 3 - Positive / negative aspects of current connection.

Group 2a and Group 3 respondents who had a current broadband connection were asked to indicate whether they agreed or disagreed with a series of statements on how their current broadband connection impacts them. Due to the small sample sizes, rather than reporting the responses separately for Group 2a and 3, the results have been combined and are shown in the table below.

Table 7-3: Group 2a and Group 3 combined - Thinking about your business / organisation and broadband connectivity, please indicate how much you agree or disagree with the following statements (n=30)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I don't know / can't say
Our current broadband connectivity restricts our access to online servers	32%	32%	16%	10%	3%	6%
Our current broadband connectivity limits our ability to sell / provide products and / or services	43%	20%	27%	7%	3%	3%
It can be difficult to promote the business / organisation with our current broadband connectivity	33%	27%	33%	10%	3%	0%
Our current broadband connectivity contributes to lower levels of productivity	30%	30%	23%	7%	10%	7%
Our current broadband connectivity impedes the performance of our business / organisation	34%	25%	25%	6%	3%	6%
Our current broadband limits innovation	32%	26%	26%	10%	3%	3%
Our current broadband connectivity makes accounting and financing activities more difficult	37%	17%	27%	13%	3%	7%
Our current broadband connectivity negatively affects turnover	13%	40%	33%	10%	3%	3%
It is difficult to make improvements to our product / service offering due to our current broadband connectivity	28%	25%	31%	13%	3%	0%
Our current broadband connectivity limits our ability to make bookings	23%	20%	37%	13%	10%	7%
Our current broadband connectivity prevents us using lower-cost suppliers	17%	23%	40%	10%	7%	10%
Our current broadband connectivity limits our access to new markets	13%	23%	50%	7%	3%	13%
Our current broadband connectivity makes it difficult to communicate with staff / volunteers	7%	27%	43%	13%	3%	10%
Our current broadband connectivity limits our ability to undertake market research	10%	23%	39%	10%	3%	13%

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I don't know / can't say
Our current broadband connectivity has a negative impact on the number of customers / visitors coming to our premises	13%	16%	48%	10%	6%	3%
Our current broadband connectivity makes it difficult to recruit staff / volunteers	3%	20%	53%	10%	7%	20%
Our current broadband connectivity has a negative impact on the training we are able to provide staff / volunteers	3%	20%	53%	17%	3%	13%
Our current broadband connectivity makes it difficult to retain staff / volunteers	10%	10%	60%	7%	10%	13%

The highest level of agreement was associated with the following statements:

- Our current broadband connectivity **restricts our access to online servers** – 65% (n=20) strongly agree or agree
- Our current broadband connectivity **limits our ability to sell / provide products** and / or services - 63% (n=19) strongly agree or agree
- It can be **difficult to promote the business / organisation** with our current broadband connectivity - 60% (n=18) strongly agree or agree
- Our current broadband connectivity contributes to **lower levels of productivity** - 60% (n=18) strongly agree or agree

Key Point: The data suggests that where Group 2 and 3 businesses / organisations have an existing connection, it is generally of a poor standard in terms of speed and reliability and as such contributes to a range of negative business outcomes.

8 Focus Groups / Interviews

8.1 Overview

8.1.1 As set out in Chapter 5, Stage 2 of the research involved a series of follow-up online focus groups / interviews with residents and businesses identified during the Stage 1 surveys.

8.1.2 As with the Stage 1 surveys, the focus groups / interviews were designed to gather information on the outcomes and impacts of R100 and the extent to which the project is achieving its Investment Objectives. However, **while the surveys aimed to gather a representative sample of data, the focus groups / interviews aimed to explore the topic areas covered within the surveys in more depth and gather individual experiences** to help supplement and augment the survey findings.

8.1.3 This chapter provides a summary of the findings from the focus groups / interviews. A detailed summary of the approach to the delivery of this element of the research is included in Chapter 5. In summary, six resident focus groups, one resident one-to-one interview and five business one-to-one interviews were held with a total of 49 participants attending (44 residents, and 5 businesses). For ease of reference, the table below shows the breakdown of participants by the three Groups affected by R100.

Table 8-1: Number of attendees by affected Group

Group	Main Contract	Voucher	Number of attendees by group at the time focus groups were undertaken
1	7	7	14
2	0	12	12
3	n/a	n/a	18 (resident) and 5 (business)
Total	7	19	49

8.1.4 The chapter is structured around the following broad themes:

- Satisfaction with R100 roll out
- Satisfaction with broadband connectivity (amongst Group 1, 2 and 3 participants)
- Benefits and disbenefits of current connectivity.

8.1.5 As noted in the previous chapters:

- The focus groups were carried out during the R100 rollout and many of those benefitting from R100 have only experienced the improved connectivity for a relatively short period of time. As such, the below narrative will not capture all of the benefits of the programme, with some benefits potentially taking longer to materialise.
- The focus groups contained a high proportion of voucher recipients. The experience of voucher recipients may differ from those who have benefitted via the main contracts, and this should be borne in mind when interpreting the comments detailed below.

8.2 Satisfaction with R100 roll out

8.2.1 There was a level of **frustration noted in relation to the communication around the roll out and delivery of the R100 programme**.

8.2.2 Many attendees highlighted concerns over there being a lack of communication. There was a clear level of frustration and confusion amongst participants which was borne from there being no clear single point of contact who they could speak to for advice or updates on their particular case. Respondents attempted to gain knowledge through providers (such as BT or Openreach) and / or engaging with their local councillor or council but were generally unsuccessful, with neither entity being able to provide reliable and clear information.

8.2.3 Participants described there being long delays in communication and conflicting information. Echoing the findings of the survey, there was a general lack of awareness of the programme, with some beneficiaries only finding out they were receiving a connection when engineers appeared, or a cabinet was installed.

8.2.4 While some participants had received prior communication, this was not always of a quality that may be expected of a government funded programme. For example, one Group 3 attendee who was due to receive a connection the week following the focus group noted that they received fliers about the scheme but that it looked like 'junk mail' and, having never heard of R100 previously, they were therefore initially sceptical and resistant of the work.

8.2.5 While several attendees had used the online postcode checker, they noted that the information included was inaccurate or unhelpful, or that the dates for delivery were continually updated to extend the timeline of their installation.

8.2.6 As a result of the above, many of the Group 3 participants who took part in the focus groups were sceptical about the programme and had a sense of distrust that R100 would ever reach their property.

8.2.7 It is recognised that the focus groups may contain a larger proportion of participants who were dissatisfied with the roll-out / communication as, given their frustration, this group is more likely to respond to the invite to attend. While the above may therefore overstate the problems, it is evident that communication on the roll out has been and / or is an issue for a proportion of R100 beneficiaries.

8.2.8 From an equality perspective, limited and inconsistent communication may disproportionately affect older residents and disabled people, who are more reliant on clear, accessible, and timely information. Unclear communication also risks reinforcing scepticism about public investment initiatives and in rural areas may be interpreted as evidence of being lower priority.

8.3 Satisfaction with broadband connectivity

8.3.1 Given the different levels of connectivity and the unique circumstances amongst each group, this section is divided into sections covering each of the Groups affected by R100 as follows:

- **Group 1:** those who have been provided with broadband via R100 and have taken up the connection
- **Group 2:** those who have been provided with broadband via R100 but have not taken up the connection
- **Group 3:** those who are scheduled to receive broadband via R100 but have not yet been connected

Group 1 – Provided with broadband and taken up the connection

8.3.2 Of the 14 Group 1 attendees:

- seven had been provided with access via the voucher scheme - three via a satellite connection and four via a fixed wireless connection

- seven had received access via the main contracts – one via Fibre to the cabinet, five via Fibre to the premises.

8.3.3 Overall, **most (11 of the 14) were satisfied with their connection**. However, three voucher recipients were dissatisfied as follows:

- Two were dissatisfied as they had initially been provided with a satellite connection but the company who had provided the connection had since gone into liquidation and they were now reliant on 4G connectivity. Both participants noted that they feel they have nowhere else to turn as they have already accessed a voucher via the R100 scheme and may not be entitled to further support.

- One was dissatisfied with the speed of their connection and now relies on 4G connectivity.

Group 2 – Provided with broadband but not taken up the connection

8.3.4 Of the 12 Group 2 respondents, all were eligible via the voucher. Of these the majority had existing access to the internet via an ADSL connection, mobile broadband (4G or 3G), or satellite providers such as Starlink. Other than the latter, **the majority were dissatisfied with their current connection**.

8.3.5 Two participants based in Shetland shared details of disruptions to their existing services and how they are left with no access:

"I live in Shetland… We currently use EE 4G Internet. Which works sometimes, sometimes it doesn't. This time last year it went off and it stayed off for six weeks, so we had absolutely no connection at the house whatsoever." (Group 2 participant, Shetland)

"I live in Shetland… on one of the islands…One issue we do have is the way the signal is brought from the mainland of Shetland to the island… It's not through a subsea cable; it's actually a radio link about two or three miles between the antennas. Every time a big cruise ship comes in the harbour, it blocks off the signal… we get more than 100 of these a year … morning and night… You get about 3 or 4 minutes cut off … while the ship break breaks the signal." (Group 2 participant, Shetland)

8.3.6 While the majority of Group 2 participants taking part in the focus groups were dissatisfied with their connection, they had not taken up the R100 service. A variety of reasons for this were provided. Four participants noted that the **voucher did not cover the cost of the service they required**. For example:

"I contacted about doing a community scheme several years ago and for a community of 220 people, [the broadband provider] suggested it would be £1,000,000" (Group 2 participant, Isle of Skye)

"It comes nowhere near covering the cost of a viable solution for us" (Group 2 participant, Aberdeenshire)

8.3.7 The above respondent also **struggled to find a local provider** who would provide a connection for them:

"We looked at it on a community level to see whether the voucher scheme would cover the cost of installing fibre for all the properties, and it came up financially we could potentially make it work, but we couldn't get any of the recommended providers to come out" (Group 2 participant, Angus)

8.3.8 Some participants also noted that they were **already tied into a contract** and therefore could not sign up via the scheme:

"I got it before I heard about the funding for R100, so I considered cancelling it and signing up again and taking the funding. I didn't do that though" (Group 2 participant, Perth and Kinross)

8.3.9 One participant mistakenly believed that not taking up the voucher scheme may mean they get access to the full roll out scheme at a later date.

Group 3 – scheduled to receive broadband via R100 but have not yet been connected

8.3.10 As with the Group 2 attendees, the majority of the Group 3 attendees had existing access to the internet via an ADSL connection, mobile broadband (4G or 3G), or satellite providers such as Starlink.

8.3.11 In general, respondents were **dissatisfied with their connection**. Some participants highlighted the high-cost relative to the poor service received:

"They were charging me quite a substantial amount of money every month for a service which was incredibly poor, and … as I was on a copper line I couldn't even get rid of the landline". (Group 3 participant, Aberdeenshire)

8.3.12 Some respondents had resorted to Starlink. However, while this provided a reliable connection, the high cost was a barrier:

"I've given up and bought Starlink… which I've got to say is very, very good, but it's very expensive" (Group 3 participant, Aberdeenshire)

8.4 Benefits and Disbenefits

8.4.1 This section discusses the benefits of gaining access to R100 noted by Group 1 respondents along with some of the disbenefits of not having a reliable connection raised by those in Group 2 and Group 3. The discussion covers the following topic areas:

- Employment
- Education and training
- Wellbeing
- Safety and resilience
- Life choices
- Benefits and disbenefits for businesses

Employment

8.4.2 Most participants from **Group 1** who were satisfied with their connection described positive benefits in terms of employment. Two participants noted the importance of now being able to access superfast broadband to complete work activities:

"I was running a mail online delivery service…. I actually had to do dial up every time I wanted to check orders … Wi-Fi then moved on to the 4G system … and since [then] we've moved to fibre. I wouldn't say it's completely been trouble free, but it is 99% of the time. You can do what you want to do, so it's been transformational" (Group 1 main contracts recipient, Argyll and Bute)

"I'm able to actually host websites here which is very useful… particularly when it's so much easier to actually create these things with AI… so having enough bandwidth… has been a big change, big improvement." (Group 1 main contracts recipient, Aberdeenshire)

8.4.3 While the majority in Group 1 highlighted the benefits for their employment, as highlighted above, the Group 1 voucher recipient who is unsatisfied with their connection and relies instead on 4G connectivity described difficulties with respect to working from home:

"Both my wife and I are both healthcare workers. I do need to look at important things like x-rays, which are quite large and …CT scans, MRI scans, these things are huge and It's very difficult when they take a long time to download, particularly if someone is on the end of the phone asking for an opinion…My wife could work from home, but she can't because of the broadband… we've already touched on the travel implications and the effects of travel on the environment. … So, she goes into work every day when she could work from home two or three days a week." (Group 1 voucher recipient, Fife)

8.4.4 Amongst those in **Group 2 and 3** a higher proportion highlighted the negative impact of this on their work. For example, one participant highlighted the impact in terms of efficiency:

"There's times where there's a delay and it's really frustrating to get a conversation, so that all has like efficiency issues" (Group 3 participant, Isle of Lewis)

8.4.5 One participant highlighted that being unable to work from home due to the poor connection means that they have to **travel more** which has a consequent impact on the environment:

8.4.6 Another participant noted that they often had to work later due to the poor connectivity, and this had an impact on other aspects of their life, including **reduced personal time** with resultant impacts for them on their physical wellbeing:

"I think these slow speeds have an impact on family life, on personal time, on time to go to the gym. I mean, I'm in a gym that closes at 9:30[pm], so if I don't get out the house by 8:00 at night, you know, there's no point in going, really. And sometimes I'm kept late working." (Group 2 participant - access available via voucher scheme but cost higher than covered via the voucher, East Lothian)

Education and training

8.4.7 The benefits in terms of education and training were also highlighted. One Group 1 participant noted that he had been able **expand his interests and personal knowledge through online learning**:

"I started trying to do online courses or tutorials or webinars, which was extremely difficult, since we had the [new] connection… I can now do all those things quite comfortably" (Group 1 voucher recipient, Aberdeenshire)

8.4.8 Conversely, those in Group 2 and 3 noted the **problems in terms of accessing education and training, including for school children**, with one participant sharing an experience of hosting a family in their property and noting the challenges the school child faced as a result of poor connectivity:

"We had a Ukrainian family living with us for a while and the lad was at school and any schoolwork that he would have, simply it was impossible for him to [do]" (Group 3 participant, Perth and Kinross).

Wellbeing

8.4.9 There was general agreement amongst the **Group 1** participants who were satisfied with their connection that the positive impacts on wellbeing outweighed any negative impacts:

"I think there's far more upsides, personally" (Group 1 voucher recipient, Moray)

8.4.10 A number of respondents highlighted that the connection had allowed them to **keep in contact with friends and family** from across Scotland and further afield. One respondent noted that as a result of the R100 programme *"[they] can do FaceTime calls with family members who are in in Edinburgh" (Voucher recipient, Highland).*

8.4.11 Participants also noted that it had made them **feel more connected to the outside world**, with positive benefits in terms of mental health:

"Reconnecting with folks from all over the world… that has been a great help to my mental well-being, [it] means I'm not just kind of like in my local area. I'm nice and global in a social kind of way" (Group 1 main contracts recipient, Aberdeenshire)

8.4.12 Another highlighted that they previously felt like they were missing out in comparison to other areas and now **feel less frustrated** as a result:

"I think frustration is gone because it was quite frustrating not having access and everybody else had and you could hear it. You know, you feel like you're missing out almost type of things. So, I think that helps." (Group 1 voucher recipient, Moray)

8.4.13 Amongst **Group 2 and Group 3** respondents, the reverse was the case with attendees noting that they felt **left behind compared to more urban areas**:

"… I would say [I am] feeling like a second-class citizen in Scotland, so you know, I feel that the urban people, you know, are more like first class citizens. And I feel like a second-class citizen who's probably 5 to 10 years behind." (Group 2 participant - access available via voucher scheme but cost greater than that covered by the voucher, East Lothian)

8.4.14 One Group 3 participant noted that they live *"quite an isolated lifestyle"* and noted their concern at this because "*it is important to remain connected for well-being*" (Group 3 participant, Isle of Lewis).

8.4.15 Participants in Group 2 and 3 also highlighted the difficulties associated with **independent living for older people / relatives** due to alarm systems not working. For example:

"There's a large elderly population and in the villages, many of whom will be relying on home alarm systems as well" (Group 3 participant, Isle of Lewis).

8.4.16 This was discussed further by another attendee who noted that they use a doorbell video system to monitor an elderly parent's movements, and this is sometimes unavailable if there are connection problems.

8.4.17 One disabled participant highlighted the adverse impact of poor connectivity on his ability to socialise and therefore his mental health:

"I've got long COVID, and my energy levels are very low and just having to go and manually reset the router like four or five times a day to get it to work really cuts into my energy for doing just other things. Having to like, wait 10 minutes for it to turn back on means that when I'm online with friends for only a few hours, if it happens even once, it can cut massively into my ability to socialise with people" (Group 2 participant - access available via voucher scheme but cost higher than what is covered by the voucher, Renfrewshire)

Safety and Resilience

8.4.18 Several participants noted benefits with respect to safety and resilience. One Group 1 respondent noted that a key benefit was being able to make calls via the Wi-Fi connection:

"This this sounds sort of trivial, but actually it's been a major, major change. I've got this three-foot-thick stone wall which meant mobile coverage in the house was minimal, so actually having good broadband which allows you then to do Wi-Fi calling … my mobile is my main way of interacting with people" (Group 1 main contracts recipient, East Lothian)

8.4.19 In contrast, one Group 2 participant highlighted the lack of resilience as a key issue:

"In an emergency situation… because we have no reliable mobile signal, plus the really, really poor Internet, the second you have something like the storms, you know, adverse weather, events flooding, all of that kind of thing, it becomes very, very difficult to contact people and to find out what's going on" (Group 2 participant - access available via voucher scheme but cost higher than what is covered by the voucher, Angus)

Life Choices

8.4.20 Several respondents commented on the impact of poor connectivity on their **decision to remain in the area** and the impact on house prices / rental incomes.

8.4.21 One Group 3 respondent noted that due to the issues with his connection and the difficulties working from home, he had in the past considered moving house:

*"I've had to use cafes and actually leave the house. I talked about moving… I don't want to move. I like where I live, but my work depends on broadband. … It's important to me that I get the job done in a timely fashion and done correctly and … I've certainly found myself in situations being unable to [and]… having to go in search of broadband elsewhere" (*Group 3 participant, North Ayrshire).

8.4.22 A number of respondents highlighted how homes without a connection were seen as less desirable and this was reflected in **house prices and rental incomes**:

"Without high-speed broadband, it does actually impact things like house prices and the ability to sell your home. We definitely see that in our area because it's something that people ask if someone's moving and selling - are you one of the houses which has the high-speed broadband or are you not?" (Group 2 participant, Angus)

"I sometimes have let out my spare room in the past and I let it out to students, and they always want somewhere where they've got high speed broadband Internet. So, it affects the rental market." (Group 1 participant, Edinburgh)

Benefits and Disbenefits for Businesses

8.4.23 As noted above, five businesses took part in this aspect of the research, all of which were in Group 3 and did not currently have a superfast broadband connection. A range of issues resulting from this lack of connectivity were highlighted.

8.4.24 Several businesses noted that the **inability to undertake remote checks** had a **negative impact on productivity**. Both of the hydroelectric businesses noted that due to connectivity issues staff had to go out on site to complete in-person checks of their hydroelectric system rather than check the system remotely with resultant impacts for staff time and travel costs.

8.4.25 The inability to undertake remote checks was also highlighted as an issue by one Airbnb property owner whose property is reliant on an oil tank for heating and who is currently unable to monitor this due to the poor connection:

"Most people obviously live on site, so they can see it day in, day out, they can go and measure it. We don't, we live 500 miles away from it. So, we rely on… a device that sits in the oil tank and… every week it sends us a message to say how much is left".

8.4.26 The owner advised that sometimes when the broadband is down this app doesn't work, and they can be without enough oil due to not ordering it in time.

8.4.27 The farmer noted that he was **unable to undertake many business activities**, including sales and as such these are delivered by his son who does not live at the farm. He noted:

"Obviously [I] would like to run it from this house… [but] that's just not possible"

8.4.28 The accommodation providers noted that they had **lost customers** due to not having access to superfast broadband after customers queried the possibility of being able to complete working holidays *("Digital Nomads"* as one owner put it).

8.4.29 The Airbnb owner noted that customers sometimes have difficulty getting into their property and try to call via a mobile connection, but this is unreliable, with resultant implications in terms of **safety**:

"I've had calls from guests where [the connection] keeps breaking in and out …. They have struggled to get in the property, [so] they haven't connected to the Wi-Fi, so they can't make a call."

9 Conclusions

9.1 Overview

9.1.1 This chapter provides a summary of the findings from the research. It includes:

- A summary of the findings in the context of the R100 Investment Objectives
- Consideration of the extent to which R100 has contributed to the Scottish Government's Programme for Government 2025-2026 Priority Areas
- A summary of equality risks and considerations along with a series of recommendations from an equality perspective

9.1.2 Each of the above are discussed in turn.

9.2 R100 Investment Objectives

9.2.1 The primary aim of this research was to evaluate the R100 Programme against its investment objectives which were established as follows:

- **Improve business performance** in Scotland by facilitating increased productivity, innovation, and access to new markets.
- **Improve wellbeing** of people across Scotland.
- **Reduce the negative impact of the digital divide**, through a) addressing regional disparities in provision and b) increased availability amongst groups disproportionately represented in these areas.
- **Strengthen communities**, including in rural areas, by offering enhanced opportunities to work, trade, and deliver public services, helping to address depopulation.
- **Aid the transition to net zero** by reducing travel requirements that result from ability to work or engage with others remotely.
- **Increase Scotland's capacity** to maintain business productivity, activities important for wellbeing, and access to essential services **in the face of communication disruption**, especially for those rural and island communities.

9.2.2 The sections below provide a summary of the findings from the research in the context of the above investment objectives, with each objective considered in turn.

Improve business performance in Scotland by facilitating increased productivity, innovation, and access to new markets

9.2.3 While the business survey sample sizes were small and therefore it is difficult to draw firm conclusions, the results of the research suggest that the delivery of improved connectivity through the R100 programme has resulted in improved business performance for the businesses who have taken up the connection. Focusing specifically on the metrics within this objective:

- **69%** (n=20) of Group 1 businesses in the sample reported an overall positive benefit on business performance
- **76%** (n=22) reported a positive impact on **productivity**

- **52%** (n=15) reported a positive impact with respect to **innovation**
- **31%** (n=9) reported a positive impact with respect to **access to new markets**.

9.2.4 The Group 1 businesses in the sample also reported positive benefits with respect to turnover (41%, n=12), the number of customers / visitors to their business premises (38%, n=11), the range of products / services provided (35%, n=10), and the cost of supplies (34%, n=10).

9.2.5 A range of positive impacts with respect to business activities were also identified, with the results providing an indication of the key mechanisms through which the improvement in connectivity results in improved business performance. The business activities on which the improved connectivity had the largest positive impacts were:

- Accounting and financing activities - 66% (n=19) of Group 1 businesses in the sample identified a positive impact
- Accessing online networks and storage - 66% (n=19) identified a positive impact
- Selling products or services, including online bookings / tickets - 59% (n=17) identified a positive impact
- Promotional activities, including via social media – 52% (n=15) identified a positive impact

9.2.6 A high proportion of Group 2 and Group 3 businesses in the sample identified their current broadband connectivity as a key constraint on business performance. Overall:

- 59% (n=19) of Group 2 and Group 3 businesses in the sample strongly agreed or agreed that their current broadband connectivity **impedes the performance of their business / organisation**
- 60% (n=18) strongly agreed or agreed that their current broadband connectivity contributes to **lower levels of productivity**
- 58% (n=18) strongly agreed or agreed that their current connectivity **limits innovation**
- 36% (n=11) strongly agreed or agreed that their current broadband connectivity **limits their access to new markets**

9.2.7 The above issues were also highlighted in the open text responses to the survey and in the one-to-one interviews with businesses in Group 1 highlighting the significant efficiency gains and those in Group 2 and 3 reporting reduced productivity, higher operational costs and missed market opportunities.

- *“Having a faster broadband connection just makes everything easier. From stock management, to bookkeeping and accounting, as well as being able to call customers and suppliers now through Wi-Fi calling or the digital calls.” (Commercial business and SBVS recipient, Aberdeenshire)*
- *“We would like to make our production systems more efficient, but we cannot because our broadband provision is so hopelessly slow.” (Group 2 survey respondent, commercial business, Aberdeenshire)*
- *"We cannot reliably fill in any online form. The broadband drops frequently. “Booking anything via internet is unreliable. Safer to go into Stranraer and use library." (Group 3 survey respondent, commercial business, Dumfries and Galloway)*
- *“Our clients look for fast internet and may choose to go elsewhere if we cannot provide it.” (Group 2 survey respondent, commercial business, Orkney)*

Key Point: Overall, the results of the research suggest that the delivery of R100 has led to improved business performance and increased productivity, innovation, and access to new markets for the businesses / organisations who have taken up the connection. A range of mechanisms for this were identified through the research, including improved accounting and financing, being able to access online networks and storage, and the ability to more easily advertise / promote and sell products / services. While considerable benefits for businesses were identified, it should be borne in the mind that achievement of these is contingent on businesses taking up the connection, with those that don't upgrade at risk of relative declines in productivity and competitiveness. The barriers to take-up and the implications of this are discussed further below.

Improve wellbeing of people across Scotland

9.2.8 To help identify wellbeing impacts, two questions which specifically focused on the topic of wellbeing were included in the resident survey as follows:

- a question asking Group 1 respondents who lived at the property when broadband was installed whether the improvement in broadband had a positive or negative impact on their wellbeing
- a question which replicated the format of the questions on personal wellbeing included in the UK's APS[86] whereby respondents are asked one question covering each of the four measures of personal wellbeing (namely life satisfaction, feeling the things done in life are worthwhile, happiness, and anxiety) - this approach to capturing wellbeing impacts is well established in the literature and has been used in previous evaluations of similar schemes although attributing any change identified to the investment being evaluated can be challenging.

9.2.9 In terms of the former, nearly 50% (49%, n=130) of Group 1 respondents in the sample stated that the improvement in connectivity had had a positive impact on their wellbeing.

9.2.10 With respect to the UK APS personal wellbeing question, the results indicate that **respondents in Group 1 had higher wellbeing scores than those in Group 2 and Group 3**, corroborating the above findings. It is noted however there are a wide range of factors which could influence the APS wellbeing scores and it is therefore difficult to attribute the differences between the groups directly to the R100 Programme.

9.2.11 Beyond the specific questions on wellbeing, Group 1 respondents to the survey also identified a range of positive impacts of the improved connectivity which are likely to contribute to improved wellbeing. For example, a high proportion of Group 1 respondents (proportions shown in brackets) reported positive impacts on:

- Keeping in touch with family and friends (63%, n=165)
- Feeling of connectedness to wider world (62%, n=164)
- Finding out about what is going on in the local area (47%, n=125)
- Feeling of connectedness to the local community (35%, n=94)

9.2.12 The positive benefits with respect to wellbeing were also noted by Group 1 respondents in the open text survey responses and the focus group discussions, with respondents noting that they are now better connected with family and friends and the local community and that this has resulted in reduced isolation and improved mental health:

[86] see https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingintheukqmi

- *"[The] overwhelming benefit is mental health improvement associated with wider connectivity to the outside world in terms of access to services, to information, to financial management etc. - I would stress again, that as a rural dweller, this cannot be under-estimated!" (Group 1 Survey respondent - IVS recipient, Stirling)*

- *"Reconnecting with folks from all over the world… that has been a great help to my mental well-being, [it] means I'm not just kind of like in my local area. I'm nice and global in a social kind of way" (Focus Group Participant - Group 1 main contracts recipient, Aberdeenshire)*

9.2.13 While there were clear wellbeing benefits for Group 1 respondents, it should be recognised that these benefits do not extend to those who have not taken up the connection offered by R100 and in contrast to those in Group 1, those not taking up the connection may be at risk of further marginalisation and reduced levels of wellbeing, particularly where digital connectivity and digital services replace more traditional means of communication without inclusive alternatives.

Key Point: Overall, while it is difficult to draw firm conclusions from the results of the specific question on personal wellbeing, the wider research suggests that the delivery of R100 has resulted in improved wellbeing amongst those respondents who have taken up the connection offered via R100. As with businesses, while considerable benefits in terms of wellbeing were identified, it should be borne in the mind that achievement of these is contingent on households taking up the connection, with those that don't upgrade at risk of further marginalisation / reduced levels of wellbeing, particularly where digital connectivity and digital services replace more traditional means of communication. The barriers to take-up and the implications of this are discussed further below.

Reduce the negative impact of the digital divide, through a) addressing regional disparities in provision and b) increased availability amongst groups disproportionately represented in these areas

9.2.14 As set out in Section 2.4, there is a clear disparity in provision between connectivity levels in urban areas in Scotland and those in more rural locations[87] and this inequality can have a range of negative impacts which can affect the long-term sustainability of rural areas. R100 aims to address this disparity and thereby reduce the negative impacts of the digital divide through the delivery of broadband services in locations where they would not otherwise be provided by the market.

9.2.15 As set out in Section 2.5, the Scottish Government maintains a database of properties which have either benefited from the R100 programme or are due to benefit over the upcoming period and data from the September 2024 version of this database suggests that 80% of the properties affected by R100 are in rural locations with just 17% located in urban areas. [88] The programme therefore appears to be effectively targeting rural areas with the aim of addressing the above disparities in provision.

9.2.16 While the programme is targeting rural locations, it is noted that the research suggests that **those provided with connectivity via the main contracts were more satisfied with the speed and reliability of their connection than those provided with connectivity via IVS or SBVS (who are perhaps more likely to be in rural and island communities)**. . Perhaps unsurprisingly given the need for voucher recipients to more actively engage with the

[87] As set out in Chapter, according to Ofcom's 2023 Connected Nations Report, nearly all residential properties and 97% of commercial properties in Scotland's urban areas are able to access superfast broadband compared to just 89% and 97% of residential and commercial properties respectively in Scotland's rural locations – see https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-2023/interactive-report; accessed February 2024

[88] The remaining 3% are located in accessible small towns (2%), remote small towns (1%) or very remote small towns (1%)

programme / suppliers, voucher recipients also appeared to experience more challenges with respect to communication. There is therefore a risk of uneven outcomes across the programme footprint and an element of continued geographic inequality.

9.2.17 The impact on the availability of broadband amongst groups disproportionately represented in these areas will depend on the ultimate level of take-up amongst these groups. While the specific groups in question are not defined in the objective, the following is of note:

- Rural areas in Scotland tend to have a higher proportion of elderly residents
- The most remote rural locations have higher proportions of those aged 65+ with long-term health problems and / or disabilities
- While the picture in terms of income is more complex, island and rural communities experience higher costs of living which impacts levels of disposable income
- In terms of businesses, microbusinesses and sole traders make up a large share of rural enterprises.

9.2.18 A number of key barriers to take-up were identified in the research, including:

- **A lack of awareness of R100**
- **Cost barriers – including the cost of the connection and the cost of devices**
- **Process barriers – i.e. the complexity of the voucher application process / changing an existing contract.**

9.2.19 These are discussed below.

Lack of Awareness

9.2.20 The research suggests that **a lack of awareness of R100 is the primary barrier to up-take**, with more than 85% of Group 2 households eligible for the voucher scheme, 50% of Group 2 households eligible via the main contracts, and 81% of Group 2 businesses unaware of R100. Furthermore, **for the large majority of households who were unaware, the lack of awareness was the only barrier to take-up** with the majority of those in the sample who were unaware (89% of households with a current connection and 74% of those without a current household connection) stating that they intend to apply now that they know about the programme.

9.2.21 A lack of awareness was also raised in the focus groups, with some beneficiaries noting that they only found out they were receiving a connection when engineers appeared and others noting that communication was of a poor quality. A lack of awareness of R100 is a particular challenge with respect to the voucher scheme which requires eligible property owners to take the initial action and progress with an application. From an equality perspective, **awareness gaps may disproportionately affect older residents and disabled people, who are more reliant on clear, accessible, and timely information.** Unclear communication also risks reinforcing scepticism about public investment initiatives and, in rural areas particularly, may be interpreted as evidence of being lower priority.

Cost and Process Barriers

9.2.22 These barriers are likely to be more acute for:

- **Low-income households** who are most affected by affordability challenges

- **Older adults with lower digital confidence** who are less likely to complete voucher applications or switch providers without support
- **Disabled people** who may encounter additional obstacles in the application processes if accessibility is not built in.
- **Small businesses**, particularly in agriculture and tourism, who often lack administrative capacity to navigate complex application processes or invest in new technology and who may therefore be at risk of relative declines in productivity and competitiveness.

9.2.23 Where take-up is limited or focused on particular groups, the overall benefits of R100 will be reduced and equality of access will not be achieved. Further, as digital connectivity becomes the norm, excluded groups risk becoming more marginalised. In order to maximise the effectiveness of the programme and achieve broader equality aims, there may therefore be a need for:

- More targeted communication which is delivered in accessible formats and distributed through trusted intermediaries, including schools, GP practices, libraries and community groups.
- Direct support and guidance for groups more likely to be affected by cost and complexity barriers.

Key Point: The R100 programme appears to be effectively targeting rural locations with the aim of addressing the regional disparities in broadband provision. While effectively targeting rural areas and therefore addressing existing disparities, it is worth nothing that satisfaction amongst voucher recipients (who are likely to be concentrated in more remote rural locations) was lower, creating a risk of some level of continuing geographic inequality. The extent to which the R100 results in greater availability of broadband connectivity amongst certain groups in targeted areas will depend on the ultimate level of take up amongst such groups. The emerging findings from this research suggest that the key barriers to take up are a lack of awareness of R100, the cost of upgrading; and the complexity of the voucher application process / changing an existing contract. These barriers are likely to be more acute for certain groups in society. In order to ensure this objective and wider equality aims are achieved, targeted communication and more direct support and guidance for these groups would be beneficial.

Strengthen communities, including in rural areas, by offering enhanced opportunities to work, trade, and deliver public services, helping to address depopulation

9.2.24 The results of the survey and focus groups suggest that the delivery of R100 has provided **enhanced opportunities to work** for those taking up the connection.

9.2.25 While based on a small sample, **20% (n=54) of Group 1 residents who had lived at the property when broadband was installed said they were able to work from home more frequently as a result of the improved connectivity**. Being able to work from home can particularly help strengthen communities in rural areas where the barriers to accessing employment are often higher due to long travel distances, high travel costs, and a lack of transport connectivity. As well as facilitating working from home, there was also some evidence from the survey that R100 had enabled some Group 1 respondents to **work more hours** (5%, n=12), **change job** (3%, n=9), or **take on an additional job** (3%, n=7) although sample sizes were small and therefore it's difficult to draw firm conclusions on these aspects.

9.2.26 In addition to employment, while sample sizes are small, there was some evidence that the improvement in broadband had enabled access to education, with 9% (n=25) of Group 1 respondents stating that they can now access formal learning opportunities which they previously could not access. A range of courses were identified in the open text responses

including degrees, diplomas, postgraduate studies, and professional and work-related training. There was also some evidence that the delivery of broadband had led to a general improvement in digital skills for some, with 33% (n=87) of Group 1 respondents stating that the improvement had had a positive impact on their digital skills and 28% (n=75) stating that it had had a positive impact on their confidence using the internet

9.2.27 In terms of providing **enhanced opportunities to trade**, while sample sizes were relatively small, there was some evidence from the Group 1 business survey that R100 had had a positive impact on trade with:

- 59% (n=17) of Group 1 businesses stating that the improvement in broadband had had a positive impact on **selling products / services**
- 38% (n=11) recording a positive impact with respect to **the number of customers / visitors to their promises**
- 34% (n=10) recording a positive impact with respect to the **range of products / services provided**
- 34% (n=10) recording a positive impact with respect to the **cost of supplies**
- 31% (n=9) recording a positive impact with respect to **access to new markets**

9.2.28 Conversely, those who had not taken up the R100 connection or had not yet been provided with the connection, identified a number of challenges in terms of trade due to their current levels of connectivity. For example:

- 63% (n=19) of Group 2 and 3 respondents strongly agreed or agreed that their current broadband connectivity **limits their ability to sell / provide products and / or services**
- 43% (n=13) strongly agreed or agreed that their current broadband connectivity **limits their ability to make bookings**
- 40% (n=12) strongly agreed or agreed that their current broadband connectivity **prevents them using lower-cost suppliers**
- 36% (n=11) strongly agreed or agreed that their current broadband connectivity **limits access to new markets**

9.2.29 While the research did not explicitly cover the **delivery of public services**, there was evidence that respondents from all three groups complete government processes, pay council bills and access virtual GP appointments online, highlighting the importance of internet connectivity for such activities regardless of the level of connectivity. The wider availability of broadband connectivity may contribute to increased use and the greater viability of such services with resultant cost savings for both those using and providing the services.

9.2.30 In terms of **strengthening communities**, there was also some evidence from the survey that the availability of broadband had had a positive impact on the level of community activities in some areas with 24% (n=63) of Group 1 respondents stating that there had been a positive impact on this aspect. This sentiment was also echoed in the open text responses to the survey:

- *"There are a lot more activities / events published / organised at the Village Hall, and which are now also very well attended, because of the wider availability of communication." (SBVS recipient, Moray)*

9.2.31 The findings with respect to the number of shops and other services available locally were more mixed with roughly equal proportions of Group 1 respondents stating that the

improvement in broadband had a positive / negative impact on this aspect. The impact on local shops / services may take longer to materialise than the period covered in this research. As touched upon above, where the availability of broadband leads to the closure of local shops and other services, there may be a consequent impact on community cohesion and a disproportionate impact on groups in society who do not use online services, such as older people, low confidence users, or those on lower incomes, who may experience feelings of increased isolation.

9.2.32 **Depopulation** is a particular challenge in rural locations where more limited employment, education and social opportunities can lead to outmigration, particularly amongst younger cohorts. Enhancing digital connectivity can help to break this cycle as improved connectivity can make activities, including the delivery of education, services, and business activities viable in less central locations. While sample sizes were small and therefore it is difficult to draw firm conclusions, there is some evidence from the survey that the availability of superfast broadband has encouraged some people to move to the areas affected, with 42% (n=13) of Group 1 respondents who had recently moved stating that they would not have done so if superfast broadband (or quicker) had not been available. As with the impact on local shops / services, the impact in terms of depopulation may take longer to materialise than the period covered in this research.

Key Point: Overall, the results suggest that the delivery of R100 has contributed to a strengthening of the communities affected by the programme particularly with respect to opportunities to work and the level of community activities in some areas. While sample sizes are small, there is also some indication that the availability of broadband connectivity has influenced people's decision to move to the area. The impact of the programme on the number of shops and other service available locally is less clear. The overall balance of benefits / disbenefits in this respect is likely to differ depending on the community in question and may take longer to materialise than the period covered by this research. It is noted though that if digital services replace local provision, such as banking or council services, without inclusive alternatives, there is a risk that older and low-confidence users are further excluded.

Aid the transition to net zero by reducing travel requirements that result from ability to work or engage with others remotely

9.2.33 While sample sizes are small, there is some indication from the survey results that the ability to work and engage with others remotely has resulted in a reduction in travel at the local level. Overall, 12% (n=32) of Group 1 respondents to the survey said that the improved connection had resulted in a change in the level of day-to-day travel made by their household, with almost all of these stating that their household travel had reduced. A range of reasons were provided for this, including being able to work from home more frequently; increased use of online shopping; and accessing government and NHS services online. Several respondents also emphasised the benefit of being able to check public transport options before leaving the house, thereby reducing unnecessary trips.

9.2.34 While the above may lead to a reduction in travel and a consequent reduction in greenhouse gas emissions, it is also the case that home working and the delivery of online shopping / services will themselves generate carbon emissions (e.g. through additional domestic energy consumption, more delivery drivers etc) which will in part offset the savings generated. In addition, the research identified evidence of increased community activities as a result of the ability to organise online which may contribute to additional travel albeit potentially more locally based.

Key Point: Overall, the results suggest that the improvement in connectivity has led to a reduction in day-to-day travel for some households due to increased home working, higher levels of online shopping, and use of online government and NHS services. Some of these savings will however be offset by carbon emissions generated via other activities with more detailed analysis required to determine the overall impact.

Increase Scotland's capacity to maintain business productivity, activities important for wellbeing, and access to essential services in the face of communication disruption, especially for those rural and island communities

9.2.35 The research suggests that the delivery of improved broadband connectivity has improved the capacity of businesses and communities during periods of disruption.

9.2.36 In terms of **business productivity**, evidence from the business survey suggests that Group 1 businesses are now able to undertake a wider range of business activities online, including accounting and financing, accessing online networks and storage, selling products or services, and being able to call customers and suppliers through Wi-Fi. As noted above, there is also evidence of people being able to more frequently work from home because of improved connectivity. In the event of a disruption, there is therefore greater capacity in the system to maintain business productivity.

9.2.37 There is also evidence from the surveys that the availability of broadband has **enabled residents to access travel and emergency information more easily during periods of disruption, helping to maintain access to essential and other key services**. In total, 37% (n=96) of Group 1 households said that the improvement in broadband had benefitted their household in periods of disruption, with respondents highlighting that they are now able to access up-to-date travel and other emergency information which they were previously unable to access.

Key Point: The research suggests that where businesses and residents have taken up the enhanced broadband connectivity provided by R100 additional opportunities for communication and additional mechanisms by which to deliver business activities have been created and these channels help to maintain business productivity and access to key services during periods of disruption.

9.3 Programme for Government Priority Areas

9.3.1 In addition to considering the R100 Investment Objectives, the below table summarises the findings of the research in the context of the Scottish Government's Programme for Government 2025-2026 Priority Areas, namely growing the economy, eradicating child poverty, tackling the climate emergency, delivering high quality and sustainable public services.[89]

Priority Areas	How R100 has contributed
Growing the Economy	▪ While the sample sizes were small, the research suggests that the improvement in broadband has had a positive impact on a wide range of business activities, including accounting and financing activities; accessing online networks and storage; selling products or services; promotional activities; and staff training. This has in-turn led to improved productivity and enhanced levels of innovation resulting in an overall improvement in business performance. ▪ Benefits for the tourism industry were identified via the focus groups and open text responses, with accommodation providers noting that access to broadband is often a pre-requisite for visitors and that a lack of connectivity can result in lost trade. There was also evidence that the availability of broadband had had a positive impact on the level of community activities with 24% (n=63) of Group 1 respondents stating that there had been a positive impact on this aspect. An improvement in community-based activities may help support visitor trips in some areas.

[89] https://www.gov.scot/publications/programme-government-2025-26/

Priority Areas	How R100 has contributed
Eradicating Child Poverty	▪ While based on a small sample, 20% (n=54) of Group 1 residents who had lived at the property when broadband was installed said they were able to work from home more frequently as a result of the improved connectivity. The ability to work remotely can help certain groups, such as women, carers, and those with disabilities, to enter the labour market or work more hours. This helps to increase participation levels and can help to reduce the gender gap in employment which is typically higher in rural communities.[90] There was also some evidence from the survey that R100 had enabled some Group 1 respondents to work more hours (5%, n=12), change job (3%, n=9), or take on an additional job (3%, n=7) although sample sizes were small and therefore it's difficult to draw firm conclusions on these aspects. ▪ In addition to employment, while sample sizes are small, there was some evidence that the improvement in broadband had enabled access to education, with 9% (n=25) of Group 1 respondents stating that they can now access formal learning opportunities which they previously could not access. A range of courses were identified in the open text responses including degrees, diplomas, postgraduate studies, and professional and work-related training.
Tackling the Climate Emergency	▪ Some evidence via the focus groups that improved connectivity enables remote monitoring of infrastructure, leading to reduced travel and efficiency gains ▪ More generally, there is evidence that the improved connectivity had led to a reduction in household travel due to increased home working and use of online services / shopping. However, it is also the case that home working and the delivery of online shopping / services will themselves generate carbon emissions (e.g. through additional domestic energy consumption, more delivery drivers) which will in part offset the savings generated.
Delivering high quality and sustainable public services	▪ Evidence that respondents from all three groups complete government processes, pay council bills and access virtual GP appointments online, highlighting the importance of internet connectivity for such activities regardless of the level of connectivity. In terms of providing such services, the wider availability of broadband connectivity may contribute to the viability of such services and potentially lead to cost savings for both government and the NHS. ▪ Results from the survey suggest that improved connectivity led to positive benefits in terms of providing access to online learning, tutoring, schoolwork and educational resources for those aged under 16 with some respondents noting that there were particular benefits for children with disabilities / autism as it enabled more independence and access to tailored resources.

9.4 Equality Considerations and Recommendations

Equality Risks and Considerations

9.4.1 Findings presented in the evaluation report present four cross-cutting equality risks:

- **Affordability barriers:** Continuing costs (tariffs, equipment, assistive technologies) risk excluding low-income and disabled households, even where coverage exists.

[90] https://ec.europa.eu/info/strategy/priorities-2019-2024/new-push-european-democracy/long-term-vision-rural-areas/eu-rural-areas-numbers_en

- **Process barriers:** Complexity in application and switching processes disproportionately affects older adults, disabled people with limited support, and small businesses with limited administrative capacity.

- **Parity of outcome:** Potential differences in speed and reliability between main-contract and voucher-based connections create a risk of some level of continuing geographic inequality which may reinforce perceptions of second-tier provision.

- **Digital-only service delivery:** The migration of services to online platforms, while beneficial for many, risks excluding older and disabled residents without accessible alternatives.

Recommendations

9.4.2 The R100 programme has so far provided a wide range of benefits for those who have taken up the connection, including improved business performance, enhanced wellbeing and strengthened, more robust communities. The programme is effectively targeting existing regional disparities in provision and has significant potential to narrow connectivity gaps and deliver inclusive growth across Scotland. It is also expected that the outputs, outcomes and impacts of R100 will continue to develop over time. The evaluation findings demonstrate, however, that infrastructure improvements alone are insufficient to deliver equality of outcome. Affordability, digital skills, confidence and service reliability remain key challenges, particularly for older adults, disabled people, low-income households, children and young people, and those in rural and island communities.

9.4.3 To ensure that equality is central to delivery and that the programme delivers not only on connectivity targets but also on Scotland's broader commitments to equality and social justice, the following measures should be considered:

- **Targeted communications:** Deliver awareness campaigns in accessible formats and through trusted intermediaries, including schools, GP practices, libraries and community groups, particularly in rural and island areas.

- **Application and switching support:** Provide dedicated support to residents and microbusinesses in navigating voucher applications and provider switching, ensuring older adults and those with limited digital literacy are not excluded.

- **Affordability measures:** Strengthen promotion of social tariffs, explore targeted subsidies or device loans for low-income and disabled households, and consider funding for assistive technologies.

- **Parity of outcome assurance:** Introduce clear quality standards for voucher-based solutions, supported by monitoring of service reliability and consumer satisfaction across geographic areas.

- **Support for children and young people:** Work with schools and youth services to combine connectivity improvements with access to devices, skills development and safe online environments.

- **Inclusive service design:** Ensure that digital public services retain telephone or face-to-face options, particularly for older adults and disabled people in rural communities.

- **Ongoing equality monitoring:** Track awareness, take-up and satisfaction by age, disability, income and geography. Regular reporting can identify emerging gaps and inform responsive action.

Appendix A : One-to-one Consultations

A.1 Overview

A.1.1 To gain insight into issues around digital exclusion and how this affects different groups in society, a series of one-to-one consultations were undertaken with relevant stakeholders. The organisations who were consulted as part of this process were as follows:

- Digital Ethics, Inclusion and Assurance, Scottish Government
- Mhor Collective
- Renfrewshire Council
- SCVO
- Simon Community

Appendix B : Survey Response by Local Authority

Table B-1: Survey responses by local authority

Local Authority	Number of resident responses	Number of business responses	Total number of responses	Percentage of responses	Responses as a percentage of R100 properties in the local authority area
Aberdeen City	6	0	6	0.64%	0.23%
Aberdeenshire	188	14	202	21.47%	0.90%
Angus	35	2	37	3.93%	0.48%
Moray	38	3	41	4.36%	0.57%
Highland	174	14	188	19.98%	0.80%
Dundee City	0	0	0	0.00%	0.00%
Perth And Kinross	72	6	78	8.29%	0.70%
Fife	28	2	30	3.19%	0.29%
Dumfries And Galloway	39	4	43	4.57%	0.33%
South Lanarkshire	16	2	18	1.91%	0.24%
Scottish Borders	28	3	31	3.29%	0.32%
East Ayrshire	5	5	10	1.06%	0.26%
South Ayrshire	11	1	12	1.28%	0.32%
Edinburgh	10	1	11	1.17%	0.27%
Midlothian	2	0	2	0.21%	0.10%
West Lothian	8	0	8	0.85%	0.32%
East Lothian	9	1	10	1.06%	0.32%
North Lanarkshire	5	0	5	0.53%	0.16%
Falkirk	4	0	4	0.43%	0.18%
Clackmannanshire	3	1	4	0.43%	0.68%
Stirling	18	2	20	2.13%	0.45%
Argyll And Bute	72	11	83	8.82%	0.67%
Glasgow City	1	0	1	0.11%	0.02%
East Dunbartonshire	2	0	2	0.21%	0.19%
East Renfrewshire	5	0	5	0.53%	0.78%
Renfrewshire	5	0	5	0.53%	0.30%
West Dunbartonshire	1	0	1	0.11%	0.10%
Na H-Eileanan An Iar	8	0	8	0.85%	0.22%
North Ayrshire	7	1	8	0.85%	0.27%
Ayrshire	0	0	0	0.00%	0.00%
Orkney Islands	36	1	37	3.93%	0.83%

Local Authority	Number of resident responses	Number of business responses	Total number of responses	Percentage of responses	Responses as a percentage of R100 properties in the local authority area
Inverclyde	4	0	4	0.43%	0.30%
Shetland	25	2	27	2.87%	0.74%
Total	865	76	941	100.00%	NA

Appendix C : Profile of Residential Properties and Businesses / Organisations responding to the survey

C.1 Residential Survey – Household Profile

Household type

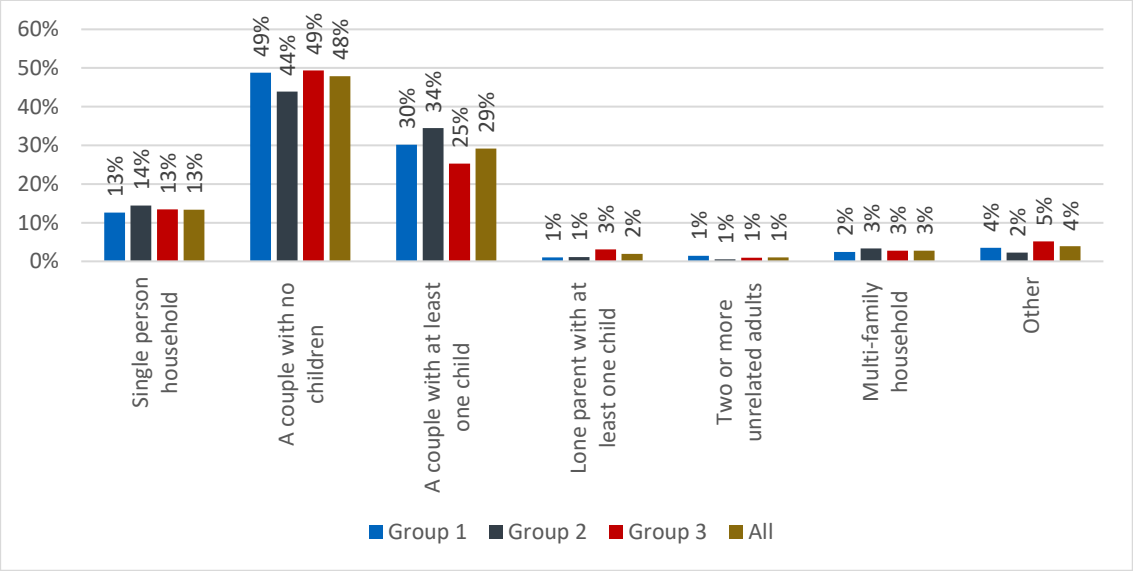


Figure C-1: We would like to understand the upgrade experience for different types of household. Please tell us which of the following best describes your household? (Group 1 n=285; Group 2 n=180; Group 3 n=328)

Children / no children

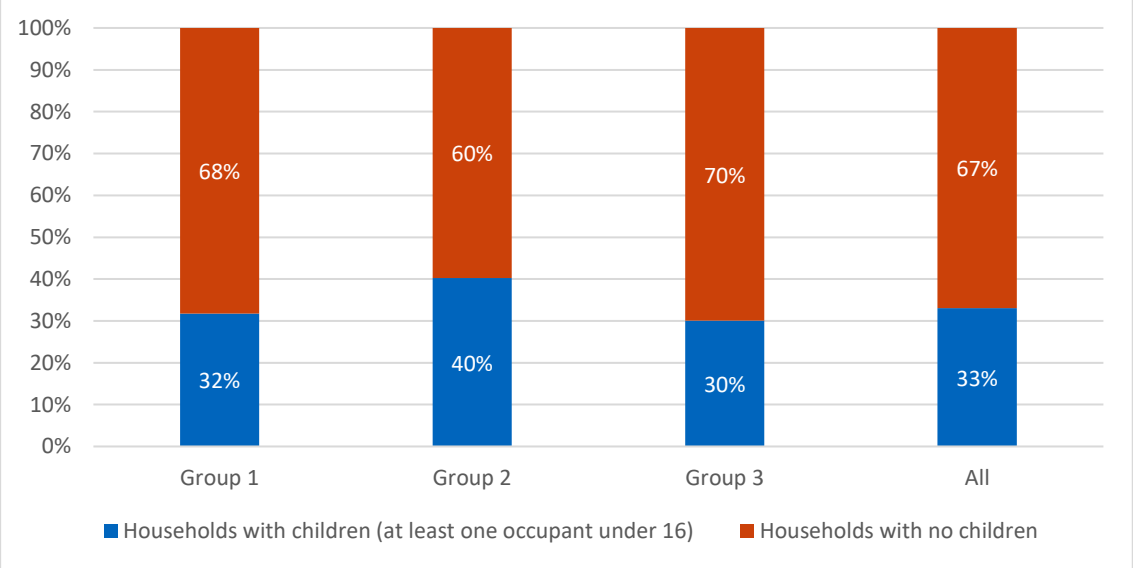


Figure C-2: Proportion of households with children (at least one occupant under 16) versus proportion without children (Group 1 n=296; Group 2 n=189; Group 3 n=316)

Disability

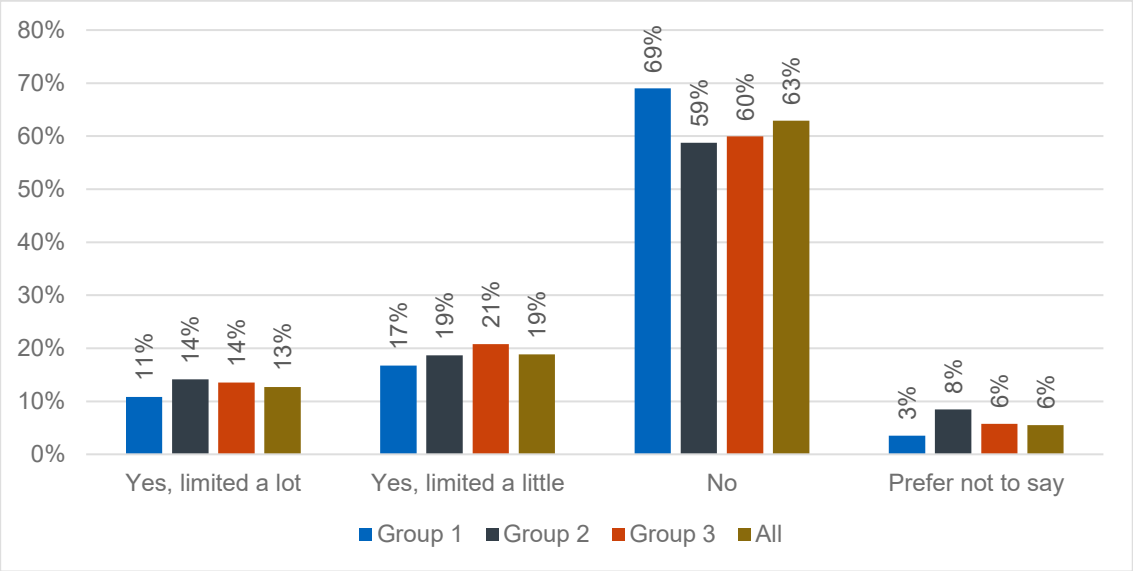


Figure C-3: Including yourself, are the day-to-day activities of anyone in your household limited because of a health problem or disability which has lasted, or is expected to last, at least 12 months? (Group 1 n=287; Group 2 n=177; Group 3 n=332)

Household ownership

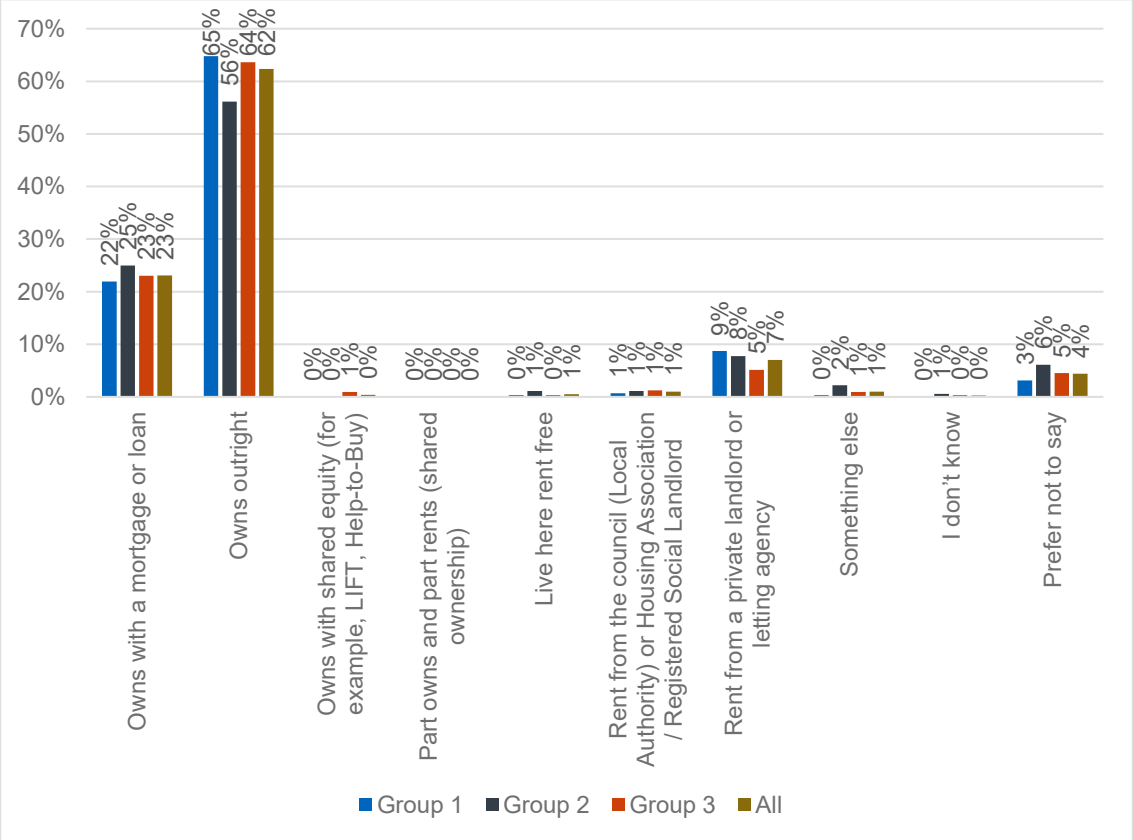


Figure C-4: Does your household own or rent the property for which you entered the postcode at the start of this survey? (Group 1 n=287; Group 2 n=180; Group 3 n=330)

Household Income

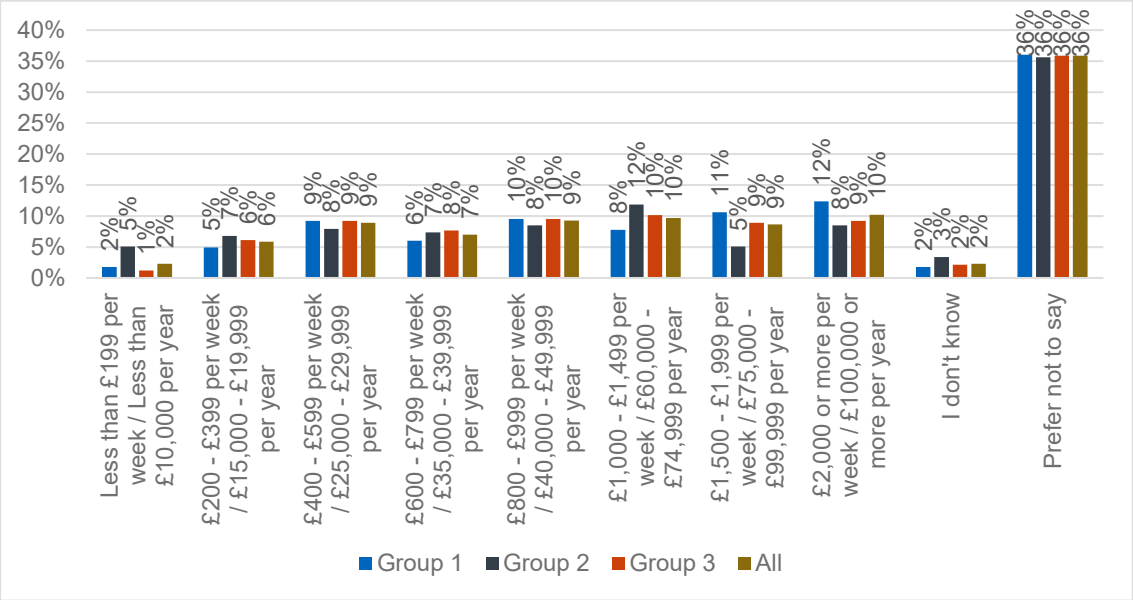


Figure C-5: What is your total household income before tax? (Group 1 n=283; Group 2 n=177; Group 3 n=326)

C.2 Residential Survey – Respondent Profile

Sex

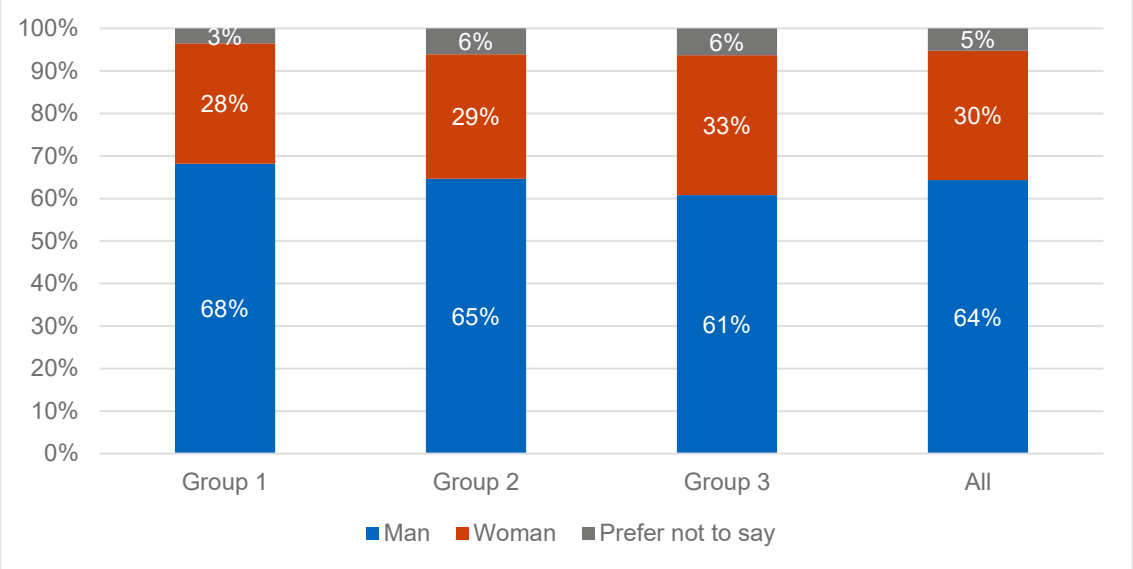


Figure C-6: What is your sex? (Group 1 n=286; Group 2 n=181; Group 3 n=334)

Gender

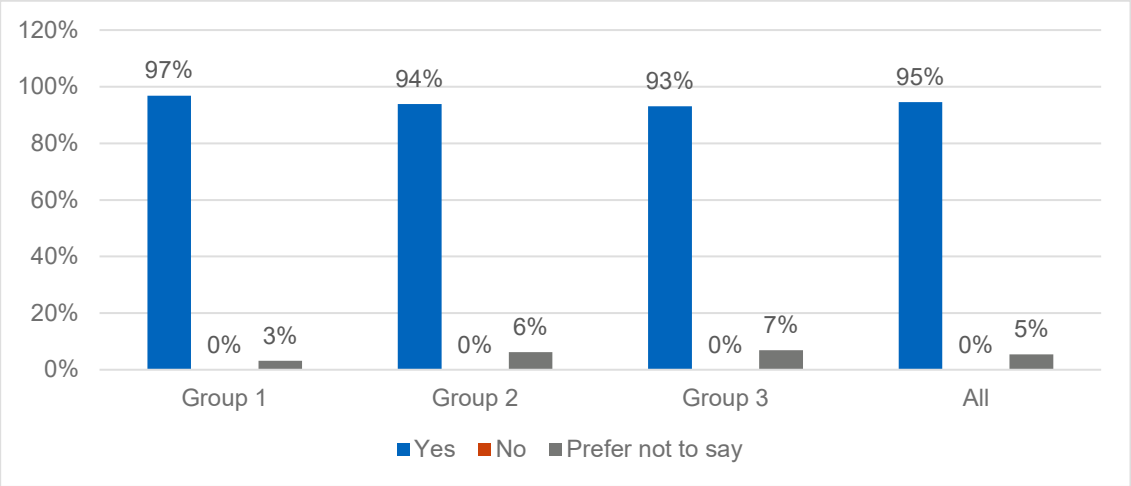


Figure C-7: Is the gender you identify with the same as your sex registered at birth? (Group 1 n=285; Group 2 n=178; Group 3 n=333)

Ethnicity

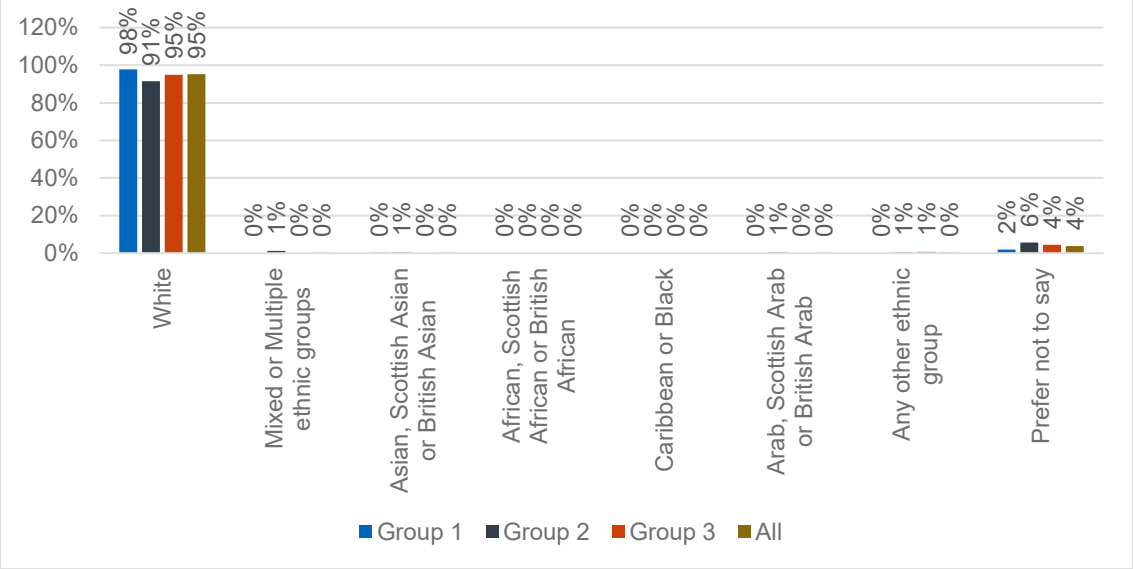


Figure C-8: Which one of these groups best describes your ethnic group or background? (Group 1 n=276; Group 2 n=175; Group 3 n=318)

C.3 Business Survey – Business Profile

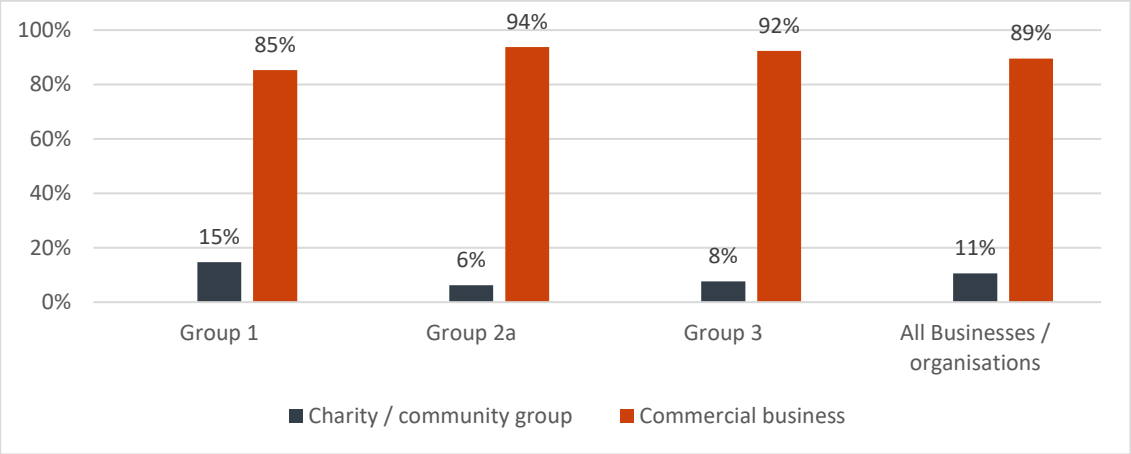


Figure C-9: What type of business or organisation is associated with the property?

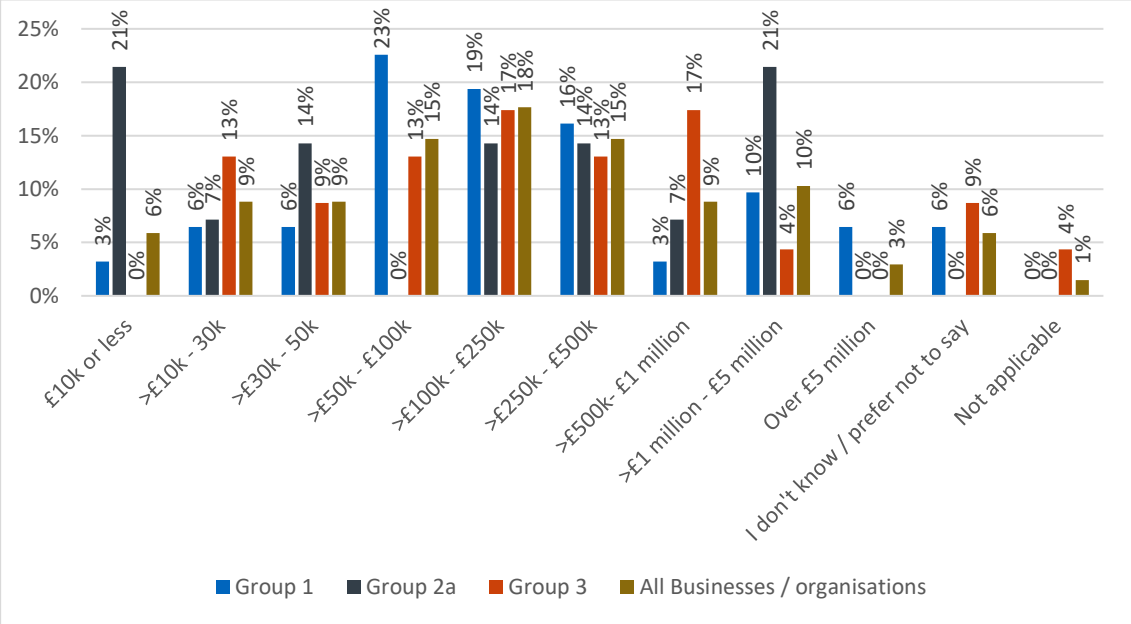


Figure C-10: Approximately, what was your annual turnover in the last financial year? (Group 1 n=31, Group 2a n=14, Group 3 n=23, All n=68)

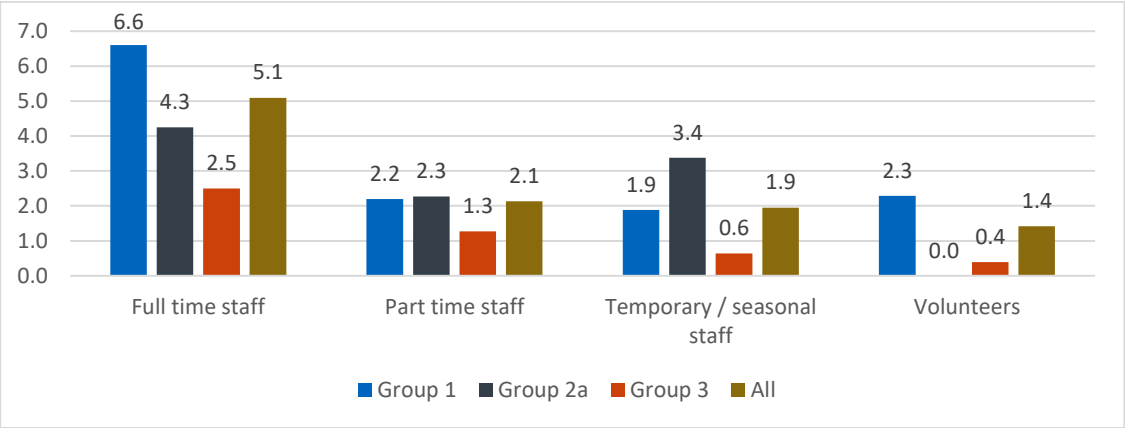


Figure C-11: Average number of people working or volunteering at business / organisation premises

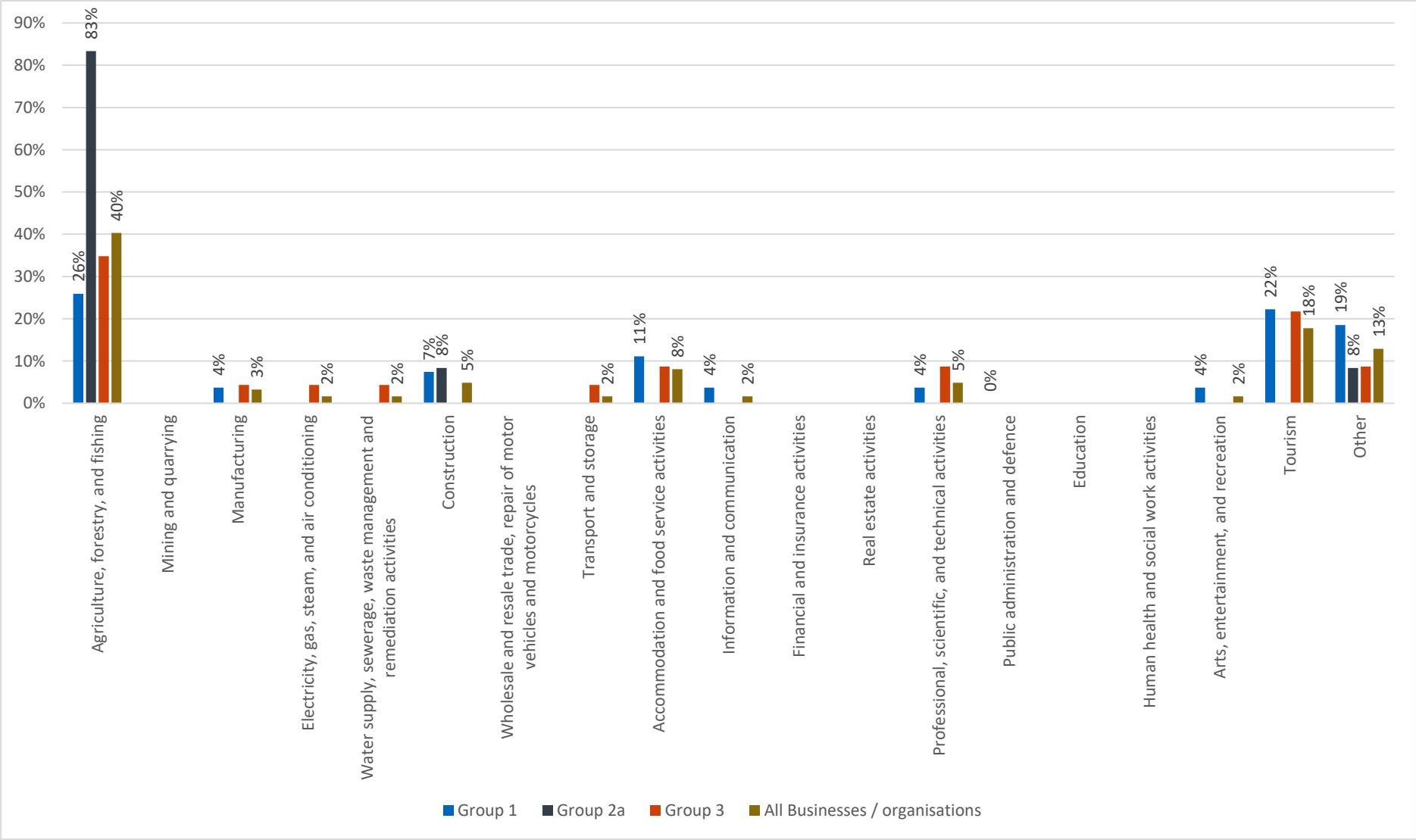


Figure C-12: What is the primary activity of your business

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The Scottish Government
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Edinburgh
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