

Smart speakers research with the public

Research report
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community
research

Bringing the voices of communities into the heart of organisations



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1. Executive summary

Research approach

- In Autumn 2022 Community Research conducted research with the public on behalf of Ofcom to explore usage of and attitudes towards smart speakers. This research consisted of a three-week 100-person online forum with smart speaker users, followed by focus groups with around half the forum participants. The research also included 15 depth interviews with non-users of smart speakers. These participants were sent smart speakers to try out, and follow-up interviews captured their experiences.

Acquisition

- Most smart speaker users purchased or received their speaker with relatively **low expectations** beyond **curiosity** as to what it might offer. Many had little awareness of what the speaker could be used for beyond a few basic functions, primarily music and radio. Speakers were often bought on special offer or were received as a gift; there was **little financial risk** to most people at the point of acquisition.
 - Brands and specific voice assistants did not play a significant part in people's decision making, although a few chose to buy a brand that linked with their existing devices or accounts for convenience.
- Among non-users, the main reason for not having a smart speaker was that they simply did not see a compelling reason to get one – it felt an **unnecessary** luxury.
 - A few also cited concerns around privacy or cost as secondary reasons for not having a speaker.

How people are using smart speakers

- Participants in the research mainly used their smart speakers for **content provision** (largely music, radio, news, weather and information), although many also used them for their **household management** functions (such as timers, alarms and reminders). A few used them to control **smart devices** in their homes, and a handful used them to **communicate** (for example making calls or sending messages).
- Most participants, having discovered new functions beyond just content since they first got their device, found that they used their speakers more than they had anticipated, although a few felt that the novelty had worn off and they used their speaker less than they used to.
- Smart speaker users largely fell into three categories: those for whom it was '**just a speaker**', who tended not to use it for much beyond listening to radio and music; those for whom it was '**a speaker with added fun and functions**', who used a variety of additional features; and those for whom smart speakers were '**a control hub**', who depended on their speakers for their daily routines and household management. This latter group included people with mobility difficulties



and disabilities, for whom smart speakers provided **assistive and facilitative technology** helping them to lead more independent lives.

Benefits and frustrations of smart speakers

- The vast majority of participants in this research (including those who were participating as non-users) were **positive** about their experience of owning and using a smart speaker. They liked the **convenience** it brought, allowing them to do a range of different activities in addition to listening to music. The fact that they could use their **voice** to control those activities meant they could do things quickly and hands-free.
 - People also liked speakers for wider **benefits** – for example, the companionship they could provide, and the ways in which they could help people with physical or neurological disabilities.
- Most participants did identify some downsides to smart speakers, most commonly that they did not always respond correctly to commands, either **ignoring** them or doing the '**wrong**' thing.
 - This was felt to be particularly the case by people with strong regional **accents**.
- However, these downsides were generally seen to be **minor irritations** that did not fundamentally impact on people's enjoyment of their speakers.

Smart speaker features in detail

- Most participants recalled their smart speaker as being **easy to set up** initially, and non-users were pleasantly surprised at how straightforward they found this. Very few had changed their default settings on their speaker when setting it up, and most said they did not know much about settings, but had no reason to be unhappy with them.
 - There was a mix of views as to the extent that people liked their speakers to **personalise or tailor** their content; some appreciated the improved user experience they felt this gave them, while others found it unsettling and disliked relinquishing too much control.
- The radio function was used by most of the research participants, and people generally felt that **they listened to the radio more** than they had done before they had a smart speaker, because it was now quicker and easier to do so. Even many of the non-users found they were listening to the radio more since receiving a speaker.
 - Most were confident that they could **access** all the radio stations they wanted to, and that their smart speaker allowed them to listen to a **wider range** of stations than had previously been available to them via their radio sets.
- Around half of the forum participants accessed news via their smart speaker. Although some consumed less news from other sources since getting a smart speaker, most people saw the smart speaker content as an addition to rather than alternative to more in-depth news coverage, using it for **instant headlines**, but returning to TV, print or online news for more detail if needed.



- Participants were generally confident that they could currently **trust** the news they received through their smart speakers (in as far as they could trust any news).
- The vast majority of participants used the speaker to access information. They felt that speakers were better placed to provide more **inconsequential** and / or **fact-based** information, as opposed to anything more important and / or nuanced.

Concerns and risks

- When it came to risks, **privacy and data use** were the uppermost concerns (although it should be noted that this was in the context of a largely very positive attitude towards smart speakers). These concerns ranged from people feeling generally uneasy about being listened to and targeted for marketing purposes, to more defined worries about hackers and data security.
- Parental concerns, where they existed (some parents did not feel that they had cause to worry), were more likely to centre on the potential for their children to access **inappropriate content** or make **unauthorised purchases**.
- For most participants, the benefits and conveniences the smart speakers brought **outweighed** any concerns about risks; they were resigned to living with these niggles.
- Not many participants actively reduced the risks of using smart speakers. Those who did **tended to alter their behaviour** (such as turning off the speaker; not having private conversations near it; supervising children's use of it), **rather than changing privacy and parental control settings**.
- When prompted to look for / at them, some participants felt that privacy and parental control settings were **not prominent enough**, and **too hard to change**.



2. Background and approach

2.1 Background and objectives

Given the fast-paced growth in take-up of smart speakers, Ofcom wanted to commission qualitative research to further understanding of the impact of smart speakers on daily life. The research explored users' attitudes towards the devices, looking at ease of use, privacy concerns and potentially harmful experiences. The main research areas Ofcom wished to explore were:

- **Drivers for getting a smart speaker:**
 - What was the original reason participants had for getting a smart speaker and how did they choose their specific device?
- **Impact of smart speakers on daily life and behaviours:**
 - What impact has the device had on participants' lives generally? Has it made some activities easier? How extensive is their use of the device? What types of activities do they use their device for and how often?
- **Awareness / ease of use of different smart speaker functions:**
 - Are certain activities easier to do than others or do participants think the smart speaker is better suited to certain activities? How easy was it to originally set up their smart speaker?
- **Impact of smart speakers on radio and news consumption:**
 - How has the device changed participants' radio listening behaviours? How has their news consumption changed?
- **Concerns and expectations in relation to smart speakers:**
 - How do participants expectations of smart speakers vary by brand? Do they have any privacy concerns relating to their device? Do parents have concerns about their children using the smart speaker? Do they have any concerns specifically around news consumption on the device?

2.2 Approach

In order to meet the objectives, a multi-stage mixed-method research approach was designed, consisting of:

- An online forum with 100 smart speaker users, which included:
 - 1-week diary task to record at least three days of smart speaker usage
 - 2-week forum including polling, discussions and individual tasks, exploring attitudes and behaviours in relation to smart speakers.
- Online focus groups with 46 forum participants:
 - Five 2-hour groups consisting of plenary and breakout sessions with in-depth exploration of specific research areas
 - Although some of the same content was covered in all five groups, four had a particular focus:
 - Radio
 - News



- Parents
 - Smart speaker brand choice and acquisition decision making with people who own multiple devices.
- Depth interviews with 15 non-users of smart speakers:
 - 30-minute interview exploring views on and barriers to getting a smart speaker
 - 1-week task – setting up and using a smart speaker (participants were sent a Google Nest Mini or Amazon Echo Dot)
 - 30-minute follow-up interview exploring experiences and any changes in views / behaviour.

Fieldwork took place between August and October 2022.

Sample

The 100 smart speaker users were recruited to ensure a demographic and geographic mix. Minimum quotas were set to ensure a good spread of age, gender, socio-economic group and location across the UK. The sample specification was also designed to ensure the inclusion of sufficient numbers of parents (of children aged both under and over 11); people with disabilities or long-term health conditions; people from minority ethnic backgrounds; people who did not speak English as a first language; and people who self-identified as having strong regional accents. Quotas were also put in place to ensure a broad range of smart speaker usage and ownership, including use of smart speakers with screens / displays.

The 15 non-users were similarly recruited to ensure a mix of demographic and geographic representation. The sample included a quota of people on low incomes in case cost was a significant financial barrier. People who were firm rejectors of smart speakers were excluded from the research.

A full sample breakdown is provided [in the appendices](#).

As well as fitting the specific focus of the group (for example, being a parent or using the speaker for news), participants who took part in the discussion groups were selected to ensure inclusion of a broad range of smart speaker consumers, both in terms of demographics and smart speaker usage and ownership.

2.3 A note on the research report

As this is a qualitative study, this research cannot – and does not set out to be – representative of the wider population. Instead, what we aimed to do was sample participants purposively in order to highlight a diverse range of views and circumstances. When analysing the data, we were not seeking to establish prevalence – as with a quantitative survey – but rather to understand what underpinned people’s experiences. The online forum did include some polling to quickly ascertain the spread of people’s experiences and views. We report on these findings using raw numbers, rather than percentages, to underline the fact that – while true of this cohort of participants – the findings do not claim to be more widely representative.



It is worth noting that, in contrast to quantitative research (which provides a broad understanding of the population at large), qualitative research provides depth and granularity to gain insight into people's lives, thinking, and motivations. This can be used as evidence to develop hypotheses and inferences – about smart speakers in people's lives in this project. In the report, we aim to distinguish between what participants said and did, and any inferences that we – as researchers – draw from the evidence.

Throughout the report, quotes have been included to illustrate particular viewpoints. It is important to remember that the views expressed do not always represent the views of all who participated.



3. Acquisition and purchase decisions

3.1 Decision making

Reasons for purchasing a smart speaker varied across participants, but one of the most common drivers amongst those who made an active decision to acquire the device was a general sense of curiosity – people wanted to see what they were like. They wanted to experience the different functionalities and see how useful a device it might be. Some had bought their smart speaker during lockdown, when they were bored at home and looking for distraction. This often coincided with another key driver, a speaker being offered at a reduced price or on special offer, which encouraged people to make the final jump as there was little financial risk.

"During lockdown there was a good deal on for a smart speaker (£19.99) and as I was working from home I thought it would be a good thing to have to help with some tasks like setting reminders, playing music and asking questions."

25–34 year-old Woman, Smart speaker user (Google Nest), West Midlands

"I'm interested in technology and the price of my first smart speaker had been greatly reduced. I liked the idea of giving instructions to the speaker whilst doing something else."

65+ year-old Man, Smart speaker user (Google Nest), London

Some bought their device purely to use as a music speaker, not particularly thinking about the other functions that it offered.

"I originally wanted something that I could listen to music from bed and not have to hold a phone, for example, or wiggle the setting on a radio, [and] a smart speaker felt the perfect fit! Now it's just great to have for so many reasons!"

16–24 year-old Man, Smart speaker user (Google Nest), Scotland

Around a quarter of participants in the forum had not made an active decision to get a smart speaker – instead, they had received it as a gift, or it had come free with another purchase.

"I was never really interested in smart speakers. I received one free with a purchase of a ring doorbell. I am so glad I did. It has definitely enhanced my life."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), East Anglia

Overall, because participants generally had little prior knowledge of the smart speaker's capabilities and it was a low (or no) cost outlay, expectations were low, both in terms of what the speaker could do, and how much it would be used.

Amongst those who did actively choose their speaker, some made their choice based on the ability to link to other accounts (Amazon or Apple, for example) or because



they already had the specific virtual assistant (VAs)¹. However, for a lot of participants, it was the fact that the speaker was on offer or was the most affordable brand that was the main reason for their choice. Many had not heard of other brands so just went for the one they had come across, often having seen friends or family using it previously.

"I wasn't really aware of different brands or types of smart speaker at that time. I just bought the Echo Dot, the same as what my cousin had. It was a good price and I have Amazon Prime."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), West Midlands

Just over half of the participants in the forum had more than one smart speaker, with nearly all having got their additional speakers at a later point (rather than all at the same time). Most had gone for the same brand again for their additional speaker(s) because they thought this would make it easier to link them together and / or because they were happy with their original speaker brand. Those few who had chosen a different brand generally either wanted variety or had not actually chosen the brand (for example, it had come as a gift or a 'freebie').

"Maybe it makes them easier to link together? I didn't really think any others were better or much different."

16–24 year-old Woman, Smart speaker user (Amazon / Alexa), Wales

"Once I had got one Amazon we stuck to that because I thought, well that's got to be easier than adding something different in, to be able to make them interact sort of thing."

Multiple speakers focus group participant

Drivers for particular brand choices were further explored in the focus groups with people who had multiple speakers. Most people did not feel strongly about their brand and had chosen it for convenience, for example, in order to link up with their existing accounts, or because the brand that was on offer. There was little sense of particular brands being better than others – people assumed they all did the same sort of thing, although (amongst those with experience of more than one brand) there was some sense that Amazon devices were more intuitive.

"I don't think I went with Google because I had an affinity to Google. I think it was, just, saw a good price or it came free, thought let's go and get them. I'm always down for a good bargain. I have other Google products. I've got the doorbell and then the cameras, but that wasn't really the deciding factor."

Multiple speakers focus group participant

¹ A virtual assistant responds to voice commands like 'Alexa', 'Hey Google', 'Siri' or 'Hey Portal'.



When they were asked about the importance of VAs, there was general agreement among most participants that this was not a significant factor in decision making or in driving attitudes towards smart speakers.

"The virtual assistant wouldn't really matter to me either, because I'm only asking them to google something or set an alarm, like it doesn't make a huge difference to me."

Multiple speakers focus group participant

Some participants used VAs on other devices, for example on their phones or smartwatches or in the car, and there was some sense that they had started to do this more since getting used to using the VA on their smart speaker. Some felt that the VA on their smart speaker(s) worked better than VAs on other devices.

"I probably use it more on my phone than I ever did, simply because you've got into the habit of doing it with a smart speaker and it just seems to make sense when you're away from home and you've got your phone out, just asking in the same way."

Multiple speakers focus group participant

3.2 Reasons for not getting a smart speaker

Non-users were asked why they had not got a smart speaker, and the extent to which this was an active decision as opposed to something they simply had not got around to. Reasons for not having a speaker varied hugely across the 15 participants, but most common were:

- Not seeing the point:
 - Some felt that any benefits provided by a speaker could be derived from other devices (namely mobile phones), and did not understand what the speaker could offer on top of this.
- Seeing it as a luxury rather than a necessity:
 - For some, a speaker was seen as a 'nice-to-have' rather than a 'must-have' device.

"For us, it's the fact we've got lots of other devices that we use... so I haven't really felt the need to add a smart speaker."

25–34 year-old Woman, Non-user, Scotland

"If I can google something and find what it is, or type something in, then I don't see the point in trying to do it verbally."

55–64 year-old Man, Non-user, Wales

A few were concerned about being listened to (although this was more of a secondary concern rather than a main barrier) and a handful were put off by the perceived cost (both the initial outlay and running costs).



"You could be in your living room having a private conversation about something, you're never 100% sure who's there."

45–54 year-old Man, Non-user, Scotland

"I was worried that it listened into conversations... but I don't know enough about it to know whether that's an active worry or not."

35–44 year-old Woman, Non-user, Southwest England

Awareness of the functionality offered by speakers was often low amongst non-users, so many were basing their decision making on relatively vague perceptions. Some had come across smart speakers in the homes of friends or family, while others knew very little about them. The general perception was that they played music, and some knew that it was possible to ask the smart speakers for information. Only one non-user talked about being able to get reminders. For most, it was the content provided by the speakers that was 'top of mind'. A few talked about the fact that the speakers were hands-free and portable, which they thought would make them easy and convenient to use.

Prior to receiving their smart speaker as part of the research, most non-users said they were looking forward to trying it out and finding out what it could do. While a couple were nervous about setting it up, and some expressed concerns about privacy, people were, overall, curious and excited.



4. How people are using their smart speakers

4.1 Smart speaker usage

Unsurprisingly there is huge variation in how and how much people use their smart speakers.

The different ways in which the speakers were used are shown in Figure 1, and are categorised as follows:

- The provision of **content** (used by all) – music, radio, news, information, games etc.
- **Organising** the household (used by most) – timers, alarms, calendars, shopping lists etc.
- Controlling **smart** features (used by a few) – lights, heating, TVs, alarms etc.
- **Communication** in and out of the house (used by a handful) – calls, messages, drop-ins, announcements etc.

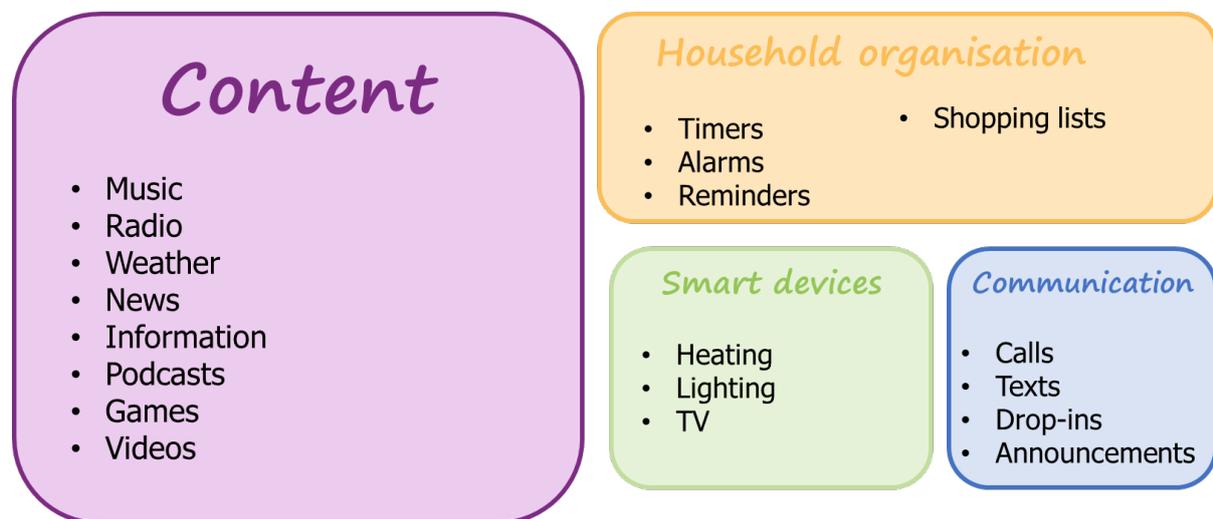


Figure 1: Categories of smart speaker functions used by participants

Although a few people had initially purchased their speaker to use it to control their smart devices, most had first bought it for the content provision it offered, that is, for its primary function as a speaker. Some never progressed beyond these initial uses, but most participants embraced the different functionalities. Many were struck by how much more could be done with the speaker than they had realised (often this realisation only came about as a result of taking part in the research) and wanted to use their device more than they had been doing.

As part of the diary exercise, participants were asked to record what they used their smart speaker for each day (and who in the household used it). Figure 2 shows the number of households that used the speaker for different activities at least once over the diary period ([click here for this information in table form](#)). Overall, speakers were



most commonly used for listening to music via streaming services, getting the weather forecast and as an alarm or reminder².

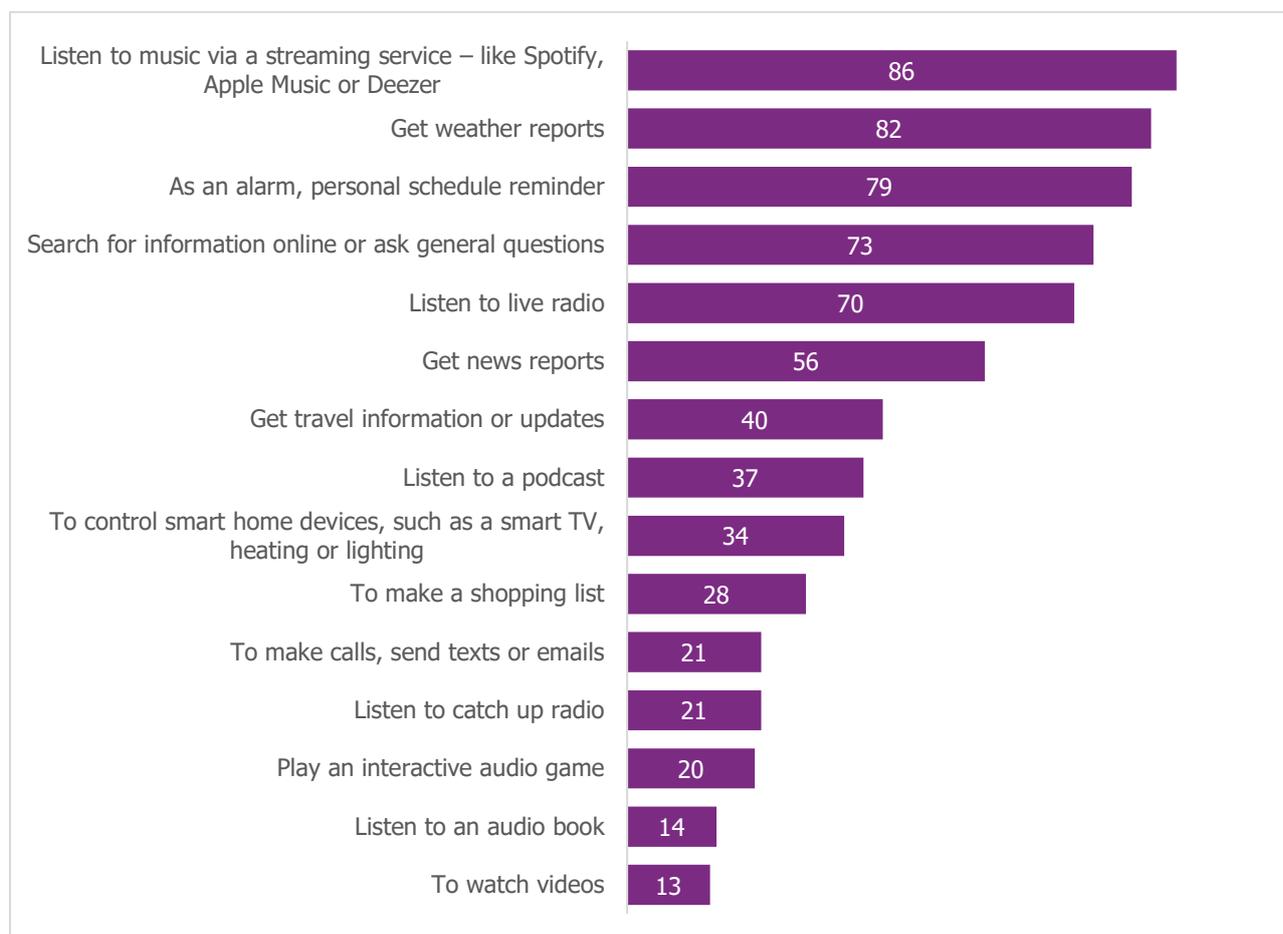


Figure 2: Number of participants indicating use of their smart speaker for a particular activity by their household during the diary exercise (Base: 100 forum participants)

Changes in use over time

Forum participants were asked how much their use of their smart speaker(s) had changed over time. Amongst those who were using it more than they had expected and / or more than they had used it initially (around a third), a large proportion said that it was because they were now using a wider range of features. For example, they had bought it for one purpose and found themselves using it for something else, or they had discovered functions offered by the speaker that they had not initially been aware of, or confident in using. Several people mentioned that they were pleasantly surprised at how useful they found it as a hands-free help in the kitchen – for example, using it as a timer, for converting measurements, or for keeping them entertained.

² As noted above, as a qualitative research study, the sample is not fully representative of the UK population. Ofcom’s Technology Tracker is a large-scale quantitative tracking survey which provides information relating to smart speaker use and ownership.



"At the beginning, it was just a smart version of radio. Great in the kitchen while cooking and doing chores. Later found out about lots of other useful benefits – e.g. reminder, alarm, phone call etc."

25–34 year-old Woman, Smart speaker user (Google Nest), Southwest England

"I would say I've realised that the smart speaker has more functions and can do more than I thought. This has added to my enjoyment and [inclination] to search for more and see if it can fulfil more of my aspirations!"

16–24 year-old Man, Smart speaker user (Google Nest), Scotland

Those who used their device less than they had originally or less than they had anticipated (around a quarter) often felt that the novelty factor had simply worn off. A small handful were using it less because of concerns about privacy.

"I think at first it's a novelty and you're asking questions all the time, especially my husband who thought his purpose in life was to catch it out and argue with it! But it seems to level out to what we use now, which is general questions, weather, music, games etc."

55–64 year-old Woman, Smart speaker user (Amazon / Alexa), West Midlands

Some participants talked about how becoming accustomed to using voice activation on their smart speaker(s) had resulted in them using voice activation more with smartphones, smart TVs and other devices.

"A few years back I wouldn't have thought I would have been using voice-activated systems, because I was very [much]... just stick with what I've got. But now I like to try all the different ones and as many devices as possible."

65+ Man, Smart speaker user (Google Nest), London

4.2 The smart speaker's role in the household

The way participants perceived their smart speakers ranged from those who saw them very much as a voice-activated 'tool' to those who had a much closer 'relationship', as show in Figure 3.

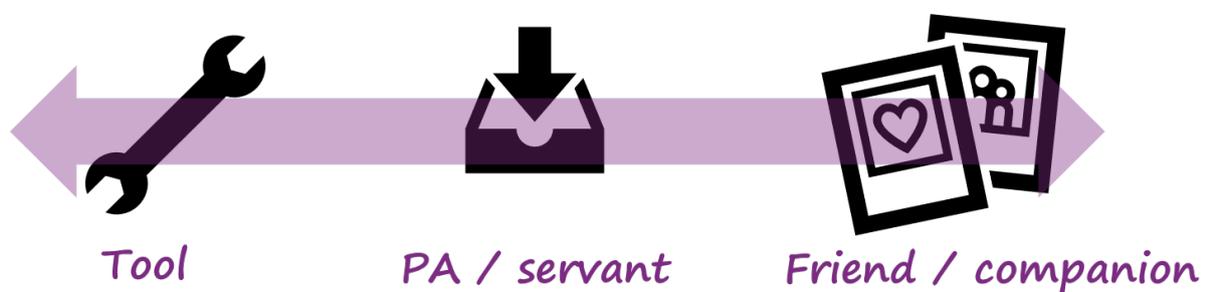


Figure 3: Spectrum of views of smart speaker's role in the household

For those who saw the speaker as a **tool**, there was no difference between it and other types of tech such as phones and tablets, beyond the fact that it responded to a voice command rather than typing or pressing a button. At the other end of the



spectrum were those who described their speaker as being like a **companion**, for example helping people living alone to feel less lonely, or providing children with entertainment and fun. Somewhere in the middle were those who humanised the speaker (see further details below), but did not feel affectionate towards it – it was more of a **servant** (albeit, occasionally badly behaved) than a helpful friend.

"It's a bit of machinery. I wouldn't thank my hacksaw for going through a bit of wood. I wouldn't thank a screwdriver for screwing it in."

25–34 year-old Man, Smart speaker user (Google Nest), Yorkshire and the Humber

"It's like my own personal assistant that doesn't get in a huff if I fail to say please."

55–64 year-old Woman, Smart speaker user (Google Nest), Southwest England

Notably, in households of more than one person, the speaker was often considered a communal rather than a personal device (except where children had them in bedrooms). This differentiates it from a personal smartphone or tablet.

It was also apparent that a large proportion of participants treated their smart speakers and other tech devices differently in that they often anthropomorphised the former. Most commonly, when talking about their smart speakers, they referred to them as 'he' or 'she'. However, there was also further evidence of people attributing human characteristics to their smart speakers, or relating to them in a more human way by, for example:

- Asking questions in a conversational manner (rather than issuing commands);
- Reading 'intent' or 'personality' into responses and mistakes;
- Saying 'please' and 'thank you' when giving commands (either from habit or to model good behaviour to children);
- Finding mistakes and errors funny / attributing a sense of humour to their smart speakers;
- Taking care not to 'offend' their smart speakers by rejecting its suggestions.

"It sometimes has a tendency to repeat my command back to me and say that it doesn't recognise it... This is frustrating, as it repeats what I've said back to me. I know that it has heard my command correctly and is just frankly 'choosing' to be difficult."

16–24 year-old Man, Smart speaker user (Amazon / Alexa), Yorkshire and the Humber

4.3 Types of smart speaker users

Over the course of the research, we identified a number of different types of smart speaker users, based on how much they used their speaker, what they used it for, and how they felt about its role in their life. While there is often overlap between the different types of users – and some people move from one type to another over the



course of their ownership – these broadly represent the different ways in which the speaker was used by our research participants.

There were three broad typologies, in order of increasing frequency and range of speaker usage: those for whom it was ‘just a speaker’; those for whom it was ‘a speaker with added fun and functions’; and those for whom the speaker was ‘a control hub’. These are shown in Figure 4 and then described in turn, and illustrated with case studies of participants from the research who fit these typologies.

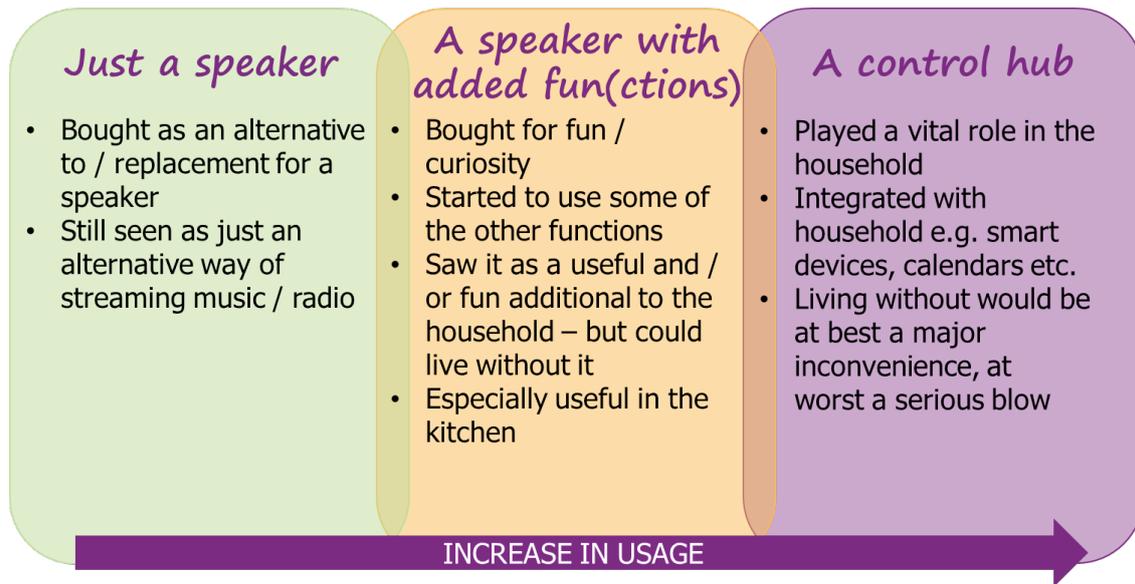


Figure 4: Three types of smart speaker user

‘Just a speaker’

These participants used their speaker as a voice-activated alternative to a Bluetooth speaker. They did not really use many other functions and had a limited ‘relationship’ with their speaker. They felt that their speaker had a limited impact on their lives, and that they would easily replace it with other devices if they no longer had one.

Case study: Dan

Dan is in his early 20s and lives with friends. He has a single Amazon Echo speaker that he generally only uses for listening to radio and music. He sees it as an alternative to a Bluetooth speaker, and thinks it is useful to be able to control it by voice when he has his hands full, but hasn’t used many other features.

“The best thing about having a smart speaker is being able to control music without having to touch my phone etc, with wet hands while I’m in the kitchen.”

‘A speaker with added fun(ctions)’

These participants (the largest group in our sample) primarily had their speaker for music and radio, but also used a range of different functions. For most, this had evolved over time, as they learnt more about what it could do – for example, helping in the kitchen with recipes and timers, setting alarms and reminders, games or quizzes.



Some used it for help with parenting, using the timers for bedtime, or the 'drop-in' function to tell children to get up /come to mealtimes.

Case study: Chantelle

Chantelle is a mum of two who works from home. She uses the speaker to listen to music and radio while at home, to get information, and for reminders. Alexa has become part of her daily routine – she uses the 'start my day' function every morning. She likes to have some fun with her speaker too, for example asking it for suggestions as to what to wear that day.

"I have managed to shave time in the mornings now. Instead of relying on local news, which only gets aired once an hour on TV. I can get more in-depth detail on weather, news and travel with my smart speaker. The first 5 mins of my mornings are me with a coffee, while listening to Alexa."

Case study: Steve

Steve is in his late 60s and has a number of Amazon and Google brand smart speakers, including one with a screen. He originally purchased a speaker because he liked technology and was interested to try out the voice activation. He has since started using it for a variety of different functions including music, information and lists, but a key benefit for him is the discovery that he can use his speakers to help with spelling.

"My smart speaker is brilliant support technology for me as a dyslexic person. I ask my speaker to spell words that I don't know how to spell and would not be able to google."

The 'speaker with added fun(ctions)' group were distinct from the 'control hub' group in that these people were not using the device for integration with smart systems. In addition, they felt they would miss the added functions and convenience provided by their smart speaker, but would make do with other devices if they did not have one any longer.

'A control hub'

A notable minority of participants were using their speakers as a central control mechanism for their household and lives (and felt calling it a 'speaker' did not reflect its function at all). There were different manifestations of this.

Firstly, some used their smart speakers as a 'control hub' to **integrate smart technology** in their homes. They linked up their lighting, heating, doorbells and home security systems and operated these systems via voice commands channelled through their speakers.

Case study: Sam

Sam is in his late 20s and lives with his partner. He has four Amazon smart speakers. He loves new technology, and has smart technology throughout the house. He uses his smart speakers as a central control hub to operate lights, home security and heating. Although he originally bought his first speaker for music, having bought a



number of smart plugs, he now sees the devices less as speakers, and more as control hubs to automate his daily routine.

"Began and ended the day by using the smart speaker voice commands to switch on and off the bedside lamps. Had control of the fans throughout the night without having to get out of bed by using voice again, very convenient. Added new voice commands to switch on and off the lamps without having to use language associated with the evening."

Secondly, some used smart speakers to **manage a busy household**: they had multiple speakers throughout the house and used them to manage family life throughout the day. Their speakers were their alarm and woke up their children; reminded them and others what they had on that day (with reminders through the day); broadcast messages / drop-ins to different householders (asking family members questions; 'dinner-time' announcements; chats between family members etc.); created shopping lists. They were also used for entertainment and information.

Case study: Rachel

Rachel is a working mum in her 40s with four children aged 10 to 16. She has multiple smart speakers, with devices in each of her children's bedrooms as well as in communal areas. In addition to entertainment purposes (such as music and games) she relies heavily on the smart speakers for managing the household – for example, using it for waking her children, setting reminders for her and others in the family, managing shopping lists and diary appointments, and using the drop-in / announcement functions. She felt she would be lost without her smart speakers.

"My smart speaker appeals to my need to be organised in a busy household. I have four children in different schools with multiple after-school activities. I have a paper diary for the family, but all reminders and events are uploaded to the smart speakers as a tool to ensure everyone knows what is happening. I love that I can add things from the app on my phone to each individual child's device as well."

Thirdly, a couple of participants with mobility difficulties and disabilities used their smart speakers as **assistive and facilitative technology**.

Case study: Michael

Michael is in his 30s and lives with his parents. He is a wheelchair user and is reliant on live-in carers. He has a single smart speaker in his room. For him, the voice-activated technology and multi-functional nature of the device facilitate his independence by helping with everyday tasks. For example, it wakes him up, it enables him to engage with the world (through news, radio, podcasts, music etc.), it operates smart switches for lights / devices, and it allows him to add to the family shopping list. He describes the speaker as a 'lifeline'.

"From my overarching software for controlling my environmental controls around the home (lights phone etcetera) to voice command, and everything in between, it is vital for someone like myself and many others in the disability



community... to maintain their overarching independence... thus maintaining a sense of purpose."

For all these participants who saw their smart speakers as a 'control hub', their speakers were central to day-to-day life, and – for some – a key component of maintaining independence. Losing their speaker would be a major blow, not just an inconvenience.



said that they would keep their smart speaker (one remained unconvinced by its usefulness, and the other did not find it user-friendly). They generally felt that it had surpassed their expectations in that it was easier to set up than they had anticipated, and offered more functionality than they had previously realised.

"I really didn't know it could do half the things. I thought it would just be like a basic Wikipedia thing. I didn't know it played music. I didn't know it set reminders."

45–54 year-old Man, Non-user, Scotland

When recording their experiences as part of the diary exercise in the forum, the vast majority of participants who were existing users rated their speaker(s) highly. Well over half rated their speaker as 9 or 10 out of 10, and only a handful gave a rating of 6 or lower. This was despite the fact that many reported problems with their speaker over this time period (for example, it not hearing or misunderstanding commands). This further illustrates the relatively low expectations people have of their speakers – that is, even when they do not function perfectly, people are generally positive.

5.2 Benefits of smart speakers

Participants were able to identify a wide range of benefits and advantages of smart speakers, and these are explored in this section.

Convenience

For most participants, convenience was the smart speaker's key selling point. People appreciated the fact that it allowed them to do all sorts of different things, from setting alarms and reminders to getting weather and travel updates. It was felt to make life just that little bit easier, because it allowed tasks to be completed more quickly.

"The best thing is that the smart speaker is available quickly and saves searching for CDs. It is an instant response to requests for information, jokes or music. News and weather are immediately available if you want summaries. You can find information quickly."

45–54 year-old Woman, Smart speaker user (Amazon / Alexa), Wales

Voice-activated / hands-free

Related to this convenience factor, the fact that people were able to control their devices using their voices was seen as hugely beneficial. Voice activation was seen as being easier and more natural (than typing and using screens), and enabled participants to give commands or operate their speaker while doing something else. This hands-free functionality was seen to be particularly useful in the kitchen – people liked the fact that they could, for example, listen to the radio when doing the washing up, or be given step-by-step instructions for a recipe as they were making it.

"The best thing about having my smart speaker(s), is that I am able to ask things hands-free. For example, when I am cooking in the kitchen and my hands are



dirty or my phone is too far away, I am able to ask my smart speaker to perform tasks that I would tend to use my phone for."

16–24 year-old Woman, Smart speaker user (Apple), Southwest England

The voice activation also meant participants could reduce their screen time.

Music

Many participants had originally purchased their smart speaker primarily as a device for listening to music, and still saw this as its main benefit. They liked the fact that they could play whatever they wanted, with access to a huge range of music and without having to rely on CDs, and that the speaker's portability allowed them to listen to music (be that streamed or via the radio) more easily. They also liked being able to easily switch tracks without having to get up to change radio stations or CDs.

People were also impressed with the sound quality of the speakers; this was something that non-users in particular remarked upon and were pleasantly surprised by.

"The best thing is being able to ask for and play music on demand and quickly change channels. They take up little space and the sound quality on the Google Home is decent for the speaker size and price I paid."

35–44 year-old Woman, Smart speaker user (Google Nest), Northwest England

Wide range of functions

Many participants remarked on the range of things they could do on their smart speaker – and that there was so much more to it than its ability to play music. People had often purchased it for one function (usually as a speaker), and found themselves using it in many different ways.

"I'm still delighted with the speaker. It does everything that it was bought for – to be my main source of music. I hadn't however realised that I could get other things on the speaker such as podcasts, YouTube recordings etc. as I thought it was for sole Spotify usage and so I hadn't even thought of exploring or connecting to other things."

55–64 year-old Woman, Smart speaker user (Boom), West Midlands

"The speakers were originally bought as a bit of a novelty and on special offer, but we soon added them to the kids' bedrooms as could see the increasing benefits for schoolwork and entertainment."

45–54 year-old Man, Smart speaker user (Google Nest), East Midlands

Household management

A number of people found that having a smart speaker to be useful in the running of the household. They were able to use the different functions to keep track of things like appointments and shopping requirements.

They could also use the speaker to manage and control different smart devices in the home, such as those linked to lighting and heating.



"Best thing is being able to change music / radio when washing up. Being able to turn lights on when I enter the house rather than look for hall light in the dark – actually it is all linked, turn on light, TV. To run the routine 'goodnight', to turn off TV, lamps, office and turn on a bedroom light."

55–64 year-old Man, Smart speaker user (Google Nest), Northwest England

An alternative to other devices

Some participants liked their smart speakers as they felt that it meant that they were less likely to use other tech devices. They most commonly referred to their phones – for example, being able to get information from their speaker meant they could avoid additional screen time, and / or would be less likely to get distracted. Some also talked about the fact that the speaker encouraged them to listen to more music rather than watch TV.

"I didn't even have the TV on. I just had the Alexa on in the room. It was just nice to have quiet and, you know, I put my phone into the living room on silent so I wasn't going to be disturbed. So whenever you're on your [listening to music on your phone] and people ring and it just like distracts you."

35–44 year-old Woman, Non-user, Northern Ireland

Parents particularly liked the fact that using smart speakers for entertainment was a way of helping to keep their children away from screens.

Companionship

A number of participants talked about the fact that having a speaker provided them with a type of company, particularly if they lived alone or were at home by themselves for long periods of time. Some felt that they were good for combatting loneliness and liked the fact that they could talk to their speakers.

"Living alone it's like having a friend in the house."

55–64 year-old Man, Smart speaker user (Amazon / Alexa), West Midlands

"When there is nobody here, I've got a companion to speak to."

45–54 year-old Man, Non-user, Scotland

Supporting and enabling people with a disability

While not something that came up with the majority, some individuals talked about specific ways in which their speaker had been beneficial in relation to physical or neurological disabilities. For example, people with mobility issues were able to do things like change radio stations or get information without having to move; people with visual impairments could get information without having to use a screen; people with dyslexia could find out the spellings of different words; children with delayed speech development or speech impairments could interact and practise speech with their smart speakers. Some people with disabilities said that a smart speaker had had a significant impact on their lives, enabling greater independence and helping them manage (and even improve) their conditions and abilities.



"Since I volunteered for this research, I have been diagnosed with macular degeneration in my left eye and probably starting in my right eye. Therefore, coincidentally, I now have a very strong motivation to find out how to use verbal aids such as Alexa (and those on iPhone) as AMD can only be slowed down, not cured, at present. So, my use, which used to be mainly music and weather forecast, with occasional news items will be heavier than usual."

65+ year-old Woman, Smart speaker user (Amazon / Alexa), Northwest England

"It's silly things like my computer is on the other side of the room, or even upstairs, and I need to access information quickly, I just ask Alexa. It's a big thing for me [as someone with limited mobility] to move room to room and if my life is made easier by having this to do things for me then it's perhaps more important than I initially thought."

55–64 year-old Woman, Smart speaker user (Amazon / Alexa), West Midlands

"My eight-year-old has ASD [Autism Spectrum Disorder] and he had such major delay with speech, he found lots of his confidence mostly asking 'Hey Alexa' like 1000 × in a day. At the time of purchase, I had no idea it would have such impact. Aside the confidence with speech, it actually helped me realise my son wasn't deaf even before his audiology appointments as he had selective hearing and most times won't mind you when you said his name or anything to him. With Alexa, he was always fascinated by it, responded back and I could tell even before his assessment he could hear which was later confirmed by his audiologist."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), London

"For me, it's the multifaceted nature of... my smart speaker, with the capabilities that were there... It really is the difference between maintaining independence around the house... my Mum or Dad, or [carers], don't have to keep getting up every five minutes. Like this evening before this meeting, I was able to just ask it to put these lights on. Years ago, before I had that facility... I would have had to ask people to do things manually, whether it be even putting alarms on for knowing when carers are coming in to get me up etc. So it really is for me that multifaceted approach."

25–34 year-old Man, Smart speaker user (Amazon / Alexa), Southwest England

Home security

A small number of participants had linked their smart speaker to security cameras or smart doorbells – and one participant had managed to stop a burglary during the fieldwork period, thanks to being alerted by his smart speaker.

"Interestingly my smart speaker alerted me to a burglar at my door last night who I was able to chase away before calling the police."

55–64 year-old Man, Smart speaker user (Amazon / Alexa), Northeast England



5.3 Drawbacks and frustrations of smart speakers

Most people identified some **downsides or drawbacks** of their smart speakers – although often these were frustrations with how the speakers worked (or failed to work) rather than with the concept of smart speakers per se. Some of the main issues identified are discussed in this section.

Misunderstanding or not understanding commands

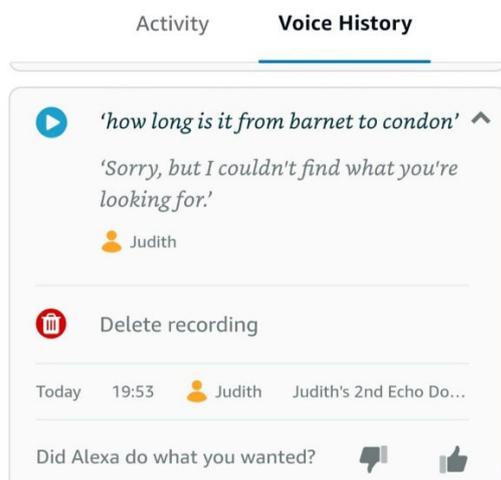


Image 1: Participant screenshot of smart speaker not understanding a command

The speaker not understanding or hearing requests was by far the most common complaint amongst participants. Participants found it frustrating when they had to repeat themselves or change the way they gave a command because the speaker had started to do something different or had 'ignored' them altogether.

"I do feel when asking my speaker to play a specific song, it struggles with understanding me which is annoying and [I] end up getting so frustrated I go and search for the song myself on my phone."

16–24 year-old Woman, Smart speaker user (Amazon / Alexa), London

Several participants said that their smart speaker had more problems understanding certain household members. For example, a sizeable minority of participants said their **regional or international accents** (or those of family members) meant they struggled with their smart speakers (it should be noted that a subset of participants were recruited on the basis of self-identifying as having a strong accent). For some, this was a regular problem. Some also said that family members with strong accents had given up using the speaker because they could not make themselves understood.

"I found the speaker not great with my Indian accent. I even tried changing the settings in Google. Interestingly, while it is now speaking with an Indian accent by itself, it is not so responsive with my Indian accent. Though it is saying it is learning but I have not seen any changes so far."

25–34 year-old Woman, Smart speaker user (Google Nest), Southwest England

Several parents said their smart speaker had problems understanding **children**, and others said smart speakers had issues with certain **speech patterns, pitches and volumes** – for example, some said that they had problems making their smart speaker understand because they were softly spoken. One woman said she had more



issues because she had a female voice (a 2019 YouGov study³ showed that women were more likely than men to be misunderstood by smart speakers). Some said their speaker struggled to understand if people spoke too fast, were too far away or did not leave a gap between the 'wake' word and the command / request. Those who used a conversational tone with their smart speakers felt this contributed to misunderstandings.

"I'm sorry, I can't find the answer to that question.' 'Sorry, I'm having trouble understanding you.' I get these two responses at least once a day when using it. I think this might be because when I ask a question I am generally conversational, i.e. 'Alexa, could you play BBC Radio 4 please'. It would probably find it easier to understand if I said 'Alexa, BBC Radio 4'."

55–64 year-old Woman, Smart speaker user (Sonos), West Midlands

A couple of participants said that some of their family members struggled with smart speakers because they had **speech impairments** (a stammer or different speech patterns), and that the smart speaker did not 'listen' for long enough, or was unable to interpret commands.

Inaccurate / wrong results

Accuracy was the second most frequently mentioned theme. The issue of song requests cropped up here, with smart speakers often playing the wrong song or playlist. Participants also said that smart speakers can give the wrong answer to information requests, for example, giving a response that is totally unrelated to their question, or for the wrong area, or out of date. A couple of participants also said that their smart speaker had called or messaged the wrong person in response to a request to contact someone. Some steered clear of this function as a result of past errors or for fear of their smart speaker contacting the wrong person.

"Weather wasn't what it had claimed the day before so I asked it again and it told me something completely different so that was frustrating."

16–24 year-old Man, Smart speaker user (Amazon / Alexa), Yorkshire and the Humber

Activating at random / offering unprompted responses

Further exacerbating their feeling of being listened to, a number of participants talked about the fact that their speaker sometimes started talking, even when the wake word had not been used. For some, this was only an occasional occurrence, but others said that it happened fairly often. Examples of unprompted activation included the following:

- Several participants said their smart speaker activated when the television was on, sometimes, but more often not, because words like 'Alexa' or 'Google' were used.

³ YouGov, 11–15 April 2019; reported [here](#).



- Many said that their speakers activated at random during conversations.
- One participant said that they had had to switch off the message or call function because their smart speaker kept calling people mentioned in conversations.

For some this was purely an irritation (and a few dismissed unprompted interruptions as one of the amusing quirks of owning a smart speaker) but for several participants these unprompted responses were an uncomfortable reminder that their smart speaker was 'always listening' and made them question the device security.

"I have heard it butt into a conversation, more than once, and that gives me concern that it is listening the whole time and recording everything I say – which is a creepy thought."

25–34 year-old Person, Smart speaker user (Amazon / Alexa), Scotland

Other frustrations

Some frustrations were mentioned by a smaller number of participants:

- The smart speaker ignoring commands – Some participants said they sometimes found it hard to activate their smart speakers using the 'wake' word, or that the device did not always respond to their 'stop' commands.
- The cost of running smart speakers – Although most felt that the costs were minimal in comparison to other household appliances, some were conscious of the amount of energy the speaker used, and tried to reduce or limit their consumption as a result.
- Over-reliance on smart speakers – Some participants were conscious of their reliance on their speakers and concerned that they were becoming overly dependent on them. These participants felt that speakers could make people lazy, and that being too reliant on them could be problematic if they stopped working for any reason or there was no internet connection.

Managing frustrations

Few participants viewed the identified frustrations as barriers to using their smart speakers. Most adjusted their behaviour by, for example, repeating commands more slowly or more loudly; pausing then trying again; shouting; rephrasing; and switching the speaker off then on again.

"I learn and adapt to how my speaker would want a question to be put across. I keep my sentences short and concise."

35–44 year-old Man, Smart speaker user (Google Nest), Scotland

However, some said they were using smart speakers less or for fewer functions because of difficulties they had experienced. These respondents reported, for example:

- Using it less overall;
- Giving up requesting information, and using their phone instead;
- No longer using it for sending messages / making calls.



Most people, though, were prepared to accept some minor irritations and / or slight niggles for the convenience the speakers provided. Similarly, when it came to the content provided by the speakers, people were prepared to trade a certain lack of depth for accessibility and immediacy, given the quick and easy access to information and entertainment.



6. Smart speaker features in detail

6.1 Set-up, settings and personalisation

Set-up

Most forum participants reported no problems when setting up their speaker, although a few recalled minor issues connecting it to the internet or linking to different accounts.

"I thought the speaker was quite easy to set up in terms of putting myself as a main occupant and add in the wi-fi. However, I did find it hard to add my Apple account to the smart speaker as I had to watch a few YouTube videos to figure out how to work it."

25–34 year-old Woman, Smart speaker user (Apple), London

Quite a few people sought help from family members when setting their speakers up.

"It was hilarious. My son and I were trying to get it set up and kept saying 'Hey Google' for about 10 times until son no. 2 [said] 'You effing idiots. It's Alexa!'"

55–64 year-old Woman, Smart speaker user (Amazon / Alexa), Scotland

Non-users (who were more easily able to recall their experiences, given their recency), generally found the set-up process relatively straightforward and tended to be pleasantly surprised.

"I think the whole process, even downloading the app, you just download the app, then you connect it to Bluetooth and you just put it in and just really it was so easy... And I just didn't expect that I don't think."

16–24 year-old Woman, Non-user, Yorkshire and the Humber

Settings

Only a handful of participants said that they had changed any of the default settings on their smart speaker when they first set it up. These participants made a range of different changes, with the most common relating to the equaliser settings or the music provider. However, most said they did not make changes, or that they simply could not remember.

Most participants admitted that they did not know much or anything about the settings on their smart speaker. Those that did know anything tended to talk about the volume settings and the ability to connect to different accounts and devices. A handful of people felt confident in their knowledge about the settings for their speakers, but they were very much in the minority.

"No idea [about settings]! It's plugged in and it works, that's about all I know I'm afraid!!"

45–54 year-old Woman, Smart speaker user (Google Nest), Southeast England



"I think I know a good amount, or the amount I feel like I need to know. Because I could set them up (Alexa) using an app and existing Amazon account it made it easier and familiar. I am always cautious with security and privacy settings."

35–44 year-old Man, Smart speaker user (Google Nest), Northwest England

When they were asked, most people thought it was possible to change the settings (such as privacy, parental controls and volume / voice type preferences) on smart speakers. A minority had actually changed the settings since the original set-up, but most had never tried.

In the online forum, participants were directed to review the settings on their smart speakers. Most people were happy with the settings as they stood and did not want to make changes. However, in the focus groups, when asked about their main takeaways from the research, participants often mentioned settings, and particularly their prior lack of awareness as to what was possible. Some felt that it should be easier or more intuitive to change privacy settings (and that other settings such as personalisation were comparatively more straightforward to put in place). It was also noted that, while some settings could be changed via voice commands, others required users to use the app, which was an additional hurdle.

"When I went into the settings, I noticed it was recording and I was a bit surprised by that. So... I switched off the recordings and deleted them, because I just feel a bit uneasy with that to be honest."

Parents focus group participant

Tailoring and personalisation

There was a mixed response amongst participants when it came to the extent to which they wanted their speakers to personalise or tailor their content. Some saw this as a useful feature that would simply improve their experience of using the device, while others found it unsettling.

"It said, 'Would you like me to turn it [the radio] up for you before you wake up?' because he knows I wake up half six. So it's like it can come on not too loud. I'm like, 'Yes please.'... I really love that. Maybe some people might not really appreciate it, but for me I kind of feel like it's really learning your routine, getting to be a part of what you're doing. Again, it can get a bit scary around the fact that it knows too much, but I feel like it's making my life easy."

Radio focus group participant

"Alexa tried to gather more information about me, supposedly to be better able to help me. This is a bit spooky to be honest, it's a bit intrusive and a bit 'pushy' for normal conversation – I don't want to be best friends with a bit of technology, nor do I entirely trust the corporations behind it."

65+ year-old Woman, Smart speaker user (Amazon / Alexa), Northwest England



Similarly, there was a range of views when it came to the smart speaker making suggestions to people. Some really appreciated the idea of the speaker giving them new content that they might not have discovered otherwise (they saw this as similar to Amazon suggestions). However, others preferred to keep control themselves – they wanted to decide on their content, rather than have their speaker choose for them, and sometimes they found it frustrating when the speaker made suggestions they were not interested in or did not have time for.

"I would say the best thing about having my smart speaker is being able to use it to discover new songs as sometimes I will just request for my speaker to play music and through it I learn about new artists. I would say it is quite good in giving me inspiration for new meals to cook as sometimes I lack creativity to what I can make."

16–24 year-old Woman, Smart speaker user (Amazon / Alexa), London

"Personally, I really dislike that, when it says, 'Oh try this', or suggests things, I hate it. Call me a control freak, I would rather do the things I want to do."

Radio focus group participant

6.2 Radio on smart speakers



Image 2: Participant photo of smart speaker playing radio

Around two thirds of the forum participants used their smart speaker to listen to the radio⁴, and most of those people said that they listened to the radio more since getting a smart speaker. They found it easier to listen via their smart speaker – for example, they could simply command the device to play a particular station, rather than having to physically tune in.

Around half reported listening to radio stations or programmes that they had not listened to before – they felt that the speakers offered access to different stations that they had not been able to easily tune into previously, and some had discovered new stations that their speaker had suggested to them. A few also mentioned the fact that their smart speaker offered a better signal than they were able to get in the car or sometimes in the area they lived.

Even in the short time that they had been using the smart speaker, many non-users found that they were listening to the radio more than they had done previously.

⁴ As noted above, as a qualitative research study, the sample is not fully representative of the UK population. Ofcom's Technology Tracker is a large-scale quantitative tracking survey which provides information relating to smart speaker use and ownership.



It was also considered easier to switch between different stations because they were using a voice activated smart speaker which did not require manual tuning. Many of those who listened to the radio in the car compared the pre-set stations to the wider range they were able to access through their speaker(s).

"I listen to more variety of stations as it is easier to select them. My old radio was difficult to tune in to different channels."

35–44 year-old Woman, Smart speaker user (Google Nest), Northwest England

"Sometimes I will not be specific in asking Alexa to go to a specific radio station but will instead ask for Alexa to play something from the radio so that helps me to discover new radio stations."

16–24 year-old Woman, Smart speaker user (Amazon / Alexa), London

Around half of respondents using their speaker(s) as a radio had actually stopped using or even got rid of other devices such as physical radio sets since getting the smart speaker. Some bought their smart speaker specifically as a replacement for a radio because of the audio quality.

"We used to have two radios in the bedroom because we love this station, LBC, and it was quite hard to tune in on the old radio, and then the clock radio that we used to have was set to our local station here. So now we don't have either of those and we just have Alexa."

Radio focus group participant

A few participants noted that they were not always clear if they were listening to the radio or to playlists provided by their speaker. This suggests some blurring of boundaries between different functions when it came to the content accessed via the speakers, as people did not always make conscious decisions to switch.

"She often said, 'Oh that particular song isn't available but here is a station based on your music.'... It may be catch-up music but it may be live [radio] and I'm not sure."

35–44 year-old Woman, Non-user, Southwest England

Overall, people did not see the smart speaker as limiting their access to radio; rather it allowed them or made it easier for them to listen to more niche radio stations (including both international and local stations, and stations with a focus on certain genres of music) than they had been able to before.

"I've been using an internet-only radio station that I managed to find, called Radio Paraguay. I recommend it to everyone. And it just gives a really good mix of sort of new music and everything. That isn't on DAB. You could have found it on your laptop but who sits there with their laptop playing music all day?"

Radio focus group participant



A few participants had specific frustrations when it came to accessing BBC radio stations. Some mentioned that it was a hassle to log into BBC Sounds, and that this was one hurdle more than for other radio stations, which was off-putting for some.

Changing the radio settings

Although many of those using their smart speaker to listen to the radio said that they were familiar with the settings for the radio, a significant proportion said they were either uncertain or unfamiliar. In spite of this, nearly all participants said that they had been able to find and listen to all the radio stations they wanted to or normally did via their smart speaker.

In the online forum, participants were given a task to complete in order to ascertain the extent to which people found the settings difficult to navigate on their smart speakers. They were asked to see if they could figure out how to play a more unusual radio station – for example, a local station or a station from a different country – or challenge it to play something unusual or different from their normal radio listening. Although most people said they found this exercise quite or very easy, a notable minority of participants struggled, with some not being able to get their speaker to play their choice of radio station at all.

"It wouldn't let me play a local radio station (local to me when I'm home visiting family). I could choose it on my phone and play it through the smart speaker but I couldn't ask the smart speaker to play it."

16–24 year-old Man, Smart speaker user (Google Nest), Scotland

Participants were then asked how important it was to be able to choose specific radio stations on their smart speaker. The vast majority said that this was very or quite important. They felt that it was important that the speaker plays their choice, and many were resistant to their speaker playing alternatives that they had not expressly asked for.

"I like certain types of music and I like them to be played through the radio. If I cannot access this through my smart speaker, what is the point in having one?"

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), East Anglia

In the focus groups, participants felt that the vast range of radio stations available through a smart speaker should be better known. They felt that it was a key benefit of smart speakers, and as such they wanted awareness to be raised of both the fact that it was possible to access so many different stations (for example, by providing a list of the different stations available) and how to do so (for example, by changing the settings to allow international radio stations).

One focus group were asked what they understood and assumed about the regulation of radio content via smart speakers. Most had not consciously considered this before, but when asked directly, participants had differing assumptions about the restrictions in place. Some assumed that UK radio played via their smart speaker would be subject



to the same regulations as broadcast radio services (particularly via well-known broadcasters such as the BBC). However, others saw radio via smart speakers – particularly non-UK stations – as similar to the internet and assumed that it would not currently be subject to regulation. This view was notable amongst those who listened to a wider variety and international radio stations. Instead, they thought that the onus would be on the user to control output (for example, by putting settings in place to avoid explicit lyrics).

"If you're listening to BBC on your radio, it's the same content you're getting. I think [participant] did say the transmission is a bit slow, obviously because we are getting it through a different [format]... But I think the content seems to be the same."

"Well, the smart speaker is basically the internet isn't it, right? So how many rules are on our laptop? Not many, right?"

Radio focus group discussion between participants

6.3 News on smart speakers

Just over half of participants said they accessed news via their smart speaker. About half of participants said they consumed around the same amount of news as they had before getting a smart speaker, although over a third said they consumed more than they had previously.

Those who said they were consuming more news tended to ask their speaker for updates or headlines in addition to getting the news from other sources as well. Some in this group said that they were using other news sources such as TV, newspapers, radio, or their smartphone, tablet or computer less since getting their smart speaker(s). For them, it was much easier to get a condensed version of the news through a smart speaker.

However, similar numbers of participants said there was no change in their news consumption from other sources. Many of these participants said they chose to use their smart speaker to provide them with brief updates, but to use other sources for more in-depth coverage.

"My news consumption has changed in that I get more news than before and I hear about a wider spread of areas than what I heard about before. I probably get less detail but more headlines and more global than just domestic news."

16–24 year-old Man, Smart speaker user (Google Nest), Scotland

When asked, most participants considered the news they received from their smart speaker to be **trustworthy**. They felt that it came from similar sources as the news they got via the radio or TV (for example, the BBC or Sky), although some had expressly asked their speaker to provide news from a specific outlet. Although some were unsure as to where the news provided by their speaker came from, many highlighted the fact that their speaker told them the source, or were often confident



that it came from the BBC (sometimes because that was what they asked for). A few participants had not previously been aware until taking part in the research.

"I assume it's main places like BBC but then sometimes they are a bit tabloidy so maybe somewhere else. I'm very unsure."

25–34 year-old Woman, Smart speaker user (Amazon / Alexa), Scotland

"I think it comes from the BBC but I decided to ask Alexa where she got the news from. She told me I could choose a source in the settings and then told me the current source was LBC – a station I listen to a lot."

65+ year-old Woman, Smart speaker user (Amazon / Alexa), Southeast England

Participants were also asked to consider the idea of news sources set as a default (that is, the smart speaker provider decides on the source). Some distrusted the idea of default news sources, and were suspicious that this could be driven by the commercial interests of smart speaker companies.

"I wouldn't trust it. Because... I feel pretty sure that it would be paid, you know, there is always paid articles that are pushed to the top."

News focus group participant

Participants were also asked their views on whether news providers should be allowed to pay for prominence on smart speaker content. There was a general consensus that this should not be allowed: participants felt that this would remove choice and push them into consuming one particular provider.

"If you've got a speaker that is run by some big business that is connected to some other kind of big business media company and it's promoting their news,... I just think it should be impartial, or I would want it to be impartial. I [think there's a risk that] it can promote someone's political agenda."

News focus group participant

Participants noted that the **depth** of news content provided by their smart speaker was often less than it might be from other sources, but this often suited them well – they could get the headlines from their speaker, and the detail elsewhere when they wanted it.

"It's okay, generally just headlines. You can ask for more depth, of course. Would usually go for a news / talk radio station if I wanted more depth, or go online."

55–64 year-old Man, Smart speaker user (Sonos), East Anglia

In contrast, some participants felt that the smart speaker enabled them to access greater depth and breadth of news content, tailored to their interests. In focus groups, participants talked about accessing very local news stories in greater depth (for example after hearing a short headline on their car radio) and special interest news on a range of topics.



"I have the radio on in the car as well, and... sometimes the actual story isn't that much in depth. So if there is something that particularly interests me that I've heard in the car on the radio or, you know, something I want to find out more [about] that's obviously relevant to me, then I will come in and I will ask Alexa to tell me the sort of latest news or maybe divulge a little bit more information on particular stories... If I'm on my way home from work and I've maybe heard a story – like I said, I'm from Sunderland, but I live in Darlington – so, you know, if there has been something that has happened in my home town, then I obviously want to find out a little bit more about that... So they do sort of touch on what happens up in Sunderland. But if I want further details about that, then I can ask Alexa."

News focus group participant

"I used to religiously get a Sunday paper and you're talking now £2 or more for a Sunday paper, and do you actually read everything in it? So I just love it [news via a smart speaker]. I love just listening. Now I can say straight away to my smart speaker, 'Latest astronomy news', and straight away I'm getting that, 'scientific news'. And I wouldn't have done that normally, and I wouldn't even find that in a paper."

News focus group participant

In the focus groups and interviews with non-users, participants identified a range of benefits to accessing the news via their speakers including being able to get the news for free; being able to get instant headlines; having control over which news stories to listen to; and being able to find out niche news from different countries or about specific areas of particular interest.

"If you're listening to the news headlines you can just say, 'Next,' if you want to skip that bit... if you're listening to radio you can't say, 'Okay, enough of this subject now. Go to the next one.'"

45–54 year-old Woman, Non-user, Wales

Changing the news settings

Participants in the forum were slightly less familiar with the news settings for their smart speakers than they were with the radio settings, with most saying they were not familiar or not sure about their settings for news. The vast majority had never changed the default news provider on their smart speaker – out of the 53 who consumed news through their speaker, only 6 had changed it. In the focus groups participants did recall having the option to specify their news source in the initial smart speaker set-up process – however, for many, once they had done this, they then forgot about it.

In the online forum, participants were asked to find the news settings and to say how easy or difficult they found it to do this. Most said it was very or quite easy, but around a third said that it was difficult or that they could not do it. They were then asked if



they could figure out how to change the news provider on their smart speaker; again, most said it was easy, but around a third said it was difficult or that they were unable to work out how to do it.

When asked how important it was to be able to change the news settings on their smart speaker, a slight majority said that it was important, but overall views were mixed. Those who thought it was important wanted to be able to choose a news provider that they trusted (albeit many of them had not realised that this was an option or had not considered the issue before the research) and / or they wanted to be able to choose a variety of news sources in order to obtain a variety of perspectives. Some felt that it was important (at least in principle) that they had **control** over which sources they chose, rather than having them chosen for them.

"I'm really glad I found that setting. It is important to be able to tailor the news provider to your particular preferences and political leanings. That's a personal and democratic choice that I wouldn't like to have made for me."

35–44 year-old Woman, Smart speaker user (Google Nest), Southwest England

Amongst those who felt it was less important (just less than half of the participants), many were satisfied with the default settings on their speaker. Others were of the view that because they were only using the speaker for headlines and were accessing in-depth news elsewhere, it did not matter so much. A few felt that it did not matter who provided the news, as it was all the same (and equally (un)trustworthy).

"I'm not really fussed about who my news provider is as I still use my phone and TV as my main source and not my smart speaker."

16–24 year-old Woman, Smart speaker user (Apple), Southwest England

6.4 Other content on smart speakers

The majority of forum participants used their smart speaker for asking questions or getting information – this was also apparent from the diary exercise, which showed this to be a frequent activity for many people. Most people said this did not mean that they used other devices (such as smartphones, computers, and tablets) less often for searching online. However, a sizeable minority did feel that they used other devices less for searching for information since having their smart speaker. They found it easier and quicker to get a single answer from a speaker, rather than having to look through multiple different answers elsewhere.



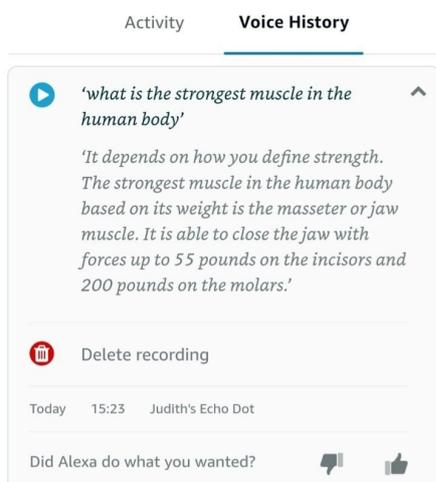


Image 3: Participant screenshot of question asked of smart speaker

The general consensus, however, was that the speaker was useful for getting certain types of information, but not others. Most people felt it was better suited for simple incontestable fact-based questions, but when a topic was more complicated, it was better to use other devices in order to see a range of different answers. There was also an accuracy issue: some said that the first answer provided by the speaker was not always the right answer, and they preferred to be given a selection.

"It's a very handy thing to have if your hands are full or you're busy and so can't google on your phone or PC. Sometimes the information you get back isn't everything you need so it's not always ideal, but most of the time we've found we get a satisfactory answer. If I were looking to do more research I would search myself but for simple questions one answer works fine."

25–34 year-old Woman, Smart speaker user (Amazon / Alexa), Wales

A few people felt that the information that their speaker provided was sometimes **out of date**. Participants described asking who the Prime Minister was after the Summer 2022 Conservative leadership contest had ended, and being told it was Boris Johnson, or the football results being a day old. This also highlighted the overlap between information and news, another example of the blurring between different functions.

Responses were mixed when it came to how much people knew about the **source of information** provided by the smart speaker. About a quarter were confident that they knew, with owners of Google smart speakers unsurprisingly more likely to be confident that Google was the information source. Most people had not really considered the source of the information before the research. If they were unsure, they guessed that it was probably Google – although a handful were confident that their Amazon device could not provide information sourced by Google.

"I don't know where my smart speaker answers are coming from and, to be honest, I never gave it a thought before. I would assume Google."

65+ year-old Woman, Smart speaker user (Amazon / Alexa), Southeast England



7. Concerns and risks

7.1 Concerns and risks

Spontaneous concerns

Throughout the forum, most participants talked primarily about the benefits of their smart speakers, and few spontaneously mentioned concerns. However, a number of participants were more conscious and worried about risks, particularly relating to data capture and use. In particular, 'being listened to' cropped up frequently as an underlying concern throughout the research.

Generally, however, the research suggests that most participants used their speakers with little concern and did not think about risks on a day-to-day basis.

Considering the risks

In the forum, participants were directed to consider potential risks and concerns around smart speakers, and asked to choose up to three of their greatest concerns from a prompted list (with the option to say they had no concerns).

Figure 6 shows the proportions who chose each concern as one of their top three ([click here for this information in table form](#)):

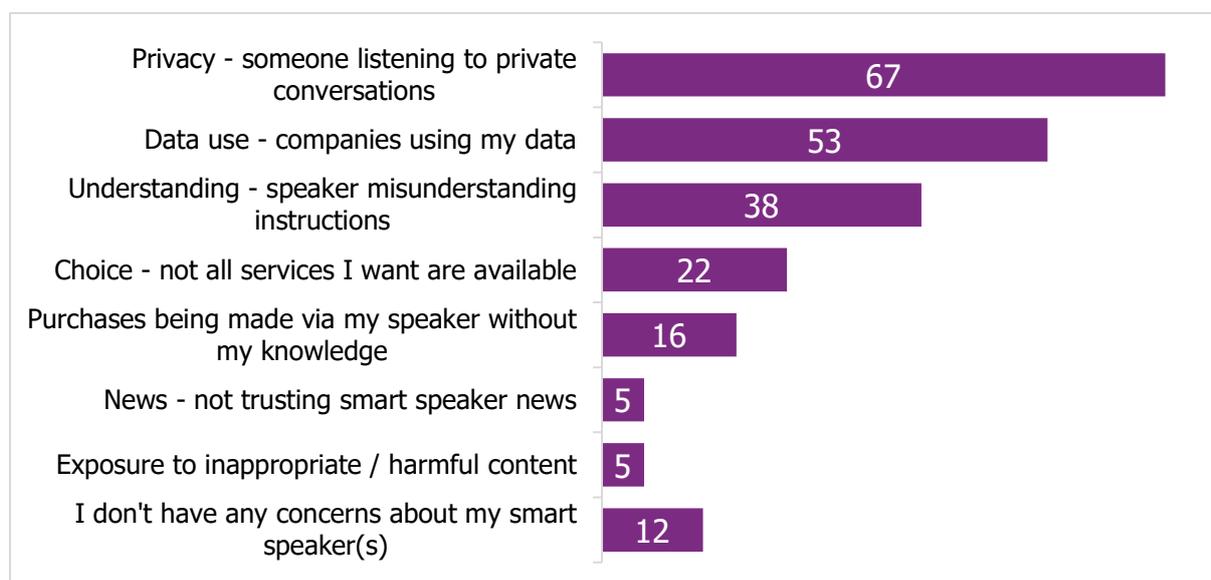


Figure 6: Number of participants choosing different concerns in their top 3 (Base: 100 forum participants)

Privacy and **data use** were the uppermost concerns. Interestingly, 'smart speakers misunderstanding instructions' was the next most common concern, suggesting that daily frustrations are more important to people than many other risks of harm from misuse (which we saw when we asked people about the [downsides of their smart speakers](#)). For example, **limits on choice** and **unauthorised purchases** were much lower down people's lists of concerns. Only a very small minority of participants included **trust in news** and **exposure to harmful content** in their top three concerns.



A minority of participants (around a tenth) said they had no concerns over their smart speakers.

People's concerns are expanded on below. However, these should be viewed with the understanding that these concerns were not high on the radar for most people. (Some participants were, though, worried to some extent about the risks of using smart speakers, and this affected their behaviour, as discussed below in the section on [managing risks](#).)

It should also be noted that, in both the later stages of the research forum and in the focus groups, several participants remarked upon the fact that taking part had made them think more about some of these issues; it is unlikely that these issues would have been a key priority had they not been prompted to think about them.

"I do consider myself quite responsible for protecting my data and not leaving myself exposed, but this [research] highlighted that I'm not quite as good at that as I thought I was. And, again, with things like recording all the time and being able to delete your recordings that the smart speaker has taken, things like that, I'd not even considered that. So it gave me something to think about and perhaps be... just a bit more responsible really. You know, it's not a machine that just lives there and does its thing, we have to sort of allow it to access what we want to. We have some control over that and maybe we should exert that control a little bit better than perhaps I was doing."

Multiple speakers focus group participant

Privacy and data concerns

Privacy and data use were the uppermost concerns for participants.

For many, the concern about **privacy** incorporated a broad awareness of and general unease about 'private conversations being listened to'. There were variations amongst participants in terms of their concerns around who is listening, and with what purpose. For example:

- Some participants expressed a vague concern that '**Big Brother**' or the **Government** could be spying on, listening to, or monitoring them via smart speakers.
- Some expressed concerns about the potential for **criminals** to use smart speakers to steal data and hack their systems, potentially to steal identities or bank details. A few mentioned that they had heard of other technology (such as baby monitors and routers) being hacked.
- Some were uneasy about what **smart speaker provider companies** 'listened' to. Several participants said that their smart speakers were probably party to private and sensitive conversations that were not meant for other ears (though others said there was little of interest discussed in their households!).

"I worry about some aspects of my privacy at times as she always seems to be listening. When she suddenly starts talking but no one has asked her anything is the spookiest. People say that the devices can be hacked and hackers can listen



into your personal conversation and if you've got a camera on your speaker, then potentially spy on you and family."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), Wales

Some had specific privacy concerns about smart speakers with **screens**, sometimes in terms of what visitors might see on screen displays (for example, if using the speaker for household management), but mainly in relation to recording. A number of people had expressly turned their cameras off because of this.

"I have the video disabled – physically disabled – on the Amazon Show. There is a little plastic piece you can put over so I do that straight away, because, you know, you hear these stories that people's indoor cameras have been hacked and all that and they've put [it] on the internet."

Multiple speakers focus group participant

Several participants also raised concerns around **data storage, security, and use**. Some had not considered this prior to the research, but had started to question what was heard, stored and used from their conversations. Many had not known that conversations were recorded, and that those recordings might be stored.

"I didn't even know it was recording us until I took part in this research!!"

45–54 year-old Woman, Smart speaker user (Google Nest), Southeast England

For some participants, these concerns around data created a generalised feeling of unease when they thought about them, but they were hazy over what the actual risks might be. However, others were more specific, and identified a number of aspects to their concerns around data security and use, relating to:

- The safety of providers' data storage systems;
- Use of individuals' data for marketing purposes – many participants felt that their conversations led to them being targeted with advertising and services they mentioned, and, for some, this was evidence of their conversations being 'listened to' and used to target commercial activity, which was often unwelcome and added to a sense of unease;
- The potential for technology companies' data storage systems to be hacked, and sensitive data (such as bank details, medical information) to be stolen.
- The potential future uses of stored data, such as use of their voice patterns in ways to which they had not consented, or for criminal gain.

"My concern basically revolves around data and privacy. I know it's not an ideal world and if something we are given for free (e.g. free music or information) then we are the product. How safe are those data collection procedures? I have faith in GDPR but still it sometimes worries me that the smart speaker is listening to all our conversation secretly or silently."

25–34 year-old Woman, Smart speaker user (Google Nest), Southwest England



"I know that I have been targeted with specific adverts when I talked about getting a dog. I hadn't asked Alexa to be ready for a command, it knows because it's always listening and using that data to target me. I had pet insurance and pet food adverts."

25–34 year-old Man, Smart speaker user (Google Nest), Northwest England

As conversations progressed, participants expressed surprise and some concern at the lack of transparency and clarity about data storage and use by smart speaker providers. In focus groups, participants said that the privacy and data settings on smart speakers are hard to find and manage. For some, this contributed to a degree of mistrust in the technology providers, as their stated use of data did not always match up with participants' experiences, particularly when they were targeted based on private conversations ('unactivated' recording).

"[We manage data and privacy concerns] with the privacy settings, though we are still cautious / paranoid as we've had occasions where we have been discussing something and then the products related to our conversation have been suggested via Amazon."

35–44 year-old Man, Smart speaker user (Amazon / Alexa), Northwest England

"I feel that there are risks regarding how data is used, and probably feel that companies are happy to shift the responsibility of this onto the consumer by not really making it clear how it is being used, but by burying it into a terms and conditions document most people never have the time to read."

25–34 year-old Man, Smart speaker user (Google Nest), Scotland

Parental concerns

The parents in the forum were directed to consider risks specific to their children using their smart speakers. They were asked to pick up to three risks that concern them most from the following list:

- The smart speaker(s) will misunderstand instructions and may play inappropriate content
- My child/ren will ask the smart speaker(s) for inappropriate content
- My smart speaker(s) collect recordings of my child/ren
- My smart speaker(s) collect data on my child/ren
- My child/ren may buy products using my smart speaker(s) without my consent.

Around a third of parent participants said that they did not have any concerns about their children using smart speakers. For some, this was because they only had one smart speaker and it was kept in a communal area, so use was always supervised. Others said that they trusted their children to be sensible.

Amongst parents who did say they had some concerns, all the concerns listed above featured equally. However, in forum discussions, two particular concerns were mentioned more frequently: inappropriate content (particularly explicit lyrics) and



unauthorised purchases. For those with smart displays, there was an added concern that explicit lyrics will be both played and shown on the displays.

These concerns relating to content and purchases were also more 'top of mind' than concerns around data and privacy in the focus groups – parents instinctively thought about what their children might be able to do through a speaker, rather than what could be done to them – although a few were worried about how their children's data could be used further down the line.

"Before I had [set up] the kids controls on the two younger ones' [speakers], I suddenly heard they had picked a song and got the explicit version, and so that was a bit of an issue. The children have all got a little Echo Dot in their room... [but] I wouldn't be allowing them to have anything with a screen in their rooms... I think you're quite limited in a way where Alexa at the moment is only audio for the children. I think when it gets to having visual stuff as well, then I will be a lot more cautious."

Parents focus group participant

"I think personally I'd be more concerned if the manufacturers were getting data on our children and then using that to target us for marketing and stuff like that."

Parents focus group participant

Other concerns

In further discussions about concerns, participants spontaneously discussed the following themes:

- **Electricity use** – This was discussed separately on the online forum as it was explicitly raised as a topic by a participant. In the context of rising energy costs, this was a salient issue for several participants, some of whom switched off their smart speakers when not in use to conserve energy. However, the majority view was that energy use was probably minimal, and a cost worth paying for the convenience provided.
- **Obsolescence** – A few worried that their speakers would become obsolete quickly, and that they would need to regularly buy new smart speakers to upgrade.
- **Upgrades and subscriptions** – Some worried that providers would make changes and start charging or require subscriptions for services that are currently free.
- **Unprompted calls** – A couple of participants mentioned that their smart speaker had made calls to someone when their name was mentioned in conversation.
- **Electricity outages** – A minority discussed what would happen if there were power outages, given the smart speaker's reliance on electricity (and their reliance on their smart speaker).

The other concerns that participants were directed to consider were **limits on choice**, **trust in news** and **exposure to harmful content**. Only a small minority included these factors in their list of greatest concerns, and there was limited discussion of



them in the forum (though these subjects were discussed in focus groups, and the findings included in the separate sections on [News](#) and [Radio](#) and [Parental concerns](#)).

'No concerns' and 'acceptable risk'

After being directed explicitly to consider potential concerns, a notable minority of participants (around a quarter) said that they had no concerns around the use of their smart speaker(s) and/or that they had never considered it.

"To be honest I don't really have any concerns about smart speakers. I've really never considered most of the things raised in this survey before now. There's nothing I've worried about at all really."

35–44 year-old Woman, Smart speaker user (Google Nest), Southwest England

Several more acknowledged that there were some risks, but accepted these risks as part of owning a smart speaker. For them, the risks were an acceptable trade-off for the benefits and convenience of a smart speaker.

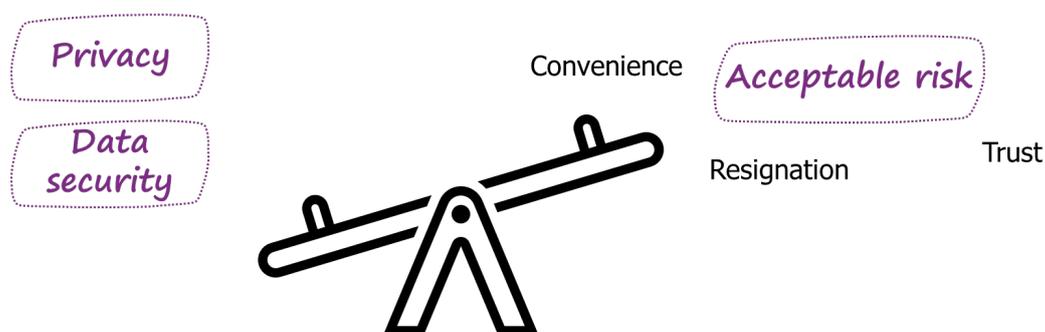


Figure 7: Acceptable risk diagram showing positives outweighing negatives

"I live with the concern about data being collected and treat it as payment for the service I get!"

55–64 year-old Man, Smart speaker user (Google Nest), West Midlands

"I've sort of moved beyond my main concern about privacy. As my smart speaker is providing richer content – interesting podcasts, recipes, assistance, information on demand... I also benefit from richer content that it helps me choose because it is familiar with the way I speak."

55–64 year-old Woman, Smart speaker user (Google Nest), Southwest England

Some also noted that the smart speaker manufacturer would already have their information (for example, because they had already given their bank details to Amazon), so providing data to their smart speakers would make no difference.

"I have been talking to friends about it and they won't have one because obviously about privacy and about it listening and stuff, but I was like well surely your phone is doing that already?"

35–44 year-old Woman, Non-user, Northern Ireland



"Whatever device you have, this collection of data is happening, and I think trying to prevent it from happening is yet another uphill battle."

Parents focus group participant

Some participants also felt that there was little of interest that their smart speaker might pick up, so were not worried about being heard.

"I generally couldn't care less. I understand some people are wary of these speakers due to privacy and data concerns, but my conscience is clear and if anyone wants to listen to the madness in my home, good luck to them I say. Ha ha."

35–44 year-old Man, Smart speaker user (Amazon / Alexa), Northern Ireland

"I'm not too worried about my data being used because I'm sure I'm not a matter of national security asking the weather, recipes, how long it will take me to get somewhere, what time it is, setting my podcast, etc. Nor are my grandchildren's request for jokes about dogs or eggs or chickens or whatever."

65+ year-old Woman, Smart speaker user (Amazon / Alexa), Southeast England

How are smart speakers different when it comes to concerns?

Several of the data and privacy concerns were similar to those related to other forms of technology, such as smartphones, smart watches, tablets, and smart TVs. There was an acceptance that we live in a society where surveillance is commonplace, and people acknowledged that their activities and data were being monitored by a wide range of methods. Some felt that the concerns over smart speakers were comparable to the risks involved in living in a modern society with smartphones, surveillance, connected and online technology – for example, many felt that their phone was already listening in on their conversations.

"Smart speakers are commonplace now and the privacy risks are similar to the smart assistants on phones (e.g. 'Hey Siri'...), which are everywhere and smart watches – these too occasionally pick up things I am saying, even when I didn't mean to activate them."

35–44 year-old Man, Smart speaker user (Google Nest), Scotland

However, other participants suggested that smart speakers are different from other forms of technology when considering the concerns and risks, especially regarding data and privacy.

The first point of difference relates to their 'passive listener' presence in the house, and the fact that it is quite easy to forget they are there and have the capacity to hear and record what is said.

"I try not to think about the Alexa listening to us and recording us. Plus it sits in the corner quietly so you forget about it."



35–44 year-old Woman, Smart speaker user (Amazon + Apple), Southwest England

"Thinking about it the speaker is a fly on the wall and hears all sorts!... I'm not totally comfortable with the thought of my voice and the voices of my family being heard by strangers."

35–44 year-old Woman, Smart speaker user (Google Nest), Northwest England

The second point of difference is that – for some participants – the relationship they have with their smart speaker is different to their relationship with other devices and technology. It is more human, more friendly, more emotional. As a result, they are inherently more trusting and more forgiving, perhaps forgetting about all of the 'back office' processes allowing that to happen. For some, this was a more pertinent risk when children use smart speakers. One of the parents felt that the 'friendly' and 'human' aspects of a smart speaker mean that their child was less likely to guard against the possible dangers of interacting with others online.

"I also worry about how my son views the technology. He regards Alexa as someone friendly to talk to and joke with, we sometimes play games with her and he asks her silly questions. It worries me that it will make him think that he can talk safely to anyone who approaches him digitally."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), Wales

The third point relates to the smart speakers' evolution of use and functionality from the time it was first purchased. This means that, for many participants, while it may originally have been considered as an alternative to a Bluetooth speaker, its use now far exceeds this, and involves far more of an exchange of data than originally anticipated. For many participants, this expansion in use (and data 'sharing') has happened gradually and subtly, without them pausing to consider the data and privacy implications each time they add a new use or functionality. This is in contrast, perhaps, to the addition of a new app to a smartphone, which entails a more active choice.

"I think pretty much everybody started off just as a smart speaker and it's almost been it's evolved without us opting into those things. So yes, it's great it can do your shopping list, but I never actually bought it to do that. And it's all these other things that have come almost under the radar. I think if we were buying things specifically for shopping lists, we would be a lot more savvy about how they're going to use my data."

Parents focus group participant

7.2 Managing the risks

Around a quarter of participants said they did nothing to manage the risks of using a smart speaker. Many of these said they felt there was nothing to worry about. However, for some, there was a sense of a lack of agency and control over the risks – that the manufacturers and technology companies had the power and ability to use



(or misuse) data if they wanted to, and that there was little they could do about it if they wanted the benefits of a smart speaker.

"I don't [manage these risks]. If companies are using my data there isn't anything I can do about it other than not using the speaker."

55–64 year-old Woman, Smart speaker user (Sonos), West Midlands

"Having a small device literally built to listen to your voice and understand key words is of course going to have some privacy implications, especially due to the fact that interactions are recorded and stored. What can you do you though? They are just so convenient!"

16–24 year-old Man, Smart speaker user (Amazon / Alexa), Wales

Amongst the non-users, some of those who had previously expressed concerns regarding privacy and data security were still mindful of these. Others had decided to simply accept the risks, given the benefits the smart speaker brought.

"I still don't know really what information is being stored; I've just decided that I'm not bothered. Like, rather than [knowing] how the information is being stored and that has made me feel safer, it's more than I don't know but I've decided not to care."

35–44 year-old Woman, Non-user, Northwest England

There was some hope that existing systems would manage data use and protection, and some expected manufacturers and technology companies to limit risks as far as possible.

"I am worried about these concerns [hacking; data theft] and hope that companies that produce smart speakers are mitigating against these risks."

16–24 year-old Man, Smart speaker user (Google Nest), Scotland

"There is risk, but I feel reasonably protected by the privacy laws and all the other regulations which are in place."

General focus group participant

Changing behaviour

Those few participants who did take action to manage risks and concerns were mostly changing their own behaviour, rather than restricting their smart speaker settings (especially related to data). For instance, people talked about:

- Turning off the microphone (or camera for screen displays) – though this was regarded as a 'faff' and as limiting usefulness for some;
- Turning the speaker off when not using it;
- Having sensitive conversations out of 'earshot' / turning off the 'listening' function;
- Avoiding some functions – for example:
 - Not contacting people via the smart speaker;



- Conducting searches on phone; not asking the smart speaker;
- Not purchasing anything over the speaker / disabling online shopping.

"I will sometimes completely unplug my smart speaker when I know it will not be needed. I have even resorted to putting a thick blanket over the top of it so she cannot hear my conversations."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), East Anglia

Changing data and privacy settings

When asked specifically if they were familiar with the data and privacy settings on their smart speaker, most people said that they were not or that they were not sure; only a minority said they were familiar with these settings. Likewise, only a minority said that they themselves had looked at the settings before, and a handful more said that someone else in their household had.

During the online forum, participants were asked to find their smart speaker's data and privacy settings and have a look at them. When asked how easy or hard it was to find these, the majority found it quite or very easy. However, around a third said that they found it hard or that they could not do it at all.

When asked what they thought of the data and privacy settings, most people were relatively content – they thought they were easy to understand and seemed reasonable. Some questioned the default settings; they felt that recording should not be standard, but should be an opt-in setting. They felt that people should not have to go into the settings in the first place to restrict data use and protect privacy, particularly given that many were unaware of the settings. However, others were reassured that Alexa was picking up on suspicious sounds, and were happy that they had the option to delete any recordings.

"They seem easy to understand, the setting of 'sounds detected' concerned me a little. One of my main fears is being 'listened to' by Alexa and it seems that this is true."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), East Anglia

"They all seem fair, nothing has been activated or given permission where I haven't consented. The only thing I wasn't aware of was that it listens for glass breaking or smoke alarms, which I'm actually quite glad it does, as if I were to have my house broken into, through the Alexa records, the exact time could be found, which will help the police investigation."

16–24 year-old Man, Smart speaker user (Amazon / Alexa), Yorkshire and the Humber

A few people felt that the information was overly long and complex – but that they were used to this with privacy and data notices in general, so were not unduly concerned about this.



"I don't really understand them. One is almost immune to all this as there is a constant reminder of data protection every time I use a computer etc. so now I don't really take any notice."

65+ year-old Woman, Smart speaker user (Amazon / Alexa), Southwest England

Most participants said that they were aware that smart speakers recorded speech when activated. However, some did not know, and further discussions suggested that many participants did not generally think of this on a day-to-day basis when using their smart speakers.

"I didn't realise that every single conversation of mine is recorded. Thankfully I don't really mind and thankfully I can delete it, but I think that would have been something I would have wanted to know like beforehand."

Focus group participant

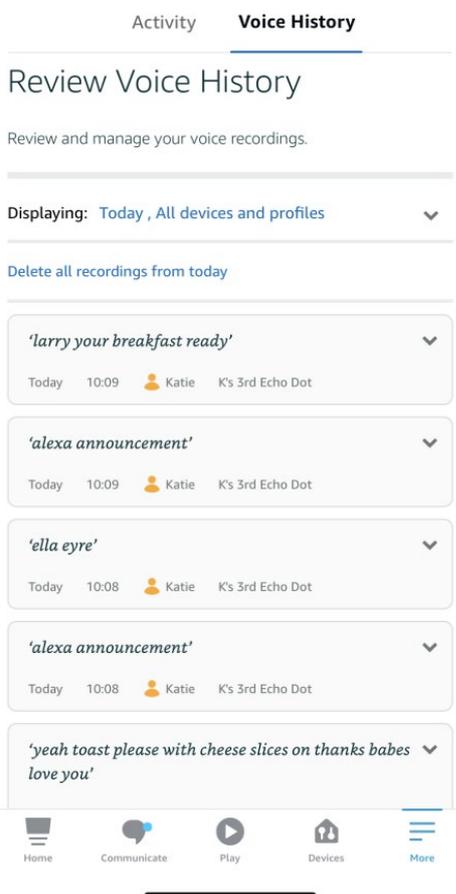


Image 4: Participant screenshot of recent smart speaker recordings

Participants were asked if they had known that it was possible to delete the recordings their smart speaker had captured. Only around a third were aware that this was an option (of whom a small minority were already using this function).

Participants in the forum were then asked how easy or difficult it was to delete the recordings. Although most said it was easy, around a fifth said it was difficult or that they were unable to do it. Several participants later commented that this had prompted them to ask questions, and some had taken extra measures to protect their data and privacy since taking part in the research (such as deleting all recordings). The ability to delete recordings was one of the things that focus group participants remarked upon the most in terms of lessons from taking part in the research.

"Now I know how to delete conversations and set the settings so it does not record me I feel much better! But I would not have known that if I had not taken part in this research."

45–54 year-old Woman, Smart speaker user (Google Nest), Southeast England



In the focus groups, there was some discussion as to the pros and cons of deleting recordings – people thought it should be made more obvious that it was an option so that they could do it if they wanted, although not everyone thought they would. Some thought it might mean that they received a less personalised experience if they did this, and others simply did not feel that it was that important.

"You try to set up settings to feel a bit safer, but it literally minimises the functionality of the device in your home. And I do feel it's very tricky. Honestly, it's one thing that is always at the back of my mind, how can I not set this up [to automatically delete recordings]? You've put it there but I can't use it. For example, if I decide to delete my recordings, it's indirectly affecting how my Alexa is working."

Focus group participant

"[I attempted to set it] to never save recordings, but [the speaker] prompted me that doing [that] will degrade how my smart speaker understands and responds over time. As a result, I left this setting."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), London

Changing parental control settings

Parents in the forum were asked whether they were familiar with the parental control settings on their smart speakers. Although most were, around one in three said that they were not. They were then asked what they had set up on their speakers from a list of potential settings or restrictions. Most said that they did not have anything set up. Amongst those who did, the most common were having 'inappropriate content blocked' and their 'permission required to authorise purchases'.

A small minority of parents also used the settings on their smart speakers to limit their children's activity and access. However, this was mainly through restricting the functions their children could use and the times they could use them, rather than using specific parental control settings on their smart speakers.

Parents who did not have any controls in place generally felt that they did not need them – for example, because their children did not use the speakers much, the speakers were in family rooms where they as parents could control what they were used for, or because their children had reached an age where they felt it was not necessary.

"Our devices are in family rooms, not my child's bedroom. He is generally well behaved and only asks it sensible questions. We are in earshot so I would speak with him if this was not the case."

35–44 year-old Woman, Smart speaker user (Google Nest), Northwest England

Many parents relied on existing 'home rules' and supervised usage to manage the risks of their children using smart speakers, using a similar approach to the one they use with other devices.



"We talk as a family about what is appropriate behaviour on all devices including phones and laptops."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), Wales

A couple of people were planning on putting controls in place when their children were older or when they had speakers in their own rooms.

"I have not added any parental controls yet. I have thought about setting Alexa up so that it knows different voices which is where I will add the parental controls. I just have not got round to doing it yet. Maybe this is because I have not noticed anything out of the ordinary yet that my three-year-old requests or gets back from Alexa."

25–34 year-old Man, Smart speaker user (Google Nest), Northwest England

Most parents in the online forum assumed parental controls would be relatively easy to set up (even if they had not previously tried). However, some parents did not feel confident.

"I can't find these in the app. I haven't changed them. I might need to though and would appreciate some guidance on this!"

45–54 year-old Man, Smart speaker user (Amazon / Alexa), East Midlands

As with general settings, a few participants had not considered parental control settings on their speakers until taking part in the research. When they did start looking into putting them in place, many were surprised that it was not easier to set up. When they were directed to find the parental control settings for their speaker, around half said it was easy, but the rest said it was hard or they could not find them.

Once found, most parents said they were confident they would be able to change different elements (for example restricting access to certain content, blocking unauthorised purchases). However, a substantial minority said they were not confident in changing any of them. When they tried, some found it impossible.

"I have set up parental controls for my kids' tablets, and for YouTube and Netflix. It was quite difficult and I'm not exactly sure I've done it as well as I could have done. But looking at the Google Nest Hub settings, it was actually impossible to set up parental controls. There is no 'parental controls' setting. I googled it and apparently you have to set up a 'filter', however when I clicked on filters it said none were available for my device."

35–44 year-old Woman, Smart speaker user (Google Nest), Southwest England

When asked how important parental controls on smart speakers were, there was a mix of views. Most parents said they were important; however, a large proportion said they were not. Linking back to the reasons some parents did not have any parental controls set up, it was felt that they were not important when children were younger, or if the speakers were not used in ways that were a cause for concern. Several



parents said that it was more important to have settings in place for other devices, such as phones or tablets, as these were used more and often in private.

"I think I have more 'trust' in my smart speaker because it is located in the communal area so I do not feel the need to set parental controls. Because my children have smart phones / TVs that they can access in private, I set parental controls for those instead."

35–44 year-old Woman, Smart speaker user (Amazon / Alexa), East Anglia

"I think it will become more important as they get older and start viewing stuff meant for older kids or asking more grown-up questions."

45–54 year-old Man, Smart speaker user (Amazon / Alexa), East Midlands

Some participants also highlighted the fact that speakers with screens should be a particular priority because of the risk of potentially exposing children to harmful visual content, which was worse than audio content.

"There needs to be more regulations, especially on smart speakers with screens, because my young eight-year-old daughter was actually watching something the other day, and okay, you've got parental filters, but it's so complicated to set up... they can access anything on YouTube. Like some of the stuff on YouTube should not be accessed by an eight-year-old. Like, you know, I mean like maybe have an 18+ filter, explicit content thing, you know?"

Parents focus group participant



8. Conclusions

Smart speakers influencing the way people consume content

For some participants having a smart speaker had changed the way they consumed some content. This was most common in relation to radio and music, with many saying they listened more overall, and often that they listened to a wider range of radio stations and types of music, but was also reported in relation to more frequently accessing information. In addition to content consumption, for the small minority who were very reliant on their speakers, the device had fundamentally changed the way they lived their day-to-day lives.

Smart speakers as a force for good

There was consensus across the research that smart speakers could make a substantially positive difference to people's lives. For some this was just about helping in relatively minor ways – for example managing the household and integrated systems, or providing wider and easier access to content (including news and radio) – that generally made life a little bit easier and more pleasant. However, for others, smart speakers had been truly life changing in terms of the positive impact they had had. Regardless of the extent to which people felt the speaker had impacted on their own lives, many identified ways in which they thought wider take-up of smart speakers could help certain disadvantaged groups in society – for example, elderly people or people with disabilities.

Potential to benefit more people... and to benefit people more

Throughout the research, participants commented on the wide range of functions offered by smart speakers and the fact that many people are not aware of these. As well as having the potential for more people (new users) to benefit from smart speakers, many existing users could also benefit from being aware of, and understanding, this wider functionality.

Managing privacy and data can be hard

The research demonstrated limited knowledge amongst users of privacy and data implications, and how to manage these. Even where there was awareness, managing settings required active choices and was hard to do even when people wanted to. This was in sharp contrast to choosing and setting preferences for content such as radio and news, which people found much easier to adjust. However, data and privacy risks were not a major concern for most participants, and was seen by some as the trade-off for a better user experience.

Creeping integration

Many were using speakers for many more things than they had initially expected as they became aware of increased functionality, or other features were made available.



For example, people may have originally bought a device to simply stream music and occasionally ask for information, but later found themselves uploading family calendars or doing their shopping through the speaker, thus sharing more data than they had ever anticipated. This 'creeping' integration and gradual reliance on the devices could result in people handing over control, without having made informed decisions or considering the potential risks.

Blurred lines

There are signs that – because it is so easy to switch between functions (and because people don't always know the source of their content) – people do not always distinguish between different sources or types of content. There are some assumptions, for example, that BBC content and UK radio shows are governed by rules, and other content (international radio stations, online content) is not. However, blurred lines may mean people assume the content they are receiving is regulated when, in fact, it is not.



9. Appendices

9.1 Sample breakdown

The 100 smart speaker users were recruited to ensure a mix of demographic and geographic representation across the UK. Table 1 shows the final breakdown.

Table 1: Smart speaker users – demographics

Category	Characteristics	Number of participants (out of 100)
Gender	Man	45
	Woman	54
	Other / prefer not to say	1
Age	16–24	13
	25–34	18
	35–44	28
	45–54	12
	55–64	18
	65+	11
	Participants with children at home (using smart speakers)	Aged under 11
Aged 11–16		17
Ethnicity / language	First language other than English / Language other than English spoken at home	11
	Strong regional accent (self-identified as having strong accent and accent causing issues with smart speaker)	39
	Minority ethnic groups	26
Socio-economic group	AB	28
	C1	39
	C2	14
	DE	19
Location	England	62
	Scotland	13
	Wales	17
	Northern Ireland	8



Category	Characteristics	Number of participants (out of 100)
Disability / health condition	Presence of disability / health condition	30

Quotas were put in place to ensure a broad range of smart speaker usage and ownership, as shown in Table 2.

Table 2: Smart speaker users – speaker ownership

Category	Characteristic	Number of participants (out of 100)
Smart speaker brand	Amazon	75
	Google	28
	Other brands (i.e. Apple HomePod, Bose, Google Home / Nest; Facebook Meta, Samsung, Sonos, Sony)	16
Type of speaker	Smart display	26
Number of smart speakers	1	47
	2	27
	3	14
	4	6
	5	4
	More than 5	2
Length of ownership	Purchased in last month	1
	2–6 months ago	3
	6–12 months ago	10
	1–2 years ago	35
	2–5 years ago	44
	More than 5 years ago	7

The 15 non-users were similarly recruited to ensure a mix of demographics and geographic representation. Table 3 below shows the final breakdown.

Table 3: Non-users – demographics

Category	Characteristic	Number of participants (out of 15)
Gender	Male	6
	Female	9
Age	16–24	2



Category	Characteristic	Number of participants (out of 15)
	25–34	2
	35–44	5
	45–54	3
	55+	3
Participants with children at home	Aged up to 7	3
	Aged 8–11	1
	Aged 12–16	3
Ethnicity / language	Strong regional accent (self-identified as below)	8
	Minority ethnic groups	5
Socio-economic group	AB	6
	C1C2	6
	DE	3
Household income	Under £10k	3
	Between £10k and £25k	3
	Over £25k	9
Location	England	8
	Scotland	2
	Wales	3
	Northern Ireland	2
Disability / health condition	Presence of disability / health condition	3



9.2 Data from charts and diagrams

Smart speaker activities reported during diary exercise (Figure 2)

Activity	Number of participants
Listen to music via a streaming service – like Spotify, Apple Music or Deezer	86
Get weather reports	82
As an alarm, personal schedule reminder	79
Search for information online or ask general questions	73
Listen to live radio	70
Get news reports	56
Get travel information or updates	40
Listen to a podcast	37
To control smart home devices, such as a smart TV, heating or lighting	34
To make a shopping list	28
Listen to catch up radio	21
To make calls, send texts or emails	21
Play an interactive audio game	20
Listen to an audio book	14
To watch videos	13

Top concerns of smart speaker users (Figure 6)

Concern	Number of participants
Privacy – someone listening to my private conversations	67
Data use – companies using my data	53
Understanding – my smart speaker(s) misunderstanding my instructions	38
Choice – not all services I want are available (e.g. my local radio service, or preferred music streaming service)	22
Purchases – purchases being made via my smart speaker(s) without my knowledge	16
Exposure to harmful content – my smart speaker(s) playing inappropriate or harmful content	5
News – I do not trust the news my smart speaker(s) gives me	5
I don't have any concerns about my smart speaker(s)	12



Words in word cloud and frequency of mention (responses to question: what 3 words do you associate with your smart speaker/s? – Figure 5)

Word	Frequency
Useful	25
Music	19
Convenient / convenience	16
Alexa	13
Easy	12
Helpful	12
Clever	6
Entertaining / entertainment	6
Fun	6
Hands-free	6
Quick	6
Radio	6
Handy	5
Information / informative	5
Knowledgeable	4
Smart	4
Stop	4
Alarm	3
Annoying	3
Frustrating	3
Google	3
Reliable	3
Technology	3

Words mentioned twice: Amazing; Amazon; Available; Clear; Company; Efficient; Innovative; Loud; Modern; News; Novelty; Play; Quality; Question(s); Responsive; Small Timer; Unnecessary; Weather; Lights; Podcast(s)

