Connected products
Getting smart about ability

University of Sussex

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www.ridc.org.uk

About us

- The Research Institute for Disabled Consumers (formerly known as Rica and Ricability) was founded by Michael Young in 1963. Its original roaming brief was to look at issues which affected all consumers.

- For nearly thirty years we were part of the [UK Consumers' Association](#), or Which? and have operated as an independent charity since 1991.

- We have developed a strong track record of providing unique insights and solutions across all sectors to businesses, government and charities.

- We are run by, and for, people with personal experience of disability.

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Our research is …

Always:

- User centred

Often:

- Participatory using mixed methods

Rarely:
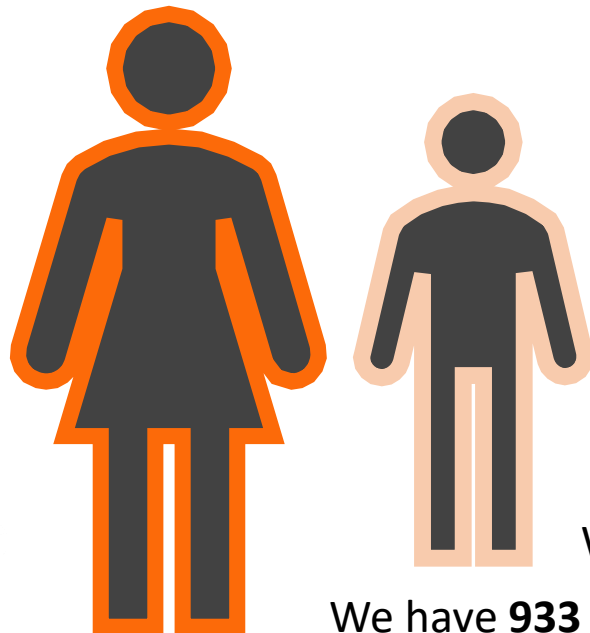
- Only desk bound

Never:

- Without the interests disabled and older people at the heart of the research

We currently have over 1,600 panel members.

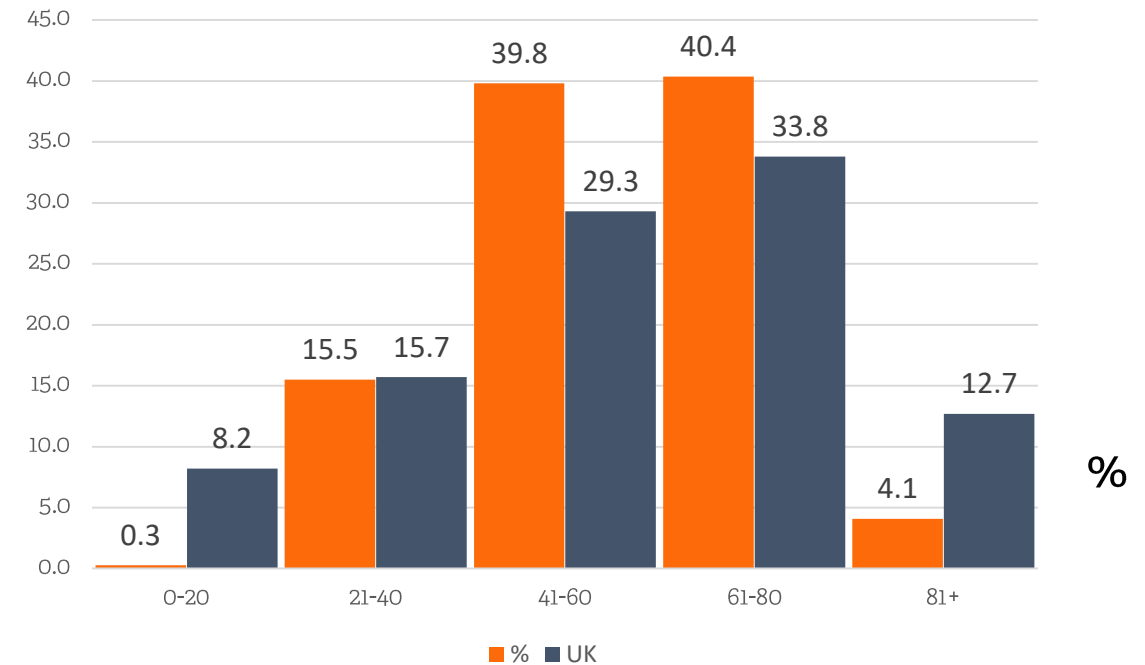In terms of different types of impairment, the panel is made up as follows:

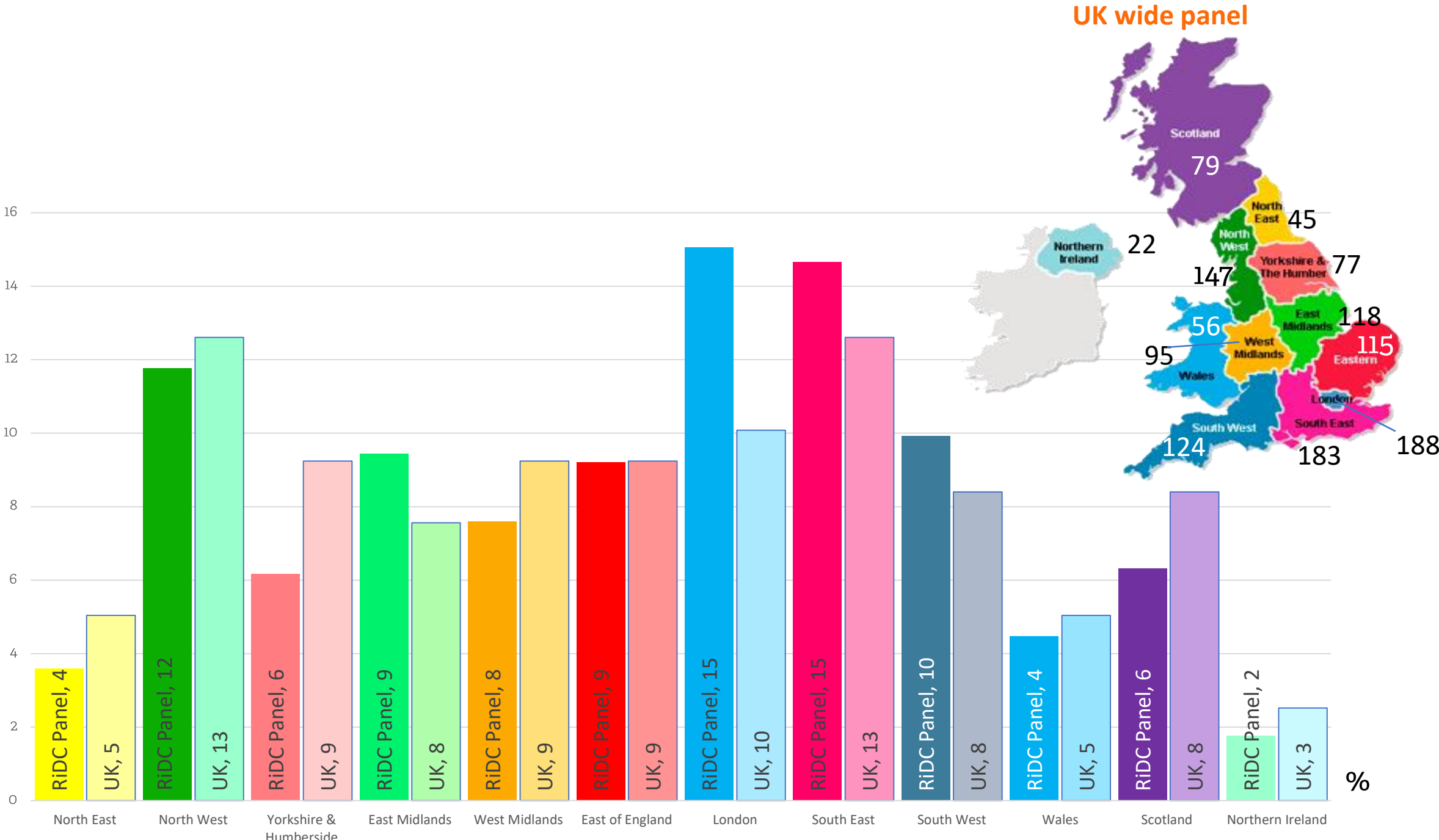|	
Mobility impairment	1,031 (79%)
Blind or partially sighted	953 (73%)
Dexterity difficulties	568 (43%)
Cognitive impairment	562 (43%)
Hearing impairment	407 (31%)
Communication difficulties	209 (16%)
Challenging behaviours	168 (13%)
Learning difficulties	127 (9%)

Age (panel compared to UK)

We have **651 male** panel members (41%; UK = 45%).

We have **933** female panel members (58%; UK = 55%).

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UK wide panel

Scotland 79
North East 45
Northern Ireland 22
147
Yorkshire & The Humber 77
56
118
95
115
124
183
188

RiDC Panel, 4 | UK, 5 — North East
RiDC Panel, 12 | UK, 13 — North West
RiDC Panel, 6 | UK, 9 — Yorkshire & Humberside
RiDC Panel, 9 | UK, 8 — East Midlands
RiDC Panel, 8 | UK, 9 — West Midlands
RiDC Panel, 9 | UK, 9 — East of England
RiDC Panel, 15 | UK, 10 — London
RiDC Panel, 15 | UK, 13 — South East
RiDC Panel, 10 | UK, 8 — South West
RiDC Panel, 4 | UK, 5 — Wales
RiDC Panel, 6 | UK, 8 — Scotland
RiDC Panel, 2 | UK, 3 — Northern Ireland

%

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Some questions about smart technology and disability …
Are these technologies accessible?
What are people's concerns?
Can they be useful?

Some thoughts about connected products from three of our panel members
two years ago

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Video of panel members discussing smart tech

To be found here …

https://www.ridc.org.uk/research-consultancy/our-insights/connected-home-technology

Themes uncovered

1. **Accessibility**

2. **Trust**

3. **Privacy**

4. **Perceived usefulness**

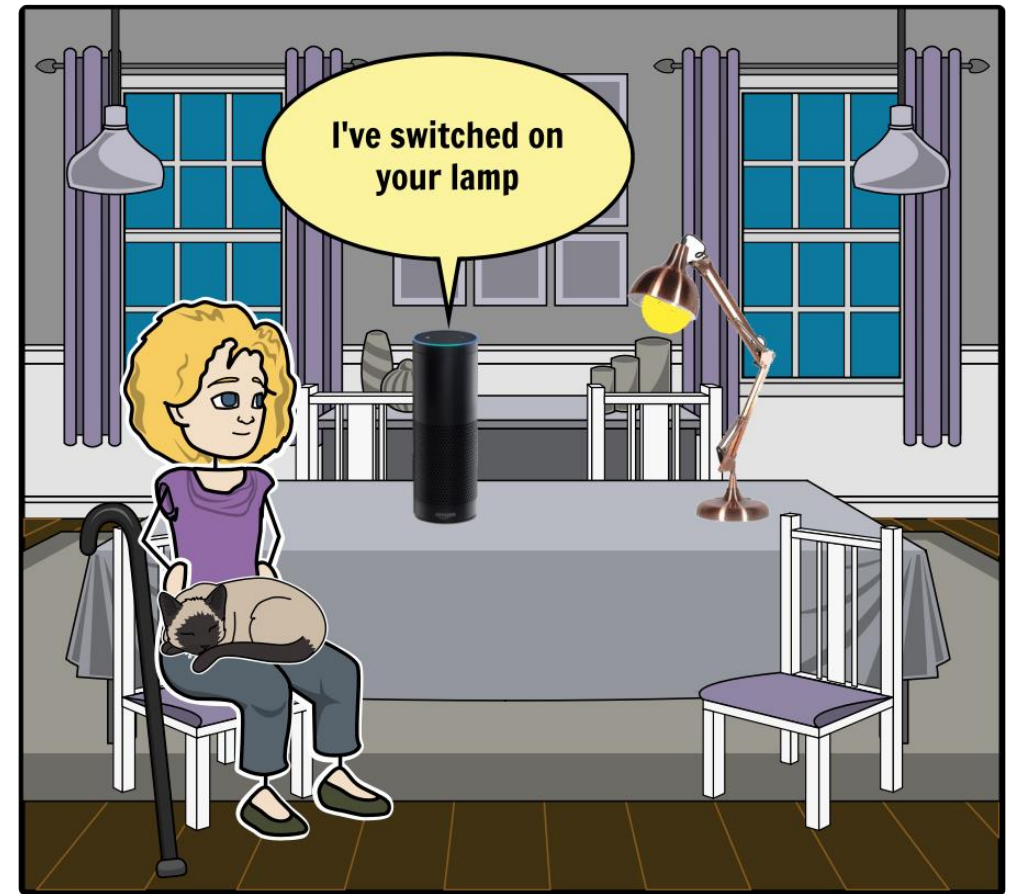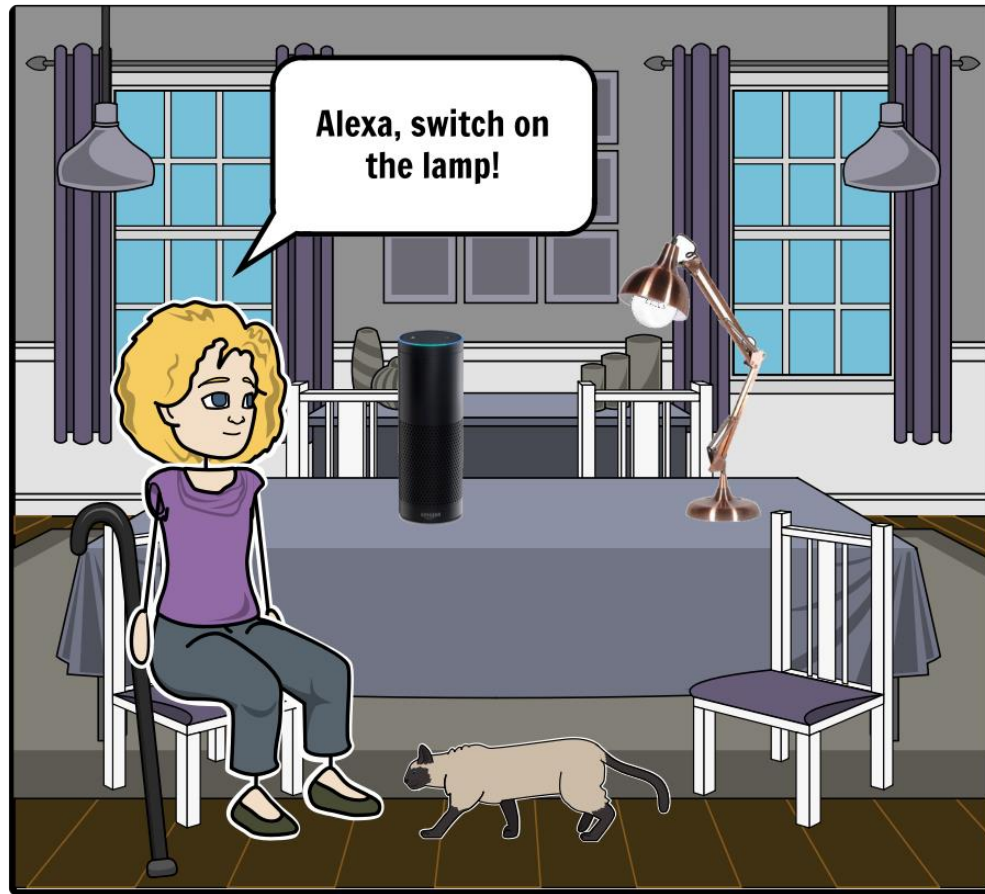5. **Self-efficacy/achievement**

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Themes uncovered

Accessibility

Are these products accessible?

Can these products make disabled user's environments more accessible?

Themes uncovered
Trust

Can users trust the information given by these products?

What is the **impact** of mistrusting information from these devices on disabled people?

"It [GPS] wasn't clear for me … I wouldn't trust it. For getting to a destination I wouldn't touch it, I would be too worried it would fail me" **– Christine**

"I trusted it [Apple Watch] most of the time … but think there was an air of sense checking. There were times that I would think, how easily could this be hacked?" **– Denise**

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Themes uncovered

Privacy

These products can reveal secrets about those around you …

Themes uncovered

Perceived usefulness

If people find these product useful, they will engage with them and build arrangement of smart technologies.

- How can connected smart products be of use to disabled people?

- Is it in making inaccessible products accessible?

- Using a home hub such as 'Google home' or 'Alexa' to control a cooker with a poor tactile landscape making it more accessible for a person who is blind or partially sighted?

- Does Google home or Alexa solve this?

"One big issue was the amount of information it would have been useful to have … none of us had enough information about how to use it, what it did " – Mike

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Themes uncovered

Self efficacy/achievement

Do these products make it easier for disabled people to accomplish tasks?

What does this mean for smart homes?

This explorative research uncovered some of the key issues that need to be addressed in order to maximise acceptance and uptake of connected products for older and disabled people. These issues are well documented in mainstream research but their application to older and disabled people uncovers several problems:

- **How to influence the design of connected products to uncover 'perceived usefulness' if older and disabled people who are not actively involved in the influencing the direction of the design?**

- **How to achieve a sense of self-efficacy when using an inaccessible product? This is difficult, if not impossible!**

Engaging older and disabled people in discussions about possible uses for combinations of connected technology is crucial in order to harness the potential of these technologies to their needs and wants.

Without this engagement in developing meaningful 'use cases', improvements of both product and environmental accessibility will be reactive and slow.

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Smart Appliances

By the year 2020 the global value of this market [Smart Appliances] is projected to be over 37 billion USD. This growth is reflected in the broader Internet of Things (IoT) market which predicts that by the year 2020 there will be just fewer than 30 billion connected end-point devices, from cars through to toasters.

Bloede, K., Mischou, G., Senan, A., Koontz, R., 2015 "THE INTERNET OF THINGS" Woodside Capital Partners. [Online]. http://www.woodsidecap.com/wp-content/uploads/2015/09/WCP-IOT-M_and_A-REPORT-2015-4c.pdf

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We see smart tech

- Around the home

- In the car

- About the person

- In the environment

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Some smart appliances

Appliance (type)	Description	App Support	Wireless Connectivity	What it does
LG's Smart Oven (cooker / maker)	Oven	Yes	Wi Fi Smart ThinQ	Allows you to control cooking remotely from a smartphone
GE (cooker / maker)	Oven	Yes	Wi Fi Needs connect plus device	Allows you to control cooking remotely from a smartphone
Cinder (cooker / maker)	Cast iron skillet (similar to Foreman grill)	Yes	Bluetooth	Will send you a notification when your meal is ready
Crock-Pot (cooker / maker)	Slow cook pot	Yes	Wi Fi Belkin home automation using WeMo	Adjust cooking time and temperature of Crock-Pot meals from a smartphone
Anova (cooker / maker)	Sous vide	Yes	Unsure Kickstarter project	Remotely monitors and controls water bath cooking temperature
Smarty Pans (cooker / maker)	Cooking pans	Yes	Unclear Start-up company	Allows you to monitor temperature, humidity and ingredients' weight as you cook

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Some smart appliances

Appliance (type)	Description	App Support	Wireless Connectivity	What it does
Pantelligent Smart Frying Pan (cooker / maker)	Cooking pan	Yes	Bluetooth	Monitors the temperature of the pan and communicates it to a smartphone. Cooking time is adjusted using an app
Smarter wifikettle (cooker / maker)	Kettle	Yes	Wi Fi	Remotely boil the kettle or heat the water to a specific temperature using a smartphone
Siemens Connected Coffee Maker (cooker / maker)	Coffee maker iQ700 appliance line	Yes	Wi Fi Home connect	Remotely control the coffee maker with a smartphone
B4RM4N (cooker / maker)	Cocktail mixer	Yes	Bluetooth Start-up company	Measures quantities of cocktail mix and allows voice control of the measurements with the use of a smartphone
Somabar (cooker / maker)	Cocktail mixer	Yes	Not known Start-up	Measures quantities of cocktail mix and allows voice control of the measurements using a smartphone
PicoBrew Zymatic (cooker / maker)	Brewing machine (Beer)	Yes	Wi Fi or Ethernet	Remotely monitor the brewing process remotely using a smartphone or tablet

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Some smart appliances

Appliance (type)	Description	App Support	Wireless Connectivity	What it does
Drop **(measuring)**	Measuring scale	Yes	Bluetooth	Coordinates with a smartphone for recipes
MixStik **(measuring)**	Measuring stick	Yes	Unclear Start-up company	Measures the amount of liquid placed into a container and communicates this to a smart phone
Egg Minder **(container / probe)**	Monitoring container	Yes	Unclear	An egg container that attempts to monitor the freshness of the eggs and communicates this to a smart phone
Vessyl **(container / probe)**	Monitoring container	Yes	Unclear Start-up company	Tracks the number of calories and nutritional content of what is in the container
Neo Smart Jar **(container / probe)**	Monitoring container	Yes	Bluetooth	Tracks how much is left in the container along with its use by date. This is communicated to a smartphone
Hiku **(stock taker)**	Scanner / audio recorder	Yes	Unclear	Scans barcodes on the boxes, bags and packages. Will add items to a shopping list

Some smart appliances

Appliance (type)	Description	App Support	Wireless Connectivity	What it does
GeniCan (stock taker)	Scanner	Yes	Unclear Start-up company	Scans barcodes and is placed by the bin to record empty items that might need restocking
Kuaisou (utensil / probe)	Chopsticks	Yes	Unclear Start-up company	Smart chopstick prototype called Kuaisou that can measure the freshness of cooking oil and the safety of water
HAPIfork (utensil / probe)	Fork	Yes	Bluetooth	Seeks to aid digestion and help weight control. The fork vibrates and lights up to remind you to slow down. Data is uploaded to a smartphone
GE (washing)	Dishwasher	Yes	Wi Fi Needs connect plus device	Allows you to track your washer and dryer cycles and set alerts remotely to a smartphone
GE (storage)	Fridge	Yes	Wi Fi Needs connect plus device	Allows you to receive alerts and reminders, e.g. filter replacement, or if door has been left open

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The challenge for smart environments

Is to make configuring smart devices and environments <mark>accessible and with enough options</mark> to be relevant to individual needs.

Many devices such as phones become accessible to people once configured to their needs … but the configuration process is often not accessible.

Disabled people's needs are often particular and nuanced, devices and environments need to acknowledge this.

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The way to respond to this challenge is for designers of smart environments

to include people with impairments throughout the design process (Usability and User Experience - from ideation, prototyping and beta testing)

And not only for accessibility testing

Because Inclusive design should not be seen as

Design to the lowest common denominator

But more as, through tackling the real world messy problems, disability becomes a resource for design

Finding creative solutions and interactions to the benefit of all

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Thank you

Any questions?

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