Speculative Design and the Future of an Ageing Population
Report 2: Techniques

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Executive summary

The Government Office for Science is undertaking a project to bring together and generate new evidence about the likely impact of an ageing population on society. The project takes a life-course approach, including the choices that people make throughout their lives, and the implication of an ageing population. It was developed around speculative and critical design (SCD) techniques, representing the first time that these methods have actively been used in UK government policy processes.

The role of visions, storytelling, and fictions around science, technology and the publics has come under particular scrutiny in recent years. This includes a greater focus on SCD approaches, in which fictional artefacts that bridge the speculative and the everyday are utilised to encourage publics to explore the implications of new developments across science, technology, and politics, and inviting critiques.

Three workshops were run, based around themes of the future of work, services, and transport. Six separate visual artefacts were developed, tailored around the workshop themes and the city they were hosted in. Unfamiliar 'future' elements were grounded in familiar worlds, with realism generated through a literature review and brief foresight analysis. Semi-structured discussions were guided around positive and negative aspects of the images; feelings and emotions; and types of personal and institutional change.

The workshops were successful, with the complex open-ended images offering a common starting point for participants, and the elements within them leading to rich discussions around the world they contained. Whilst workshops with a single image ('Services', Leicester) led to a more in-depth discussion around the subjects it raised, participants preferred to work with multiple artefacts as it allowed for points of comparison. Guided discussions also allowed participants move beyond polarising debates for 'good' or 'bad' to voice opinions about the images that were not so immediately obvious – for example, their positive aspects – and the points of conflict within them (for example, how certain elements were viewed as positive or negative by different participants). This also allowed us to steer discussion away from a too-heavy

focus on the technological realism of what was portrayed in favour of considering the future possibilities intimated by these artefacts.

In future work, it would be useful to explore the use of other forms of artefacts such as objects or film which could preclude the need for text, thus balancing the need to spur discussion with the awareness that, with these methods, every detail counts.

1. Introduction: What is speculative and critical design?

The role of visions, storytelling, and fictions around science, technology, and the publics has come under particular scrutiny in recent years. The role of expectations and foresight has been long-established in this space, as established through a rich literature on the sociology of expectations (Borup et al 2006, Brown et al 2000, Brown and Michael 2003, Selin 2007, Van Lente 2000, Van Lente and Rip 1998), which describes how expectations, as the 'wishful enactment of a desired future' (Borup et al. 2006: 286) are 'both the cause and consequence of material science and technological activity' (ibid).

Common to all emerging technologies is the sense that 'the stakes and the expectations are high … [but] the situation is very fluid, unpredictable and no actor has clear knowledge what the technology will bring.' (van Merkerk and van Lente, 2005: 1096) Operating under conditions of uncertainty, with high stakes and imperfect information, individual actors come to rely on expectations held in common. Such expectations 'shape the mind sets of [these] various actors, while, in their turn, expectations will be shaped and reshaped by research results, findings in other technical fields, or external forces.' (van Merkerk and van Lente, 2005: 1097). In this context, futures-oriented abstractions can be generative in establishing norms and use cases, mobilising and deploying investment, and even functioning as a form of informal technology assessment. As innovation is inherently futures-oriented, understandings of new science and technology – and thus the policy around them – cannot operate in isolation from understandings of the future itself.

What form these expectations take, however, has expanded from sociological research into the wider domain of fiction. Speculative Critical Design (SCD) is an approach pioneered by Anthony Dunne and Fiona Raby (2013) during their tenure at the Royal College of Art. Pitched in explicit opposition to dominant 'design as service to industry' processes developed over the twentieth century, SCD creates fictional artefacts – objects, images, films, texts, and more – that bridge the speculative and the everyday, inviting publics to explore the implications of new developments across science, technology and politics, and unsettling tacit assumptions and social norms (cf. Bassett et al 2013).

SCD techniques often ally closely with those of design fiction. As popularised by designer Julian Bleeker (2009), design fiction is a process for creating prototypes that are not intended to demonstrate proof of feasibility but, instead, gesture at a story or milieu. By coupling the speculation inherent in design with the creative licence of fiction and the pragmatic immanent reality of fact, design fictions enable forms of storytelling that allow us to imagine unrealised objects in use; while also providing alternative value systems for designers – and, potentially, policy-makers – to consider the political and social qualities of objects. 'Diagesis' lies at the root of design fiction methodologies, presenting objects and visions from another world and inviting the audience logically unpack what is not being seen in that world. SCD can thus be defined as the deployment of diegetic prototypes to create design fictions which invite critique of particular technologies, systems, and societies.

Originating in a culture and context of design but – in the vast majority of cases – with no clear manufacturable product, much SCD work is to be found in a gallery setting, nearer to the art world and away from the wider publics it seeks to engage. This has begun to change as the field has gained popular attention, and the routes through which SCD approaches can lay claim to making change are now subject to analysis and evaluation. This work, for Policy Lab and the Government Office for Science, represents ones of these investigations.

How has speculative design been used in policy?

Despite explicitly advocating its potential for 'helping people participate more actively,' enabling the exploration of pluralistic futures and important issues of the present, speculative design's capacity for sustained public engagement, particularly as mediated through policy bodies, has thus far been under-explored. Many speculative design projects either operate as stand-alone spectacle, or as engagements with those deemed to have 'expertise' – scientists and technologists, political scientists, economists, but rarely wider publics.

An example of the latter is Stuart Candy and Jake Dunagan's work on 'experiential futures' at the Hawaii Research Centre for Futures Studies. Commissioned by the Hawaii State Legislature, Dunagan and Candy's 'Hawaii 2050' project (2006) asked 600 people to engage in considering potential futures around sustainability. Candy and Dunagan developed four immersive staged scenarios – a gubernatorial debate, a citizenship ceremony for refugees of climate change, an environmental workshop, and a business pitch – engineering situations where the audience stood in for members of society to briefly become stakeholders in the futures portrayed. The experience had an important impact on attendees, with 92% of attendees agreed that 'the opportunity to experience alternative futures was thought-provoking and motivates me to action'. However, the audience remained within the boundaries of policy, rather than wider publics.

Beyond government, policy-facing bodies have also taken a wider interest in what speculative design and fictions might have to offer. As part of wider research around futures and foresight, NESTA commissioned a paired set of working papers in 2013 around the subject: 'Better Made Up: The Mutual Influence of Science Fiction and Innovation' by Caroline Bassett, Ed Steinmueller, and Georgina Voss; and 'Imagining Technologies' by Jon Turney. As their titles indicate, however, these papers focused more on the co-construction of speculative fictions and the process of technological innovation rather than the policymaking process – though, as we describe below, had much to offer this project in terms of the design process.

To our knowledge, this project represents the first time that speculative design techniques have been *actively* used within the policy process in the UK. Foresight units have become an increasingly common part of governance; however, the use of SCD has yet to become part of this toolkit. In this project, we explore what this technique has to offer the policy-making process, its benefits and its limitations.

Where else are design fictions found?

Beyond government, the influence of speculative design can be seen in a number of different spaces:

- *Commercial design:* This form of design can sometimes be systematised. David Kirby (2009, 2010) describes how large technology companies sometimes hire science fiction consultants to construct diegetic prototypes for ultra-realistic cinematic scenarios, specifically for technologies that would be costly and time-consuming to construct 'in the real'. Perhaps the

most well-known example of this is the gesture interface developed by John Underkoffler for the film 'Minority Report' (2002). In this form, diegetic prototypes can be viewed as a form of marketing, securing investment and buy-in for technologies that do not yet exist.

- *Design schools:* Following Dunne and Raby's pioneering approach, critical and speculative design approaches have been embedded in the curriculum of several design schools, and utilised as a core approach in research projects. One of the most interesting and relevant recent works is Dr Anne Galloway's 'Counting Sheep' project at the University of Wellington. This explores the role that design research can play in supporting public engagement with the development and use of science and technology, particularly around the use, generation, and collection of data in the context of New Zealand Merino farming communities. Through engagement with farmers, scientists, government policy makers, and others, Galloway's team developed fictional scenarios around possible future production and consumption of merino sheep and products.
- *Art and culture institutions*: Speculative design has been used to open up public debates around emerging technologies, through work commissioned and hosted by arts and culture institutions. Recent work in this space includes:
  - 'United Micro Kingdoms' (Anthony Dunne and Fiona Raby, 2013) – Large scale exhibition exploring competing social, ideological, technological and economic models, in the UK. Commissioned by the Design Museum.
  - 'The Monopoly of Legitimate Use' (Tobias Revell, 2014) – Film piece exploring notions of material and technologically mediated statehood.
  - '75 Watt' (Tuur Revital and Cohen van Balen, 2013) – Film piece and physical artefact, exploring physical labour in high-process manufacturing plants.

2. Method: Artefact and workshop design

Three workshops were run, in which a specially designed artefact was used to facilitate discussion and invite debate, based around themes of the future of work, services, and transport. Through structured discussion and debate and the introduction of speculative artefacts, these workshops allowed participants to explore the implications of the theme of the workshop; facilitate current understandings around that theme; and enable them to explore aspects of multiple possible and potential futures.

Artefact design

For each workshop, we created one or more digitally-rendered speculative image, depicting possible aspects of work, services, or transport provision in the year 2040, and tailored to the city that each workshop was held in. Like science fiction, speculative design can make the world strange to us through 'cognitive estrangement'; defamiliarising and restructuring our experience of the present (cf. Jameson 2005); offering a new perspective on its operations; jolting us out of our empirical environment; and providing rich and open-ended fictions which we can populate with our own scripts. Following Bassett et al (2013), the images were deliberately design to ground unfamiliar 'future' elements (eg. Self-driving cars, assistive exo-skeletons, robot repair shops) in otherwise familiar contexts. As literary theorist Darko Suvin describes, cognitive estrangement combines with 'epistemological gravity', allowing speculative fictions to gain authority because they appeal to plausible logics within internally consistent worlds (eg. If self-driving cars work like *this*, then *that* will happen).

For the artefacts, this realism was generated through a literature review and surface-level foresight analysis about the subject of each workshop, looking for trends and drivers around the elements relevant for each workshop. This was combined with elements pertaining to the city that each workshop was hosted in, to offer further experiential 'hooks' for participants – for example, referencing Manchester's canals in the 'Transport and Mobility' workshop – but not so heavily that the workshops became focused around the city itself.

From this research, we drew together the ideas for a series of scenarios that addressed the theme of each workshop, containing several layered, internally consistent elements. To explore the efficacy of using these type of images for policy, we developed a different number and type of visual artefacts for each workshop:

Workshop 1: Future of work

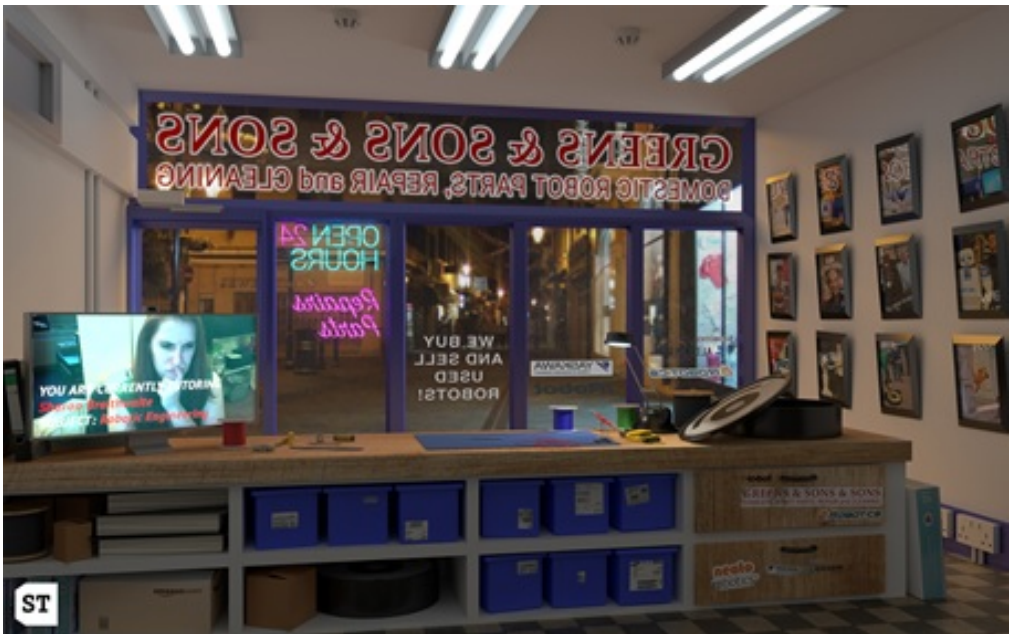

Image 1: Shop

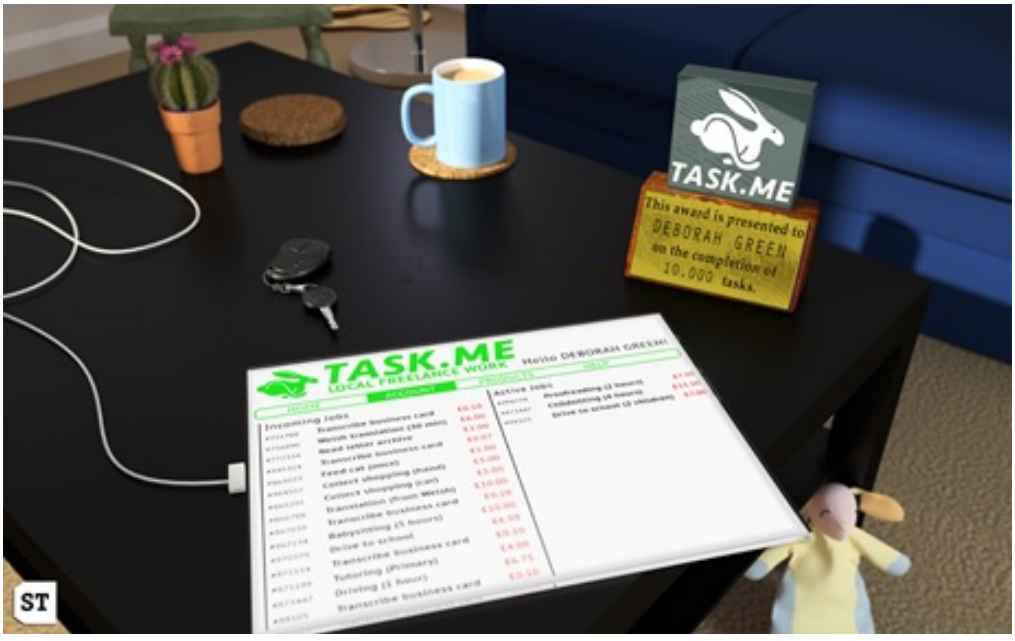

Image 2: Home

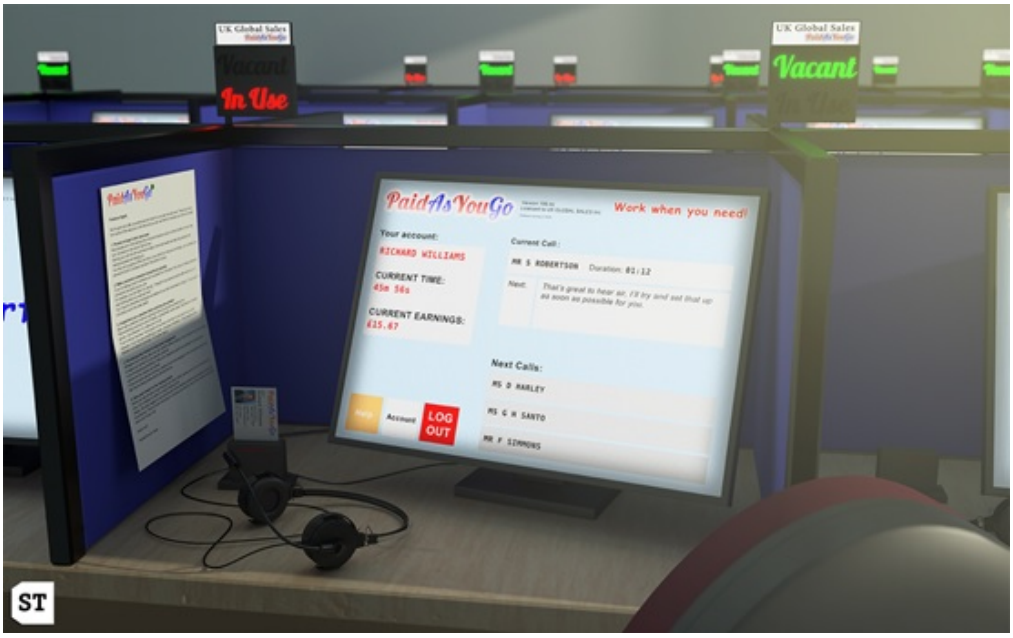

Image 3: Call centre

Workshop 2: Future of services

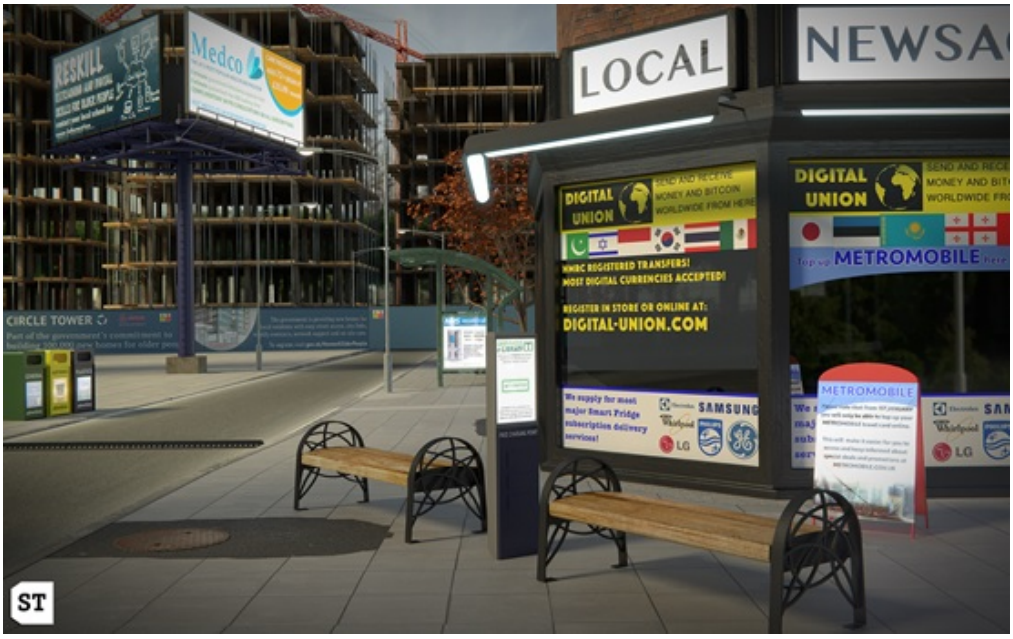

Image 4: Street scene

Workshop 3: Future of transport and mobility

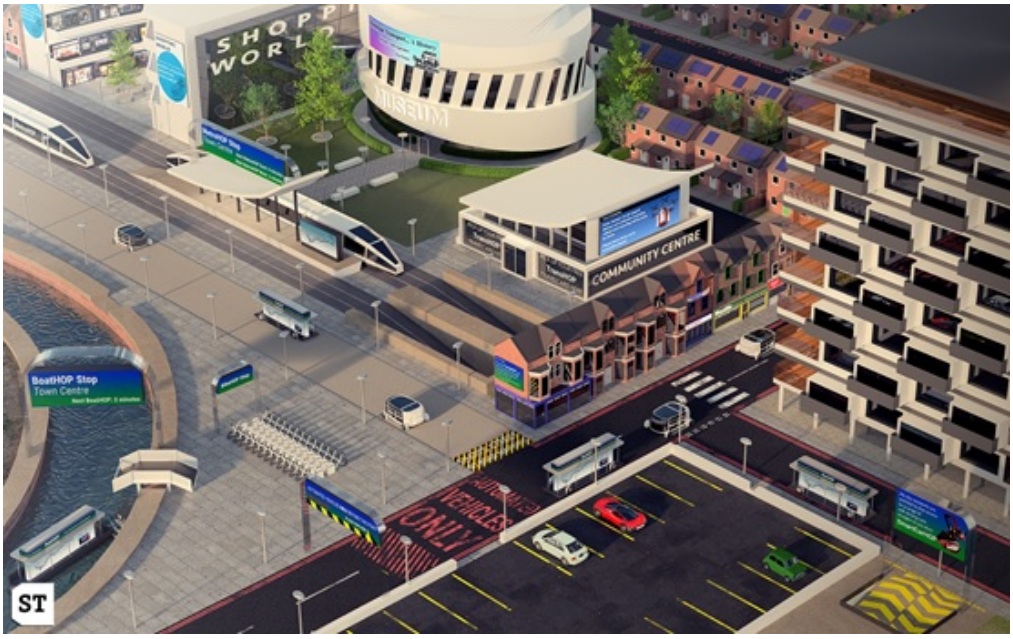

Image 5: Public governance

Image 6: Private governance

Workshop design

Introduction and scene setting: Each workshop began with an introduction from Lead Experts – in Swansea and Manchester, Professor Sarah Harper, and in Leicester, Professor Sir Mark Walport – laying out the purpose of the workshop. We then introduced the notion of speculative design, describing how the images were not predictions, but comprised a collection of things that might or might not happen, and which were intended to provoke debate and discussion. We emphasised that we did not expect participants to agree with each other or to think that what was depicted was wholly realistic. Instead, we were interested in their reactions to the scenarios, and what kind of world they imagined to be beyond its borders.

Colour cards: Semi-structured discussion was guided by the use of 'colour cards', influenced by the de Bono Group's 'Six Thinking Hats' approach.

Card	Questions
Yes (Green)	What do you like about the image? Are there things that resonate or are familiar?
No (Red)	What do you dislike about the image? Are there things that you disagree with or find unlikely?
Feelings (Blue)	Put yourself into this scenario: what are your gut feelings about it? Do you feel uncomfortable, sad, happy, relaxed, anxious?
Personal change (Yellow)	What changes would you make to your own life now if this scenario might be in your future, or part of it?
Outside change (Purple)	What changes would you want others (policymakers, local government, companies) to make if this scenario might be in your future, or part of it?

3. Outcomes and discussion

Overall, the workshops went extremely well, generating rich and lively discussion and positive feedback from participants. The material generated to feed into the policy process, is documented in the Report 1: Outcomes. Here, we examine the efficacy of the speculative design techniques themselves:

Complex visual images

The use of images was very successful, offering a common starting point for participants. The finely textured complexity of each image, populated with many different elements, allowed for a rich discussion about the meanings of each element. The 'story' element of the artefacts – that each one had been designed around a particular fictional, internally consistent scenario, rather than as a disparate collection of images, was also successful. This allowed for consideration of what the many parts suggested about the world beyond the edges of the picture, and enabling broader discussion about large themes and their components.

Overall, it was more successful to have multiple images, but not so many that participants became overwhelmed.

- *Work:* By the time we'd reached the third image in the Work event, participants were extremely familiar and comfortable with the speculative approach, and able to pull out themes of the overall discussion from across the day. However, by this stage they had also started to tire; and it wasn't clear how much value the final image added to the workshop.
- *Services:* Having a single image for the Services workshop meant that participants were able to have a much more in-depth discussion about the artefact, spending more time with each Colour Card; and were also able to integrate these thoughts into a valuable larger discussion about how the 'bad' elements of this scene could be converted to 'good' and vice versa. However, participants commented that they would have preferred to have a second image, to allow for comparison.

- *Transport and Mobility:* The images for this workshop were deliberately designed to be different versions of each other, under different forms of governance. This echoing allowed participants to draw direct comparisons between two different political/economic systems, identifying which different elements in each they found desirable, relatable etc.

Colour cards

The use of distinct cards to prompt and guide discussion was also extremely successful, allowing participants to explore and voice a range of opinion and in particular, those which may have otherwise been more challenging to express. When presented with an 'other' imaginary, it can be very easy to zoom in on its negative aspects, identifying how it is different and less satisfying or realistic than the here and now. Guiding a discussion about the positive elements of the images, and also of participants gut feelings around them – which were initially harder to articulate – was valuable. The use of the cards in combination also allowed interesting points to rise out of the discussions, as elements seen as undesirable by some participants were highly attractive to others (for example, one younger participant saw the high-rise fully serviced apartment blocks in the Services workshop as prison-like and miserable, whilst a retired participant viewed them as an appealing option to 'downsize' into).

Local grounding and verisimilitude

Each of the images was grounded in local elements, directly engaging with the world in which participants lived and offering them a way to critique, improve upon it, or work within it (for example, the reference to the call centre economy in Swansea). This opened up wide discussions between participants about their own personal experiences and daily lives.

As part of the grounding, the images were intentionally not designed to be particularly 'future-y'. Participants commented on this aspect – which we will take as a compliment, as the more 'future-y' something looks, the greater the cognitive estrangement and the harder it can be to relate to one's own experience. The unexpected grounding was picked up as a fruitful discussion point – for example, with one participant in the 'Work' workshop identifying that the 2040 robot repair shop was similar to similar white goods shops in Swansea.

Weaknesses, challenges, and cautions

Speculative design can be seen as a means of framing and mediating expectations between different communities. However, as Basset and colleagues (2013) question: to what extent do these fictions, in acting as a mediator, shape or even constrain expectations? Reading is never taken out of context and there will always be a relationship between the reader and the 'text'. One aspect of how speculative design can be powerful is through consideration of reading practices.

In the workshops, it became apparent that there was a range of literacy around how to 'read' the images. Some participants quickly focused on particular artefacts and used them to open up wider discussion – for example, the forms of intergenerational work and skill break-down in a robot repair shop. Conversely, some elements of the designs which had not been intentionally 'placed' in the image were also picked up on with equal fervour, such as whether the layout of the repair shop was realistic; or what the lack of rain in the 'Transport' scenes indicated about climate change, given that it was located in the North of England (rather, rain is notoriously difficult to render effectively). In facilitating the workshops, we were mindful of steering discussions away

from current life minutiae (for example, the current cost of high street parking) and into potential future implications (who would have access to autonomous forms of transport).

Recommendations for future SCD work

Speculative design has the potential to act both as a tool to reflect on the present and consider the future. Many of the participants in the workshops were over 60 and/or retired, and sometimes expressed a reluctance to consider life in 2040. However, older participants offered many valuable insights, particularly when in discussion with younger people (for example, around experiences with technologies). For future workshops, a mix of participants would be useful to stimulate a richer discussion.

Pragmatically, when using images filled with so many details, particularly those which were text-based (eg. Shop signs, advertising), it is important to provide artefacts large enough to show all of these details. Projecting the images onto the walls assisted the large group discussions, as did having images printed and mounted on board large enough to see. For future workshops, it might be useful to have these images larger still.

One of the earlier design constraints was that the project made a conscious choice not to use images of people in the artefacts, as a way of avoiding the stereotyping sometimes found in the 'persona' approach. This led to constant critiques across all groups that the scenes seemed empty, unfriendly, and perhaps even under some sinister dystopian control. In future work, it would be useful to populate images with abstracted people, to overcome this issue.

By providing an open-ended image, the artefacts were intended to move past polarising debates of either 'good' or 'bad', with colour cards directing discussion about the more ambiguous elements to allow for both positive and negative interpretations. However, very simple visual cues can push perceptions on one direction or another, such as dark skies or presence of greenery, indicating that for this type of visual discursive work, every small detail matters. Other SCD practitioners have overcome this issue by avoiding close detail altogether (such as in Dunne and Raby's United Micro Kingdoms), creating low-resolution, almost cartoon-like outputs where the visual language intimates that the artefact is definitely not 'real'. Balancing the need for detail to spur discussion with the awareness that every detail counts is something to be mindful of in future work.

Finally, this type of design work is very complex and time-intensive to produce, both in terms of background research, and development of the images themselves. The research and production time for this project was extremely short. Whilst we are satisfied with the final artefacts and workshop delivery, it would be useful to have a longer development period for future work, particularly to explore the creation of 'denser' artefacts such as objects or film, which can achieve different forms of high definition communication that precludes the need for text.

We advise that these tools are useful and valuable for testing and exploring ideas around future scenarios, unpicking subtle differences (ie. Not A/B testing), and nudging policy interventions. They can be considered as a parallel complement to the existing foresight toolkits: rather than a specific forecasting technique, these methods take on the deliberate assessment of certain future scenarios, acting both as a form of public engagement and a means of capturing public responses – enthusiasm, reluctance, insight – in a way which is legible to policymakers.