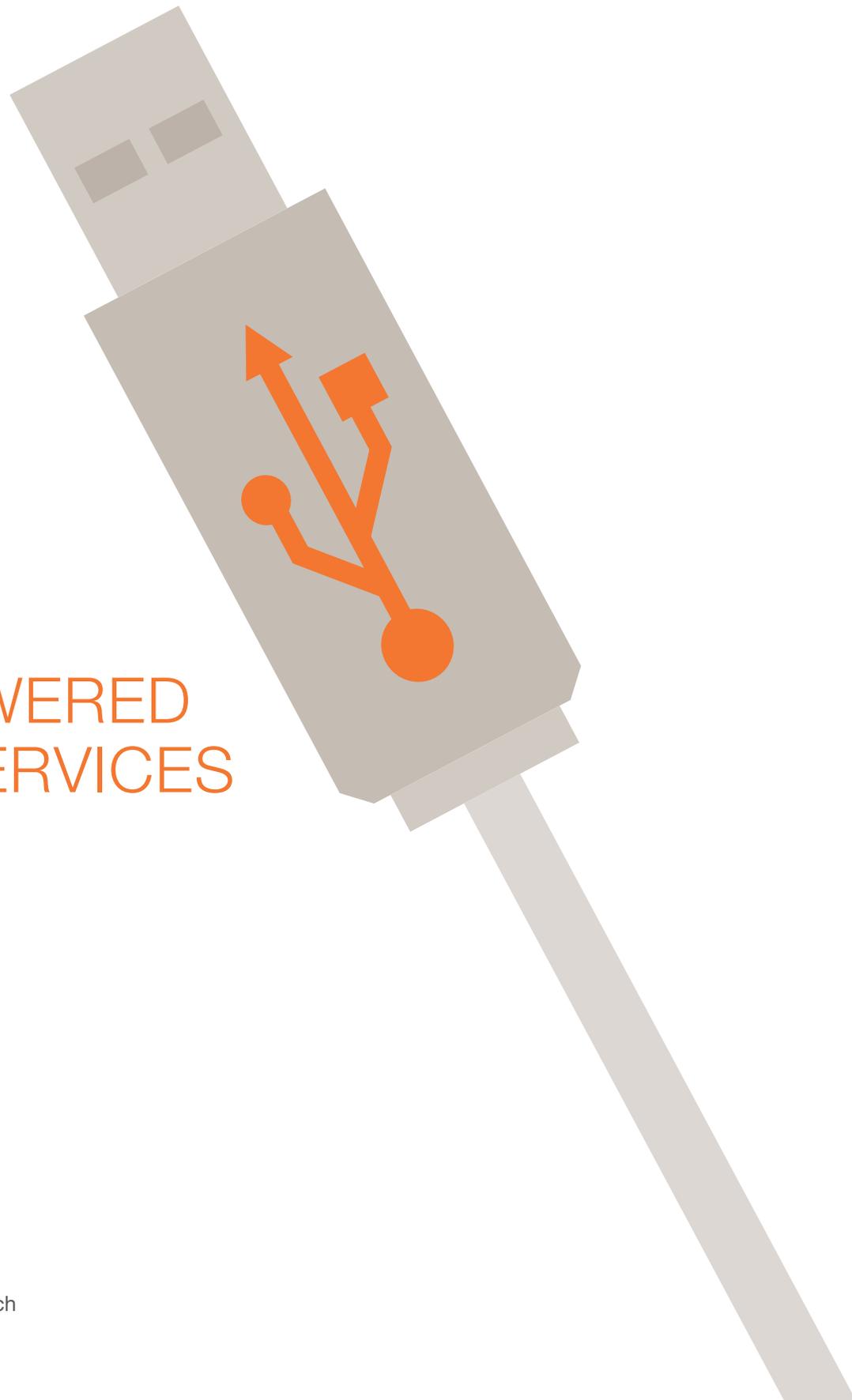


BUILDING TECH-POWERED PUBLIC SERVICES

REPORT

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ABOUT THE AUTHOR

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EXECUTIVE SUMMARY

Can technology improve the experience of people using public services, or does it simply mean job losses and a depersonalised offer to users? Could tech-powered public services be an affordable, sustainable solution to some of the challenges of these times of austerity? This report looks at 20 case studies of digital innovation in public services, using these examples to explore the impact of new and disruptive technologies. It considers how tech-powered public services can be delivered, focusing on the area of health and social care in particular.

Public services face quality and productivity challenges

The public sector in the UK has paid a heavy price for the global financial crisis, with flat or falling budgets in all areas. Social care has seen deep cuts in recent years, and the NHS budget has remained more or less frozen. These two budgets account for around a third of all government spending between them, and demand for the services they provide is rising rapidly, due to an ageing population and the changing nature of disease from acute illness that can be cured to chronic illness that can only be managed.

The reality of these changes means that many people live with multiple chronic conditions – such as heart disease, diabetes and depression – for decades. Successful management of these conditions requires people to be equal partners in decisions about their care and treatment – to be active, engaged and empowered, rather than passive recipients of public services.

This means that innovations in health and social care are operating within a context where:

- these services need to do more with less
- policymakers are looking for alternatives to ever-increasing health and social care spending as populations age
- they are particularly seeking solutions that can put people in control and help services to ‘join up’ around their needs.

Digital innovation has the potential to be part of the solution

Within this context, there are certain areas where digital innovation can make a real difference.

- **Timesaving:** Technology may not be able to replace a nurse, doctor or care worker but it can free up their time to focus where they are really needed. The Department of Health estimates that every 1 per cent reduction in face-to-face contact required for transactions such as booking appointments could save £200 million.
- **Participation:** There is potential for the participatory aspect of the social web to empower those who use public services, supporting self-management of chronic health conditions, putting people in touch with others living with the same condition, and motivating people to stick to treatment plans.
- **Encouraging health:** Technology could make an even greater contribution if it can help people to stay healthy in the first place; the popularity of apps like MyFitnessPal – which had 30 million users in 2012 – suggests this may be possible.

Public services lag behind other sectors in embracing technology

The impact of technology on public services has lagged behind other industries. High-profile failures of large-scale public sector IT projects are common, from the NHS National Programme for IT to recent problems with the universal credit IT system. The government has now adopted a more decentralised approach, seeking to encourage innovation and local solutions.

We follow this approach in this report, focusing on grassroots projects that develop technological solutions to specific problems rather than standardised 'off-the-shelf' products. We focus on frontline tools that interact directly with practitioners and users – this report does not cover the huge potential of 'big data' to improve practice.

There are good examples of public services implementing innovative technologies

Through seven in-depth case studies we explore the challenges facing digital innovators seeking to work in health and social care public services and gather their insights on the critical factors for success.

1. **Patchwork** creates an elegant solution to join up professionals working with troubled families, in an effort to ensure that frontline support is truly coordinated.
2. **Casserole Club** links people who like cooking with their neighbours who are in need of a hot meal, employing the simplest possible technology to grow social connections.
3. **ADL Smartcare** uses a facilitated assessment tool to make professional expertise accessible to staff and service users without years of training, meaning they can carry out assessments together, engaging people in their own care and freeing up occupational therapists to focus where they are needed.
4. **Mental Elf** makes leading research in mental health freely available via social media, providing accessible summaries to practitioners and patients who would not otherwise have the time or ability to read journal articles, which are often hidden behind a paywall.
5. **Patient Opinion** provides an online platform for people to give feedback on the care they have received and for healthcare professionals and providers to respond, disrupting the typical complaints process and empowering patients and their families.
6. The **Digital Pen** and form system has saved the pilot hospital trust three minutes per patient by avoiding the need for manual data entry, freeing up clinical and administrative staff for other tasks.
7. **Woodland Wiggle** allows children in hospital to enter a magical woodland world through a giant TV screen, where they can have fun, socialise, and do their physiotherapy.

Our interviewees highlighted a culture of resistance to new technology in the public sector, borne of risk aversion, fear of job losses and a lack of understanding of the potential of the social web, among many other factors. To overcome this initial resistance, entrepreneurs needed:

- expertise in the sector they were seeking to work in
- seed funding to get them going and bridge funding to help them scale up
- a strong business case that demonstrated the quality improvements and savings that could be made.

Above all, the case studies in this report demonstrate the critical importance of iterative, user-based design. This process consists of developers working with the eventual users of a product from the very start in an iterative cycle that involves repeated testing. The process creates value from day one but ensures that the product is constantly improved in the real-life context in which it is to be used.

Pioneering and leading edge examples show the potential of digital innovation

Through a further 13 high-level case studies we explore the current and future potential of technology in this area, covering a range from implemented projects through pioneering initiatives to the leading edge of innovation, such as:

- **Re-Mission**, a game that provides young people with support to cope with cancer.
- **HealthUnlocked**, a website that hosts online forums for people with specific health conditions.
- **UniversalDoctor**, a translation app for health professionals.

Together, our case studies illustrate the broad range of innovations that are already available. In the pioneering category, **online personal care planners** and **inhaler training devices** for children show the near future for technology in health and social care. Leading edge examples like **Multifunctional Epidermal Electronics** – a temporary tattoo that can take health measurements – demonstrate the potential for these innovations to transform the delivery of public services.

Tech-powered public services are more joined up and empowering

The case studies in this report also illustrate how technology can improve the quality of public services by transforming the experience of people delivering and receiving these services. Many innovations in this area are focused on creating more active, engaged and empowered users, through mobile apps. These range from information services like Mental Elf to monitoring apps like MyFitnessPal and motivational games like Re-Mission. These technologies can change the dynamic between professionals and service users, opening the door to much greater shared decision-making. Other examples, like Patchwork, show the power of technology to put public services in touch with each other, so they can coordinate around users' needs.

Other innovations are focused on freeing up professional time. In this case, there is a perception that these initiatives could diminish quality, especially in the caring professions, where relationships are so important. Of course, not all aspects of public services require face-to-face contact, and it is these non-relational, *transactional* elements that should be the main focus for labour-saving technologies. However, even where relationships are central to service delivery, labour-saving technology need not undermine the experience. While it might be naïve to suggest that labour-saving devices will enable professionals to spend more time with users, they could contribute to other positive outcomes, such as shorter waiting lists.

There is a potentially large impact on productivity but this is hard to measure

Labour-saving technologies like the Digital Pen and ADL Smartcare have a clear impact on productivity, and we have estimated that these types of innovations could create staff time cost savings of £22 million and £8.8 million respectively, if delivered nationally. Technologies that join up staff, like Patchwork, could generate large savings through earlier intervention, so avoiding later, more expensive demands on public services such as hospital admission, imprisonment or a child being taken into care.

Those innovations that create more active and engaged users have a similar potential, as research suggests that improved self-management could save around £1,800 per patient per year by reducing their use of healthcare services. The greatest potential savings would

come about if monitoring apps like MyFitnessPal could help people to maintain a healthy lifestyle and avoid developing illnesses in the first place.

It is difficult to measure the impact of interventions that seek to *prevent* things from happening, as it means understanding what would have happened without the technology. The people we interviewed for this report¹ were committed to building a stronger evidence base for their innovations, and organisations like Nesta and the Cabinet Office are providing support to do this. We recommend more rigorous use of techniques like randomised controlled trials to build the case for the impact of technology on the productivity of public services.

Delivering tech-powered public services

There were clear and consistent lessons from our interviewees on how to successfully implement technological innovations in public services. Five stood out:

- **User-based iterative design** is critical to delivering a product that solves real-world problems. It builds trust and ensures the technology works in the context in which it will be used.
- **Public sector expertise** is essential in order for a project to make the connections necessary to initial development and early funding.
- **Access to seed and bridge funding** is necessary to get projects off the ground and allow them to scale up.
- **Strong leadership from within the public sector** is crucial to overcoming the resistance that practitioners and managers often show initially.
- **A strong business case** that sets out the quality improvements and cost savings that the innovation can deliver is important to get attention and interest from public services.

Government's role

Large-scale, top-down public sector technology programmes have been beset by problems, and we suggest that encouraging grassroots innovation is the best path to successful tech-powered services. Nevertheless, it is right that there is an ongoing role for national infrastructure to support the purely transactional aspects of delivery, such as online booking in the NHS.

Beyond core transactional elements, government should seek to encourage innovation through an open and collaborative approach. In the health sector this has already helped to create a vibrant culture around digital innovation, allowing schemes like the NHS Hack Days and Public Service Launchpad to take root.

There are three specific areas where government should support action:

- **Demonstrating impact:** Government should team up with a digital specialist to produce guidelines on evidencing quality improvements and cost-effectiveness of projects in this area.
- **Overcoming resistance:** Government should ensure that the potential of digital technology is built into training for public service workers.
- **Harnessing user demand:** Government should raise awareness among users and practitioners of the innovations that are available for them to use directly and free of charge.

¹ Ten people, across the seven major case studies.

Conclusion

Given the pace of technological change and the rapid and enthusiastic uptake of digital innovations by the public, it is a question of when not if public services become tech-powered. The focus must therefore be on how to ensure the successful deployment and spread of innovations. As people become ever-more accustomed to using digital technology in other aspects of their lives, user demand may be an increasingly important driver of change within our public services.

INTRODUCTION

Public services are under pressure both from the current period of fiscal austerity and from rising demand driven by demographic change, particularly ageing. It is true that as societies get richer they almost universally choose to spend more money on public services such as health care and education (Nuffield Trust 2013). However, as all politicians are aware, western publics are reluctant to pay the additional taxes required to meet rising demand (see for example NatCen Social Research 2013). This means there is a growing gap between revenues and expenditures that must be met both by prioritisation and by radically improving productivity. Public services face another challenge too: while there have been considerable improvements in quality in recent years, the experience of many users is not good. Too often services are delivered in a depersonalised fashion and in a way that neglects the importance of good-quality relationships among citizens and between citizens and professionals (see Muir and Parker 2014 forthcoming).

This report examines the potential for new technologies to address these twin aims: to increase productivity and to improve service quality, focusing particularly on the realm of health and social care. This sector accounts for around a third of government spending (SMF 2013) and is facing a perfect storm of rising demand and costs as budgets flatline. There is substantial agreement that the health and care system is outdated and overly focused on treating acute episodes of illness in large hospitals – a ‘sickness service’ that treats people and sends them on their way again (see for example Ham et al 2012). This does not cater to today’s needs, which are dominated by chronic conditions – long-term, incurable illnesses that people learn to live with and manage for decades. High-quality care for people with chronic conditions is characterised by support for them to self-manage their own health, thereby avoiding crises and flare-ups and the need for distressing and expensive hospital visits, and so also improving productivity.

While social care has seen deep cuts in recent years, the NHS budget has remained more or less frozen. Together, health and social care services need to do more with less, but these ‘caring industries’ present an additional challenge – they are labour-intensive. Every sector that has seen big increases in productivity, such as manufacturing, has achieved this by implementing labour-saving and cost-cutting technologies. Economist William Baumol (2012) explains that while other sectors implement labour-saving technologies and improve their productivity, caring for a patient still requires the same number of nurses – only their wages have increased over time. For this reason, NHS spending has outstripped inflation, with historic average growth of 4 per cent per year (Crawford and Emmerson 2012). It’s not just Britain: across developed countries the share of GDP spent on healthcare has risen. Baumol argues that it is logical for countries to increase spending on public services as other goods and services become cheaper, but in countries barely recovering from a severe depression, most policymakers and the public are looking for alternatives to ever-increasing health and social care spending.

Technology has tended to add to costs in the NHS rather than saving them, as expensive new procedures and drug treatments are developed. Technology may not be able to replace a nurse, doctor or care worker, but it can save them time. And there are areas, even in the labour-intensive caring industries, where face-to-face contact is not essential. Patrick Dunleavy and Leandro Carrera (2012), in their study of public sector productivity, describe how big gains have been made where *transactional* services have embraced digital technology. For example, more than three-quarters of self-assessment tax returns were filed online in 2010/11, with no loss of quality. The Department of Health (2011) estimates that if the number of face-to-face contacts in the NHS were reduced by just 1 per cent it could save £200 million.

The rise of chronic conditions and subsequent policy drive towards self-management, prevention and integration – to improve quality and dramatically increase productivity – creates an opportunity for new technologies. Digital innovation – especially the participatory potential of ‘web 2.0’ or the social web – has the potential to support self-care by providing people with accessible information, motivational games, peer support and other tools. In this way, technology can be a democratising force, empowering users and changing the dynamic between patient and doctor.

Digital innovation might also play a role in preventing the lifestyle factors that are linked to chronic conditions, such as obesity, lack of exercise and smoking. In many other industries, digital innovations have created more active consumers (for example, TripAdvisor for hotels) and this report will explore whether the same is true for public services. Applications like MyFitnessPal, which had 30 million users in 2012, suggest it may be.

MyFitnessPal

- <http://www.myfitnesspal.com/>

A free (ad-supported) nutrition, weight, and exercise management web and mobile app, based in San Francisco, MyFitnessPal allows the user to track their nutrition and water intake, exercise and weight. The user is encouraged to set a goal, and use and contribute to the library of over 2 million food items (searchable by keyword or packaging barcode) to register ingredients and meals. The same is possible for exercise, and the user can supply weight data or waist measurements. The data is visualised, showing ‘net’ calories against daily goal intake, and weight loss/gain progress. Nutritional information including vitamin, salt, protein, carb and fat is listed. There is a strong community aspect – you can follow friends and comment on their progress, and access managed ‘meal plan’ programmes via a blog community.

Impact: In 2012, the app had 30 million users around the world (Ha 2012). Systematic review evidence shows that tracking nutritional intake is valuable when working towards weight and health goals (see Burke et al 2011).

The impact of technology on public services has lagged behind other industries. We are still a long way from logging into a smartphone app with our NHS number, viewing prescriptions, monitoring our weight or blood pressure and booking appointments. Yet many of us have become accustomed to managing even sensitive information like bank account transfers in just this way. High-profile failures of large-scale public sector IT projects are common, from the NHS National Programme for IT, drawn to a close in 2010 with many items undelivered (PAC 2013), to the recent problems with the universal credit IT system (NAO 2013). The Department of Health and NHS England have now adopted a more decentralised approach as they pursue the health secretary’s aim of a ‘paperless NHS’ by 2018. In the two years since the publication of *Innovation, Health and Wealth* (DoH 2011) there has also been a concerted effort to improve the deployment and spread of innovation in the NHS.

We follow this decentralised approach in this report, focusing on grassroots projects that develop technological solutions to specific problems rather than standardised ‘off-

the-shelf' products. We focus on frontline tools that interact directly with practitioners and users, and as a result this report does not cover the huge potential of 'big data' to improve practice.

Seven major case studies based on in-depth interviews with the key protagonists provide a wealth of insights. We draw on these to analyse the impact of technology on quality and productivity, and to understand how tech-powered public services can be successfully delivered. A further 13 high-level case studies showcase innovations across the world, ranging from those that have been successfully implemented to pioneering and leading edge technologies.

1. MAJOR CASE STUDIES

The following case studies were selected as good examples of different kinds of digital innovation in health and social care across a range of localities in the UK. These include products developed in partnership with the public sector from the outset and designed for a specific use in a public service, as well as private enterprises for personal use. We were keen to include major case studies of innovations that have been fully implemented in public services to draw out the lessons from this process; the additional case studies in the final section include many more innovations aimed at personal users. The innovations include hardware, software and web-based products.

The case studies are based on detailed interviews with the key stakeholders or developing organisation. The interviews aimed to draw out the barriers to implementing digital technologies in the public sector. We also include evidence from internal and academic reports where the interviewees provided these. In each study we describe the innovation, explore the impact it has had on both service quality and productivity, and consider the wider lessons for implementing technological innovations in public services. The first case study unites many of the observations that were made repeatedly during interviews, and we use it to highlight the importance of iterative user-based design (see box on page 11).

1.1 Patchwork

- <http://patchworkhq.com/>

Patchwork is an app that connects the multi-agency team of practitioners around their clients in a local area. It was developed by London-based organisation FutureGov together with Lichfield District Council and Staffordshire County Council, and more recently with Brighton and Hove City Council and Surrey County Council.

‘Through the Patchwork project we’ve demonstrated ... you can have cheaper, more elegant, easier to use technology that does a job, doesn’t need huge week-long training sessions, saves money, and changes councils.’

Dominic Campbell²

Patchwork emerged when FutureGov founder Dominic Campbell watched a documentary on the catastrophic failings in care in the ‘Baby P’ case. Campbell had experience working in local government as a head of back office strategy, as well as experience of implementing big IT systems. He explains that while working within local government he became disillusioned by technology consisting of ‘inelegant inhuman systems that make you rewire your brain rather than fitting into the world around you’. He was astonished that the terrible circumstances around Baby P were able to come about ‘in an era of Facebook’, when the general public can be so closely connected to one another. Campbell explains that he wondered:

‘How can one case worker not know what another might be concerned with? ... I found information governance wouldn’t let us share information within ourselves, let alone across organisations ... so putting that together with the [Baby P] documentary I thought “I know it doesn’t have to be this way”.’

Instead, he became interested in the potential of:

‘... using modern open source networked technology to work in areas like CRM [customer relation management] and case management in

² Unless noted, quotes in this section are from Dominic Campbell in interview with Hannah Nicklin on behalf of Hide&Seek, 13 May 2013.

particular – so a lot around case records and joining the dots a lot of the time between silos of information in the public sector to make sure that the public sector is working as well as possible and also empowering practitioners to do the best job possible.’

This process saw the founding of FutureGov, set up around five years ago, to begin to think about new ways of developing technology for and with the public sector. The organisation benefitted from early Nesta investment, and used this to spend six months testing the Patchwork hypothesis with Lichfield in Staffordshire. This process began with 12 weeks of design interventions and roughly 8–10 weeks of prototyping. Campbell explains:

‘We think that design research is totally fundamental to articulating the problem accurately ... [Patchwork] has been going on for about three and a half years now, and I would say that a year and a half of that at least has been around design research of one form or another. In that first six months [design research] was two-thirds of it. Easily 50 per cent of our time.’

Following a pilot of the project in Lichfield, FutureGov expanded the process and went on to develop Patchwork in Brighton and Surrey local authorities.

User-based iterative design

Design research is a reflective process that works carefully alongside the eventual users and in the environments in which the product will be used. FutureGov (and other interviewees) favour this method of research alongside iterative design, which uses cycles of research, design, testing and analysis to develop a project. A user-centred approach helps build a product that is responsive to the evolving concerns and environment around a project, and that enables the practitioner from the outset. Rapid prototyping is used, consisting of ‘sprints’ of two-to-four weeks built into ‘iterations’ of two-to-three months. Dominic Campbell explains how this is a different approach:

‘A lot of the e-government stuff for the practitioner is very heavy duty, top-down, ‘we don’t trust you’, fill in this form ... our approach is much more about enabling them to do the best job that they can, first and foremost.’

Technology that is developed alongside ever-changing policy and practice brings huge benefits. Rather than buying expensive, off-the-shelf standardised products, iterative user-based design can build a product that is tailored to the exact problem, and tested with the people and context in which it will be implemented.

‘Ask what the most important thing is first off, then build that, and then every two weeks, every month, release a new version, so you’ve already started change on day one, not year three. And then when you get to year three you’ve actually got the product you need in year three, rather than the thing you needed years ago. Year-long release cycles in this field are just no good.’

The process of iterative user-based design is also useful in building trust between practitioners and developers or technology providers.

Impact

Quality of care: In connecting different practitioners around a child or family that they are working with, Patchwork can lead to better, more complete decisions and earlier interventions. Practitioners can express concerns and add comments and observations, all without sharing confidential case information. In creating a ‘social network-like’ environment around an individual, outside agencies, GPs, local authority practitioners, education services and other health practitioners can see who else is working with the child or family in question, and get in touch with queries or comments. A user-centred design process ensures that the programme is tailored to suit the users and that the various levels of team are satisfied with its use, meaning a more efficient take-up.

Productivity: Patchwork can save time for frontline staff, avoiding the need to spend time calling around to find out who is dealing with a child or family. It can help to build relationships between health and social care agencies and enable earlier intervention to prevent problems developing and worsening. Insofar as it prevents children and families from developing a need for more intensive public services, such as hospital stays or foster care, Patchwork has the potential to have a big impact on productivity, but it is very difficult to quantify the potential savings from avoiding future costs.

Wider lessons

For FutureGov, the first problems were a lack of trust and of basic contemporary and social technology literacy. So Campbell says that their initial work was around:

‘... teaching them the basics, just trying to get them to get back ... to the possibility of major corporate transformation through social technology. But they were so behind you had to show them the basics and make the market before they could even imagine that it was trustworthy enough to do something serious with.’

FutureGov also encountered specific resistance in the working culture of the local authorities to the idea of transparency. Campbell talks about how digital technology ‘codifies’ practice – how normal, logical practice quite often happens outside of official frameworks of behaviour. Putting this into a system as a supported behaviour acknowledges practices that *everyone does* in day-to-day work, but *no one talks about*. These are actions that officially might be frowned upon but are taken because the practitioner believes them to be in the best interest of the service user. Exposing these practices can be incredibly disruptive:

‘Patchwork is so challenging as a change to working, in ways we didn’t even realise ... people moan about the silos [of information on cases] when they’re in them and how disruptive they are to services, but if you give them the opportunity to join up those silos you realise that kind of openness and connectivity terrifies them ... It’s like going from dark to light overnight, you’ve gone from “this is my case, it’s locked down, I know I’m the only person who can see this stuff, I can write whatever I want about this individual” to the next moment where, for example, the drug and alcohol team are terrified because even though there’s no information sharing (it’s just a way of connecting practitioners) the police and JobCentre can see that they’ve also got a connection to that client. That’s suddenly ... a new level of transparency and openness that they’re just not used to.’

Frontline workers also sometimes felt that they did not have the capacity needed to learn how to use a new technology. While the Patchwork software is timesaving, learning how to work with it does require an initial time investment. An internal evaluation document produced by FutureGov notes that a significant response from practitioners (especially around the adoption of technology while ‘in development’) was a concern about a lack of time.

‘Another participant saw this as an additional administrative task that duplicated work already undertaken for their own agency/service requirements by stating that s/he had already *‘a lot of admin tasks for our own record keeping’*. It became apparent that participants *‘only [saw] this as a pilot’* and thus the amount of effort given to contribute and maintain Patchwork when balancing challenging workloads was reduced. One participant summed this up by stating *‘if other people don’t get in involved maybe we haven’t got to do it’*. Some practitioners made it clear that they were *‘told’* to work with Patchwork, but workloads prohibited any deep engagement. Notwithstanding the ease of use of Patchwork ... participants felt it was difficult to remember to log on and contribute to the system. They proposed that it has not yet become automatic to go to Patchwork as part of their daily work, suggesting if it were to be a substantial part of their working practice, rather than a pilot, it would become more automatic.’

FutureGov report³

Campbell believes that educating public sector workers on the process of user-centred design will help to overcome the perception that existing workloads make the adoption of new technology impossible: involvement in the development process requires investment of time, but develops a better, more efficient product.

From the perspective of a technology developer, having team members with public sector experience was important. FutureGov relied heavily on this expertise to find an authority with which to begin a pilot, when they received an initial grant with the proviso that they were to spend it within a matter of months. ‘But if you were outside of the kind of network we have, I just don’t know where you would start’ (Campbell 2013). For this reason, FutureGov are also involved in setting up a platform called Simpl, described as ‘an ideas crowd-sourcing platform’ – which ‘surfaces good ideas’ – solutions to problems that practitioners and public alike can highlight, and crucially ‘in one place’ that councils can look at. Employing people with experience of the public sector means they have a shared language and a meeting point when it comes to the design and development process. It was also important for product development, as it provided an understanding of the context in which products would be used.

‘The thing that drives me most nuts about the “cool kids” who are getting into this space now is that they haven’t got the patience to go and engage with councils and practitioners, and therefore they build things that are *kind of right* – because [they] lead with technology rather than design.’

This ‘kind of right’ innovation feeds the resistance in the public sector to technology that is unwieldy or ‘fashionable’ but not, ultimately, useful.

³ From an internal document produced by FutureGov and available at their discretion.

Looking at Patchwork in action, Campbell notes the difficulty in quantifying impact when interventions are designed primarily to *prevent* future problems occurring.

‘It’s a preventative tool, so working out how many issues you prevented a vulnerable adult having, or how many kids you protected, it’s challenging, but it’s stuff we’re getting very heavy on, demonstrating impact ... It’s vital, especially if we’re talking about new creative social technology too, which is more about social capital – more nebulous ... I think the evaluation framework for this stuff is still to be born. There’s nothing good out there, yet – probably because most councils aren’t working in that way yet.’

Building a sound business case, based on a proof of concept, pilot evidence and strong evaluation techniques, is crucial. Once the business case is ready, exposure to key decision-makers in procurement and public sector innovation is also incredibly important. This is still a problem for FutureGov:

‘I see people like Jeremy Hunt paying £9.2 million for a child protection system for NHS and A&E hospitals, to join them up (but not to councils) and I know that with a third of that we could offer Patchwork to the whole country: A&E, council, social care team, whatever you wanted. So when I see that, that’s when I realise you have to connect to the top level ... the people who cost out those ridiculous £9.2 million budgets. There isn’t an opportunity for new entrants at that scale.’

1.2 Casserole Club

- <http://casseroleclub.com/>

Casserole Club is a website that connects people who like to cook with people in their local community who could benefit from a good, home-cooked meal, especially those who might not be able to cook for themselves. It was developed in the UK by FutureGov with the support of Surrey County Council and Reigate and Banstead Borough Council. Matt Skinner, who leads the Casserole project as part of FutureGov, explains:

‘Casserole is a really simple idea: we encourage people to volunteer and cook and share an extra portion of food with someone who lives locally to them who could benefit from a hot meal.’

Matt Skinner⁴

The strength of Casserole is less the technology and more the careful thought behind connecting people. For example, the use of the language of ‘Cooks’ (those who make extra portions of food) and ‘Diners’ (those who receive a portion of food) creates a non-hierarchical relationship, and one which does not define either party by anything apart from the gesture made as part of the system.

Casserole is currently live in Barnet, Tower Hamlets and Reigate; 80 per cent of diners are 80 or older. The service has over 3,000 signed up cooks, aged between 20 and 75. The longest-running cook and diner pair have been exchanging meals for 16 months. In the initial pilot, the average meal share was every 1.5 weeks and the average distance between cooks and diners was 0.8 miles.⁵

4 Unless otherwise noted, quotes in this section are from Matt Skinner, in interview with Hannah Nicklin on behalf of Hide&Seek, 16 May 2013.

5 Internal FutureGov report, provided to the authors by Matt Skinner.

Casserole was developed using the same user-centred and iterative design processes as Patchwork, although in this case it involved speaking to members of the public through street surveys, and working with organisations that have experience of working with food and older people.⁶ Skinner explains that working with those organisations in particular was important in solving an early problem identified through the user-centred design process – that the web-facing platform was much more likely to recruit cooks than diners.

‘So the strategy over the last six months, and the learning through Reigate and Banstead, has been that we really need to work with organisations because we know that diners exist and they tend to be over 80 ... Working with organisations like Age UK, small community groups, church groups, we’ve built a very simple page that they can use to get diners to sign up on the site and then that enables us to get in contact with the diner and make sure that they’re comfortable in taking part.’

Casserole also benefitted from early-stages funding from the Technology Strategy Board and the Design Council, and additional later support from Nesta.

Impact

Quality of care: By connecting members of a local community through the meaningful action of sharing food, Casserole has the potential to improve community and personal wellbeing, as well as contributing to the growing demand for social care and support among the UK’s ageing population.

‘Reducing social isolation is one of the key outcomes that we’d like to combat with Casserole in the long run, reducing malnutrition among older people and connecting communities: they’re the three big selling points.’

FutureGov is an example of a technology company that sets out to solve a problem, rather than necessarily produce a certain kind of technology. Through the user-centred design process they are able to discover the best use of technology, and where it can support human, face-to-face interaction.

‘There’s very little interaction initially from a cook and a diner with the technology, and it’s kind of a way of just bridging a conversation, so that the technology is being used to help facilitate a relationship, and after getting initially matched to someone that relationship just happens, they just talk to each other, and that’s where the real value of the project is, reducing social isolation. I don’t think we’re going to be able to do that through a piece of technology, it’s the interaction [that counts].’

Interaction with digital and web-based technology need not remain online, and often works best as an initial contact point. Connections are solidified by human contact, on the personal terms of the individuals concerned. This is what Casserole recognises when it sets out to reconnect a community.

Productivity: Casserole might create savings from fewer cases of malnutrition and by reducing social isolation, which is linked to poorer health. As with Patchwork, these potential ‘prevented costs’ are very difficult to quantify. However, Casserole could save councils money in a more direct way by redirecting some of the demand for Meals on Wheels’ services.

⁶ See <http://wearefuturegov.com/2011/11/introducing-casserole-3/>

Futuregov estimates that Meals on Wheels provides roughly 347,000 meals per week across the UK, at a cost of £88 million per year (2009/10). On average, Meal on Wheels costs councils £4.90 per meal, so if these figures are broken down Meals on Wheels offers roughly 49,650 meals per day, equivalent to £243,285. If Casserole replaces two days of meals on wheels, this would be equivalent to councils spending £486,570 less per week, or £25.3 million per year.

Excluding initial set-up costs, it costs roughly £20,000 for each local authority to run Casserole using a basic package. Across 468 local councils this would be equivalent to £9.36 million per year. Casserole estimates an additional cost of around £550,000 to run its headquarter operations; this is at the current scale, however, which is much smaller than would be needed for national delivery.

It therefore appears that Casserole could deliver significant savings if delivered nationally but these are difficult to estimate as councils' Meals on Wheels contracts are all different.

Wider lessons

As with Patchwork, having a partnership with a council in which to develop the project from inception was crucial.

'We ran an innovation camp with [Surrey Council's] adult social care team ... and Casserole came from an idea that emerged from that series of workshops. That was really important, and that camp also convinced Surrey Council to give the idea a go, and they then allowed us to test and scope the idea out in Reigate and Banstead – that was pivotal.'

Different local authorities had different needs and requirements.

'There's been a couple of sticking points: for Tower Hamlets we had to do a lot of work around our safeguarding process and ensuring we were doing CRB checks and our food hygiene quiz met very basic fundamentals ... [while] Barnet has been more flexible and want a very light-touch approach because they don't agree that there is such a risk. That's the biggest complication.'

Funding from outside bodies (in this case Nesta) was sometimes matched by local authorities, who also provided independent investment in some cases. Skinner explains that Lambeth had an innovation fund: 'councils have got little pots of money that they put aside for community-based projects – and they're really valuable'. He suggests that when councils are financially involved they may be more concerned with the outcome, and it is crucial that this interest is experienced as supportive not heavy-handed. Once again, educating local authorities about user-centred iterative design helped; authorities needed to be 'aware that if you're developing a proof of concept or allowing an idea to begin, you've got to be a little bit more hands-off than you would be with a council project'.

Following their experience with Patchwork, FutureGov built more robust reporting into the development of Casserole, and from the first pilot they were able to 'build up a solid evidence base over the proof of concept in Reigate and Banstead'. This meant they were able to 'clearly document anecdotally and data-wise how many meals had been shared, the demographics of people sharing food, [which] was really important to convince new stakeholders that the project was a good thing'.

As this was a public-facing project, one of the biggest barriers to scaling up was actual user take-up. By developing a clear narrative, design and brand around the project, Casserole was able to garner a reasonable amount of media attention. Skinner identifies this as critical:

‘We got featured on BBC News and overnight something like 500 cooks signed up, and that really helped our argument when we took it to new councils.’

1.3 ADL Smart Care

- <http://www.adlsmartcare.com>

ADL Smartcare was developed in Sheffield and provides a series of digital systems across both health and social care. The system that this case study is focusing on is a ‘staff-facilitated assessment tool’ that allows staff not trained in occupational therapy (OT) to carry out initial assessments of people who have contacted their local authority for support.

The purpose of OT is usually to re-enable patients or service users following injury and illness or as they lose function as they grow older. When a potential service user contacts their local authority seeking support, OTs will carry out an initial assessment. The SmartCare system allows non-OT trained employees to carry out this initial assessment in a clinic setting, using a digital assessment system developed during work over 10 years and alongside hundreds of health and social care OTs. Sarah Gore explains that they saw there was ‘no structured expert system’ in place:

‘What we said was if we put an expert system together, you can use support non-OTs with the knowledge of the assessment being consistent and following best practice.’

Sarah Gore⁷

ADL Smartcare was founded by Sarah and Peter Gore in 2002. In 2010, they opened a research office at Newcastle’s Campus for Ageing & Vitality.⁸ The venture began as a part of a quest to address the realities of social care provision for an ageing population. Peter explains:

‘[We] worked with a Director of Social Services at Bradford ... He and I were sat on a panel looking at the growth of the older population [which] said the existing model simply won’t work, it will break, we’re not quite sure when it will break but it will be in the foreseeable future, and ... the council was given money to work with us to develop something, and that was the start of ADL Smartcare.’

ADL Smartcare now operates in 15 local authorities and is ‘in negotiations with ... another 50’.

Impact

Quality of care: ADL Smartcare frees up OTs to deal with more of their other workload by making it possible for other staff (not trained OTs) to carry out initial assessments. This means the assessment can be done by people with other useful skills – for example, by those with locally relevant non-English language skills. This means that OTs have

7 Quotes in this section are from Sarah and Peter Gore, in interview with Hannah Nicklin, 22 May 2013.

8 For more information, see <http://www.adlsmartcare.com/about.html>

more time to deliver more efficient services, and waiting times for initial assessment are substantially lower.

‘[In some councils we have found] something like a three-month waiting list, and that’s been typically true, a three to 12-month waiting listing everywhere we’ve been ... Everybody operating clinics under us operates no waiting list, you can be seen within a week or two at your convenience.’

When an initial assessment was carried out by an OT professional alone, much of the process went on inside the professional’s head. ADL Smartcare makes the thought process transparent, which makes service users more likely to understand decisions made about their care and to accept and persist with proposed interventions.

‘[There’s a] shift that’s starting to happen where we used to do things to people, and now we try to *involve* them in that process ... The better you involve the person in the process so they understand what and why, the more likely you are to have good outcomes – we get very good outcomes from clinics ... It’s very much about engaging them in the assessment and understanding ... because everything has to be verbalised. Whereas when a professional goes in, they look around the room and make a whole bunch of judgments that the individual doesn’t know they’ve made, which doesn’t make them not valid, but [the service user is] not aware of that, whereas ... the people that are doing the facilitated assessment don’t know all of those things, [but they are raised by the system] so they’re all transparent and the individual understands the process they’re being taken through.’

Productivity: In 2012, the total number of OTs working in social care across 152 councils was 2,850. Peter Gore estimates that ADL Smartcare can enable 10 per cent of staff to be redeployed to carry out other work. Nationally, this would be equivalent to 285 ‘new’ occupational therapists. The full-time-equivalent (FTE) median annual salary for OTs working in adult social services is £30,800.⁹ In terms of time cost savings, then, this would be equivalent to £8.8 million per year.

Wider lessons

ADL Smartcare used a form of user-centred design, working ‘very closely with [OTs] because we needed to make it so that it worked for them in practice’, but they still encountered resistance from practitioners and managers.

‘We thought we were setting up a company that provided knowledge through IT. Actually what we’ve ended up doing is setting up a company that does change management, because these organisations struggle to change, so they’ll always want to go back to their existing way of working.’

Sarah and Peter Gore report a historic problem of ‘people who can manage but struggle to lead’ and identify a sense of fatigue with change:

‘Adult social care departments in the last two years have all gone through massive change: they’ve been getting rid of staff, restarting, they’ve almost restarted whole departments – they’ve been very dispirited.’

⁹ This does not take into account additional on-costs.

They recommend training for senior managers in leadership and identifying areas for innovation. Peter Gore provocatively suggests that local authorities that wish to reject a proposal to implement an innovation should be required to write a business case setting out why they are *not* adopting the new technology.

‘Somebody comes along and shows you evidence that you can save quarter of a million [pounds] for a 50k investment. If you say “no, we’re not going to this” then you have to write the business case for non-adoption.’

Sarah and Peter Gore overcame technophobia when they started out ten years ago by using well-known games such as Minesweeper and Solitaire to encourage use of and familiarity with technology, creating a setting that was enjoyable and playful rather than high-stakes and stressful. ‘We started [in 2002] by teaching them how to use computers and how not to be afraid of them.’ However, managers and practitioners struggled to understand software as a service rather than a platform (such as a word processor or operating system).

‘Most of the kind of things that [local authorities are] looking at now is more “software as a service”, and that’s a whole different ballgame to having a piece of software to maintain on your desktop ... most authorities have no concept for how to buy the kind of thing that we sell.’

Being a small organisation among much larger, multinational technology providers was a challenge.

‘We do find that local authorities are frightened of working with SMEs. The ones that they’ve had relationships with for years is one thing, but they’ll veer towards the really big companies... I don’t have any problems with these big companies, but they do not understand the nitty gritty of working among adult social care – they’re used to business organisations running business processes, [but] adult social care doesn’t really run like that.’

Sarah and Peter Gore felt that the one-size-fits-all solutions sometimes offered by larger firms were rarely useful on a case-by-case level. In order to counter perceived issues with the reliability or capacity of SMEs, they suggest that it would be useful for government or professional bodies to publish details of SMEs working in adult social care.

‘Some offerings won’t be suitable for some authorities, but if you had a sort of publication that listed which SMEs are working for different local authorities it might give them more [exposure].’

1.4 Mental Elf

- <http://www.thementalelf.net/>

Mental Elf is a blog and app-based resource for mental health professionals and patients. It was developed by Minervation Ltd in Oxford, and provides summaries of new research in the mental health field.

‘I think it’s excellent as a way of informing service users about current research and evidence, and I frequently share updates with friends and colleagues. It is also a particularly great resource for those who are involved in campaigning or policy work, as it democratises access to

research which is often behind a paywall or written for an academic audience. Mental Elf is very easy to use – written in a clear and understandable way for the layperson, and attractively presented on the website. In terms of encouraging service users, policymakers and campaigners to engage with evidence and research, I think this is a revolutionary tool.'

User respondent to survey shared on Mental Elf Twitter feed

Founded as a spin-out company from Oxford University in 2002, Minervation Ltd is an example of innovation in healthcare stemming from academia. Mental Elf was the first in a series of resources that distribute summaries of new research in health; the 'National Elf Service' now covers seven main areas. The idea is to support and enable evidence-based practice by providing accessible and easy-to-digest summaries of research material through blogs, Facebook, Twitter and a new app. Managing director André Tomlin explains that he and his writers (volunteers at this point) are:

'... very much focused on finding the best available research and trying to synthesise it and summarise it and make it available in a usable format either for health professionals or for patients ... The problem is that there's so much research: in mental health there's probably about 20 papers published every day that you should be reading if you want to keep up to date with good-quality stuff. So what we try and do ... is give people something which is interesting and engaging but not difficult ... summarising the evidence, giving people a one-page summary, giving them the bottom line of the research – and then if they're interested in clicking through and spending 20 minutes reading it.'¹⁰

Like all the previous case studies, user-centred design is fundamental to the success of Minervation's work so far.

'We definitely subscribed to the whole kind of user-centred design process, so every website we build, every mobile app we design, we involve the population that we're targeting as users in the production process, so we involve people in early paper prototyping, usability testing of early versions of the site, steering the product plan in the sense of what topics should we cover – mental health is quite a broad field, so working out which conditions to cover and what questions people have, you need to ask your audience.'

Impact

Quality of care: In a world of ever-increasing amounts of research, Mental Elf offers a solution for the busy practitioner or the information-seeking patient. Tomlin explains that practitioners are 'very poorly served'.

'If you're a psychiatric nurse working in a community you probably don't have a library service – you may have access to some information systems online, but they tend to be completely unusable.'

Better access through collected new research (which, crucially, is digested into summary form by medical professionals) enables practitioners to be up to date on current trends and recommendations. Mental Elf is also intended for patients, helping them to begin

¹⁰ Quotes in this section are from André Tomlin in interview with Hannah Nicklin, 23 May 2013.

informed conversations about their own care and medication. Ultimately, this can help to improve self-management of their mental health and their ability to share in decisions about their own care.

Productivity: If Mental Elf increases the likelihood of practitioners delivering best-practice, evidence-based care, there is likely to be a productivity gain as patient outcomes improve. However, this is difficult to quantify. Similarly, if patients' self-management of their health improves, they may make fewer demands on health and social care services and reduce costs – but again, this is difficult to quantify.

Wider lessons

Unlike the previous examples, Mental Elf is entirely private, and has not worked alongside public organisations or authorities but directly with individual users. As a result, some of the lessons are different. In particular, there is the challenge of commercialising and promoting a service that will not eventually be bought by a local authority or healthcare trust.

Like previous examples, however, Tomlin identifies a lack of progress in healthcare technology.

'[Health] is a very exciting field, it's fast-moving ... [but] it's way behind in terms of innovation: a lot of the innovation you see in other sectors hasn't really reached healthcare, particularly around the IT side of things – because you know, computer systems in the NHS, people are still using Internet Explorer 7 on an old Dell desktop computer.'

Tomlin describes a lack of practitioner literacy, particularly in understanding of the possibilities of new web-enabled technologies. Interestingly, he reports that the language of 'web 2.0' (the social web) is often misconstrued: playful is seen as unprofessional, whereas in fact games can be very useful tools.

'A lot of people look at the website and look at the Mental Elf and think this can't be for professionals because it's fun. Quite a few senior psychiatrists have made that mistake. That's a fundamental part of our brand, that we feel that health professionals want usable as well as reliable; they also want something which is nice.'

Once again, funding at the early stages was vital – a grant from the Technology Strategy Board (TSB) allowed Minervation Ltd to do initial market research and proof of concept. However, like many start-ups in the commercial or private sector, much of the initial work on Mental Elf was done for free – volunteers are vital.

'There's about 100 people involved in the National Elf Service, the broader project. Most of those people are bloggers or editors, and they're all giving up their time for free, because we're moving towards a point where this will be commercialised and we'll start to generate some revenue from it and ... pay people. But for the first couple of years building that kind of product you don't necessarily have those income streams, so if we hadn't had the TSB money we wouldn't have been able to do research and usability testing and product development ... I think they [the TSB] are absolutely essential for a small business like us.'

As well as seed funding, Mental Elf needed bridge funding, and this was harder to find. While there is money available for start-ups taking their first steps, there is little support available for further development, particularly in the commercial sector.

‘You get to a point where you’re a success, you’ve built up a good audience, you’ve got loads of early adopters on board – but then going to the next stage, that is always the most challenging part, much more difficult than starting the thing in the first place.’

In looking to commercialise and promote the service, Minervation turned to digital agency Fennario, who brought in external expertise.

‘We’ve got a really successful website with tens of thousands of people using it. To turn that into a business concern that actually breaks even is always the challenge. We’re not there yet, but we’re releasing a version towards the end of the year that will have subscription models built in, so we’ll start generating revenue from it at the end of the year.’

On the advice of Fennario, Minervation has been working to give the service greater exposure through intermediaries.

‘We’ve done presentations to regional healthcare librarians, for example, and given them promotional materials for their libraries, so they pass those on to health professionals.’

This wider networking activity extends to professional bodies, which are particularly important to the success of the new subscription model.

‘I think we recognise that there needs to be an institutional involvement in that process. The way that we’re pricing up the product that we’re going to sell ... is via individual subscriptions but also institutional subscriptions. We’re already in discussion with the royal colleges with the view to them buying an institutional subscription to the website for their members – the Royal College of Psychiatrists, 45,000 members – if we’ve already got 2,000 UK psychiatrists signed up, subscribed to it, it just makes it cost-effective [for the college] to do it themselves.’

1.5 Patient Opinion

- <https://www.patientopinion.org.uk/>

Patient Opinion is a site that allows patients to leave feedback on their health experiences and hospitals and GPs to respond. Patient Opinion was founded in 2005 and developed in Yorkshire. James Munro describes it as a ‘non-profit social enterprise’ which was formed out of the 30 years’ experience he and Sheffield GP Paul Hodgkin each had working ‘in or around the health service’.¹¹ The site went UK-wide in 2006.

The idea was originally instigated by Hodgkin.

‘[We wanted] to set up a site where people would be able to give feedback about the care they had at the health service ... Obviously the NHS has extraordinary and wonderful features, but it also has extraordinary difficulties.’

¹¹ Quotes in this section are from James Munro in interview with Hannah Nicklin, 14 May 2013.

The aim (though not directly phrased as such by Munro) was to take user-centred design into the heart of NHS improvements.

‘All solutions to NHS problems are seen in terms of vast structural change, and I don’t think anybody’s ever really made any serious attempt to involve patients in their attempts to improve the health service ... After all, the people who care the most about good-quality health care are the people receiving it and the people who are providing it ... It struck us that we might be able to use online as a way of scaling up the ability of citizens to become involved in the health service that they value – and that’s where it all started.’

Impact

Quality of care: Patient Opinion shifts the focus of the complaints procedure.

‘The NHS complaints system is rather unsatisfactory, both for the complainers and the providers that get complained about, because it’s not built for improvement, it’s built for judgment ... What we’re interested in is the effects of transparency.’

By allowing the NHS to respond directly to concerns, gather evidence and be seen to tackle problems, Patient Opinion improves on the current complaints system. Overall, this could significantly improve patient care by more quickly and openly acknowledging problems and highlighting successes, and ultimately by redesigning the NHS experience, not through top-down government direction but through a user-experience model.

‘Typically [patients] don’t give feedback: only about 5 per cent of people complain about a poor healthcare experience, and the reasons people give for that are firstly because they’re scared and secondly because they think it’s pointless ... Fundamentally that’s the problem we’re trying to solve, changing the relationship between the user and the service so the user feels that their experience matters to the service.’

Productivity: By injecting a greater dose of user experience into the way it gathers and responds to complaints, the NHS could make improvements in quality of care that could prevent the reoccurrence of costly bad practice. However, potential savings are too general to be used to make estimates.

Wider lessons

Like other interviewees, Munro emphasises the importance of public sector experience on the part of the innovators.

‘You have to understand the domain you’re working in ... I don’t think generic solutions are right, and because we understand healthcare we’ve been able to do it in healthcare. I think if we hadn’t understood healthcare we wouldn’t have been able to get this far.’

Their experience also meant that they were better able to earn trust from other health practitioners – though not all. Munro explains that mistrust of innovation is a significant problem in health, which as a sector is naturally risk-averse (as it deals with public money and individuals’ wellbeing) and also fatigued by structural change and failed technological interventions. Munro also talks about the advantage of being *outside* the public sector – in producing platforms and systems that are able to disrupt current practices for the better.

‘We’re trying to innovate around something that’s potentially disruptive to current work patterns and current cultures, and therefore, although it’s really important that we listen very carefully to what people are saying about what we’re doing, and that we constantly try to learn from it and build in a way that helps people to solve the problem they have, we also don’t want to build something that’s simply a response. When you’re trying to change a culture, it would be a mistake to *just* ask people what they want and then do that – that won’t change the culture, that will potentially reinforce it, and we are trying to make something that goes beyond what people imagine at the moment about how things can be done.’

The transparency that a platform like Patient Opinion encourages is challenging for the public sector.

‘When we started out, we were regarded with great suspicion ... That’s changed a lot, and now people are starting to see that actually it might be quite important to listen to what patients are saying, and that actually doing it online isn’t a bad idea because that’s what everybody does now ... Lots of organisations like the idea of having positive stories online but they don’t like the idea of having negative stories, but then the idea that that’s done by a service outside the NHS is particularly difficult, I think.’

Munro encountered the fear that technology must always mean that people are made redundant, rather than having their skills and time redeployed, and suggests that innovators in the public sector need to recognise this concern as a major source of resistance.

‘When we’re talking about innovation, we’re often talking about replacing some existing ways of doing things with technology, and replacing existing jobs at the same time. If there’s one thing the public sector doesn’t particularly like it’s making people redundant, and that’s one reason why so many people resist it.’

Patient Opinion has faced the same problems as Mental Elf in terms of supporting their innovation financially through commercialisation. They work on a ‘freemium’ business model – the majority of features are free to use, but there are some additional paid-for features or functions. This, despite being a not-for-profit social enterprise, means that some people in the public sector can view them with suspicion.

‘We make our service free at some level but we also have a paid offering ... I’d like us to have been freemium right from the start [but] there are still people in the health service who refuse to work with Patient Opinion because they think we always charge everybody.’

To counter this suspicion, Munro suggests that innovators need to be ‘clear about the values that drive [them]’.

1.6 Digital pens

- <http://www.streets-heaver.com/products/digital-pens>

A digital pen and form system is used alongside a system called Clinical Manager to digitally record data about patients when they are seen as inpatients or outpatients by the therapy and rehabilitation department¹² in the United Lincolnshire Hospitals NHS Trust. This case study is based on one use of digital pens within NHS services (there are several others) in order to understand some of the issues of implementing this new technology from the point of view of the public service.

Before digital pens were introduced, explains trust Clinical Lead for Therapies Anita Cooper, administrative staff were required to process and input each form manually.

‘[We’re trying] to speed up the inputting process, because the whole thing is quite an industry in order to collect the information because we don’t have an electronic patient record ... we still are in a position where we have to collect information about the patients we see and the amount of time we spend with them and the things we’re doing with them on paper, and then that is given to our admin team who then have to input it into this database.’

Anita Cooper¹³

Digital pens were suggested by a consultant and a pilot commenced three or four years ago. Cooper describes the process as much longer than expected, because they were not initially aware of the amount of iterative, user-centred design that was necessary to develop a solution that made a real difference to the way they worked. Initial problems meant that any time saved was just reallocated to error checking, but through extensive user testing in the field and iterative development, many of those problems have been solved.

‘Now, all of that patient demographic is pre-printed on the digital form – all the member of the staff has to do is write in the time, number of minutes that they’ve spent with the patient and tick the right treatment code box, and if the patient is discharged, tick the right discharge code box. So the only actual potential for error we’ve got in terms of handwriting is time, numbers. That went through quite a number of iterations ... [but] through these iterations we’ve got two different forms for inpatients and outpatients that work for those clinical areas.’

Impact

Quality of care: The digital pen was introduced to free up staff to tackle other work and see more patients. As such, it will have an indirect impact on quality of care by reducing waiting times and potentially allowing practitioners to spend more time with individual patients.

Productivity: In this case study, it is estimated that digital pens saved an average of three minutes time per patient per month. It is currently still a very small scale pilot and we cannot extrapolate savings from this example.

However, if other services were also able to save an average of 3 minutes per patient by introducing the use of digital pens, we can estimate the scale of this time saving for all outpatient attendances across the NHS.

¹² Dealing with occupational therapy, physiotherapy, dietetics, orthotics and rehabilitation medicine.

¹³ Quotes in this section are from Anita Cooper in interview with Hannah Nicklin, 7 June 2013.

In the second quarter of 2013 there were roughly 13.8 million attendances, equivalent to 4.6 million attendances per month. If using digital pens saves roughly three minutes per patient, this would save roughly 230,000 hours per month in the care of outpatients across the NHS in England. Based on the salary of band 2 clinical administrative staff, the digital pen could create potential productivity savings of roughly £1.84 million per month or £22 million per year.¹⁴ The majority of staff are likely to be redeployed rather than made redundant, so this figure represents potential time cost savings rather than cash savings.

‘It was based around time-saving and therefore freeing up time to do more activity, eventually, which brings more income into the service ... There is an element in there of staffing reduction, but ... that’s more general and quite small. It’s more about efficiency and freeing up more clinical time to do more activity and gain more income.’

Wider lessons

The digital pen pilot was only made possible because the technology provider loaned the hospital the pens and worked with them on testing and development free of charge, because they wanted to develop the pens as an accessory to their Clinical Manager system. Developing estimates of savings and writing a strong business case were essential to moving from pilot to roll-out, and as Cooper explains, this was a challenging process.

‘We’ve done a number of things in terms of business cases for roll-out but initially they fell flat. To be fair, that’s probably not unreasonable, because we probably weren’t as far down the lines as we needed to in terms of ... final requirements.’

This case study provides a valuable example of the realities of deploying new technology in the context of specific public sector infrastructure, whether that is having the kind of high-fidelity printers that the forms required or gauging the differences between working in a tower block hospital or on a large sprawling site when forms have to be collected from a single place. The extensive pilot was important in enabling Cooper to make the decision to roll out the technology only where it was able to achieve real efficiencies.

‘We’ve decided not to roll it out currently to our inpatient service areas but we do plan to roll it out to our outpatient services across the trust ... The reason we’re not going to roll it out to inpatients is because we do have an issue with printing: you need quite a high-spec printer ... also the amount of printing we would need to do for our inpatient staff, because it’s one page per patient, it’s quite significant – so we’ve got to work around that.’

Like other interviewees, Cooper highlights the fear of technology and cultural resistance. She notes that people in her team were frustrated by the impact of the iterative design process in their day-to-day practice, and that good leadership was required to support these staff and drive the project through to a point at which ‘people really can see the benefit of it and can see that it does save time – even if it’s not necessarily their time, it saves time within the service’. Strong leadership also helped to allay fears of job losses.

¹⁴ The median salary of a band 2 clinical administration staff in the UK is £15,641 pounds per annum, roughly equivalent to £8 per hour (based on a 37.5 hour work week). See <http://www.nhscareers.nhs.uk/working-in-the-nhs/pay-and-benefits/agenda-for-change-pay-rates/>.

‘[I was] very clear that, while this will save us time, the outcome of this isn’t to reduce jobs, because we know that other things are coming. We actually need to free up your time to enable you to do these other things for us and to take other admin tasks off the clinical team so that we’re clinically more efficient and effective ... We’d got some examples of that at the time – we were able to communicate to them that if you’re not doing this and spending your time on this [then] we would want you to be doing these other tasks. We were absolutely upfront that this wasn’t a job loss exercise at all and it was about efficiency.’

1.7 Woodland Wiggle

- <http://www.chrisoshea.org/woodland-wiggle>

Woodland Wiggle is an interactive installation at The Royal London Hospital. Children can play the game on a giant ‘television’ through an XBox Kinect camera using natural movements and gestures. It was developed by Chris O’Shea, who describes the work as ‘an interactive game displayed on a television the size of a room. It allows children to enter into a storybook illustrated world enabling them to paint; play music; and trigger sun, rain, snow and rainbows weather effects with animated animal characters across a number of woodland scenes.’

O’Shea developed the installation in response to a brief from Vital Arts, which is an in-house hospital arts organisation dedicated to bringing high-quality art and arts experiences to hospitals, operating since 1996. Vital Arts developed the brief alongside staff and patients before taking it to Nexus Interactive Productions, who specialise in commissioning digital art work. Nexus in turn brought O’Shea to the project.

Impact

Quality of care: An employee of Barts Health who was involved in commissioning Woodland Wiggle explains its appeal:

‘[It has] helped the work of physiotherapists – particularly with children who have learning difficulties. The programme was designed to provide an instant response and to create a soothing and engaging atmosphere. This worked particularly well for younger children and those recovering from surgery or brain injury – more research would be fantastic to look more closely at our pioneering approach.’

Barts Health employee, survey respondent¹⁵

Young users and carers who had encountered the installation themselves described how it was an important part of the play area for them.

‘[It] takes my mind off being in hospital ... I didn’t expect to see something like that in a hospital ... [It] keeps me busy and gets me out of my room and moving around. I can play with other kids on it too so it’s social, it’s good – can we have more games like this?’

Patient, 13

15 Survey quotes are from a short survey by Rachel Louis of Vital Arts on behalf of Hannah Nicklin involving 10 users and key stakeholders in the play area, including other members of the Vital Arts team, physiotherapists, teachers and three children.

‘[It’s a good reason] to get out of my room. A change of scenery ... It’s fun, it’s more interesting than books and better than doing physio in my room ... I use it every few days with my physio or play specialists.’

Patient, 8

And the mother of a 6-year-old daughter with special educational needs said that her daughter ‘becomes calm and engaged while using it and interacts – she loves the game and space’.

Productivity: It is clear from the statements above that Woodland Wiggle has the potential to improve health and wellbeing outcomes by helping children to stick with their treatment and generally remain active and social while in hospital. It is difficult to estimate the potential productivity savings that might result from reduced need for ongoing interventions from health professionals, and anyway this must be set against the cost of the installation, which in this case was £10,000.

Wider lessons

Woodland Wiggle is an example of successful cross-sector collaboration – digital specialists working with an in-house team, both dedicated to innovation. Rachel Louis, participation manager at Vital Arts, explains how the partnership worked.

‘Normally we commission directly, but in this case ... we were working to create a playful space ... and we wanted to create some sort of digital installation to put into that space ... It was much easier for us to work with Nexus as an agency who had much more experience with digital artists and the digital world – and in commissioning in that area.’

Rachel Louis¹⁶

Beccy McCray, creative producer at Nexus, echoes this sentiment.

‘It was essential to the process [that the health trust were closely involved] because we’re not part of their world ... They were the gateway to the children, and knew much more about what the children were capable of and interested in. They set up the workshops with the children – [they were] the interface between us and the children.’

Beccy McCray¹⁷

The fact that Vital Arts were in-house was valuable.

‘I know the staff I’m working with, I’ve worked with them on other projects, so it was very easy for me to ask them to come along to consultation meetings – people really wanted to be involved ... For a lot of digital organisations, to go and work with a hospital, it would just be impossible to get – it takes a long time to build those relationships and the trust.’

Rachel Louis

16 Quotes from Rachel Louis are from an interview with Hannah Nicklin, 23 May 2013.

17 Quotes from Beccy McCray are from an interview with Hannah Nicklin, 14 May 2013.

User-centred design was integral, not only to the development phase but from the very start. Louis explains that the brief was written with the people who would be using the play space:

'... with children ... with teachers in the hospital school, and with play specialists ... Crucially we consulted with the physiotherapists: we wanted to know what they would use and find useful as a medical tool in the space.'

Rachel Louis

This meant that the work was designed to answer the needs of all of the users from the outset.

As such, Woodland Wiggle faced far less resistance to the process and the product. Practitioners working with the installation were eager for more investment in interactive art therapy, and for more ongoing support.

'[It] can be difficult to motivate children, so this seemed like a great way to get them involved ... It's a new way of working for some of us. We [the physios] need practice using technology so we feel capable. When it's working it's great though.'

Physiotherapist, survey respondent

Some were keen for more study to be done in the area of interactive arts therapy.

'Currently I see this as a great pilot idea, but to make significant improvements to healthcare it would need to be expanded on ... Lack of time [is a problem]. We'd need a thorough, ongoing consultation with staff.'

Teacher, survey respondent

The main issue for those involved in Woodland Wiggle was the lack of funding for a longer-term, more sustainable installation (rather than a 'pilot'). McCray explains that it would have been good 'to have done further workshops – make the project more detailed'. She suggests that the budget was restrictive and that health and arts organisations need 'a bit of education as to what's possible within a certain budget, though I do think that's natural, within a completely different sector. And naturally when you work across sectors there's a learning curve.' Louis agreed that 'the biggest problem for all arts-in-health organisations is lack of funding ... and also the projects and evaluations that we each do would benefit from wider dissemination.'

McCray explained that a recent Nesta intervention had been valuable in creating opportunities for cross-sector collaboration.

'It does feel like a growing area where more could happen – I think it's just understanding how the world works, bringing together the science, arts and creative sectors. Nesta runs brilliant sessions: we went along to one with Vital Arts, where you learn about how the different sectors work, and how they can work together – more things like that would be really useful.'

Beccy McCray

2. ADDITIONAL CASE STUDIES

These additional case studies have been included to provide a broader evidence base around the emergence of innovative uses of digital technology in the health and social care sector. They include both public sector and private sector examples, and while they focus on the UK, there are also studies from the EU, China and the United States.¹⁸ These case studies were discovered through secondary research in journals, reports and online, and links are provided for further information.

The case studies are split into three categories.

- The bulk are **implemented** – that is, currently released or completed.
- The next category is **pioneering** – these initiatives and technology are often in pilot or an early beta stage of release. This category sets out the near future in terms of digital and networked technology in health and social care.
- Finally, the **leading edge** category includes technology that is some time or investment away from implementation but which demonstrates the likely potential of such innovation.

Care has also been taken to include different areas of innovation, from hardware to software to the application of networked technology.

As opposed to the previous section, where the major case studies were selected in part to demonstrate the challenges of implementing digital technologies in public services, this section includes many products designed for personal use. There are many app-based personal healthcare and wellbeing monitoring products available, as this is an area of significant activity and innovation.¹⁹

2.1 Implemented Re-Mission1 and 2

A series of games providing young people with cancer support, developed by US-based company Hope Lab.

- <http://www.re-mission.net/>

Description: Re-Mission1 and 2 are two iterations of a series of free games (available online and for iOS/Android) for young cancer patients, to support understanding and coping with cancer. The games are developed alongside careful research processes and user testing. The games situate the player in the human body and task them with fighting cancer ‘with an arsenal of weapons and super-powers, like chemotherapy, antibiotics and the body’s natural defences.’ Re-Mission aims to motivate young cancer sufferers to persevere with difficult treatments by improving knowledge, and encouraging positive feelings around difficult subjects (‘I won the game!’).

Impact: According to a factsheet published on the Re-Mission2 site, the research that accompanied the first iteration of the project (including a randomised control trial) ‘published in the medical journal *Pediatrics* showed that playing Re-Mission significantly improved key behavioral and psychological factors associated with successful cancer treatment’.²⁰

¹⁸ The US is well represented in this review, due to a combination of English-language based research and the country’s thriving technology industry

¹⁹ This is possibly because it is easier to create innovations outside of the health and social care sector that are aimed directly at individuals, as there are fewer of the challenges identified in this report.

²⁰ See <http://www.hopelab.org/our-research/re-mission-outcomes-study/>.

UniversalDoctor

A translation app for health professionals, developed in Barcelona by Universal Projects and Tools SL.

- <http://www.universaldocor.com/>

Description: UniversalDoctor is a multi-language translation app for medical situations. Each translation is usually accompanied by an audio clip, and all of the translations are reviewed by medical translation specialists. The app comes in three versions:

- UniversalDoctor Speaker Professional is a web app that aims to make it easier for 'different health professionals to improve communication through the use of over 1,000 questions and explanations in multiple languages'.
- UniversalDoctor Speaker Hospitals is aimed at hospitals that have multilingual needs, and allows for continuing translation and customisation to the specific needs of the institution.
- Universal Doctor Speaker for iPhone and iPad is the web app specifically designed for mobile use.

Impact: These highly visual and clinician-reviewed translation apps are of great use to practitioners working in an increasingly multicultural setting, or to those near particular tourist spots. UniversalDoctor Speaker is used by hospitals in Belgium, Portugal, Scotland and Spain, among others.

Health Unlocked

An online hub for patient communities, e-records for doctors and research opportunities, developed by a London-based team of healthcare and technology 'fanatics'.

- <https://healthunlocked.com/>

Description: HealthUnlocked is a three-tier system of knowledge networks:

- HealthUnlocked for Patients allows patients to connect with other patients and healthcare professionals as a part of an online community of support and information around a condition or disease.
- HealthUnlocked for Doctors, or 'InClinic', allows doctors to collect, collate and assess patient-reported outcomes in both clinic-based and remote situations. An independent auditor has approved InClinic for use in the NHS. 'In addition to improved care for patients, useful datasets are created alongside diagnostic and treatment details.'
- HealthUnlocked for Researchers allows researchers from charities, academia or industry to partner with the HealthUnlocked team to access particular data submitted by 'consenting users' of HealthUnlocked, or to actively 'carry out structured studies alongside doctors and patients'.

The team that developed HealthUnlocked comprised 'doctors, pharmacologists, computer scientists, designers, information architects and technology fanatics' with the support of over 100 well-known healthcare providers and organisations.

Impact: There is a common thread running through many of the innovations listed in this report – using online technologies that are already prevalent in the private sector (such as social networks or forums) and applying them to a public sector or healthcare context. The HealthUnlocked for Patients and HealthUnlocked for Doctors systems are good examples of the application of a social network to a specific health task – connecting patients and

healthcare specialists around a common illness or disorder, providing them with expertise, experience and support. HealthUnlocked for Doctors uses e-records to gather and reflect on data across treatment processes on a scale that is hard to achieve from single paper records alone. The system was trialled at the Royal National Orthopaedic Hospital: among other benefits, the study found that the system allowed 'hospitals and commissioners to quantify the benefits of different types of operations', created 'an estimated 300 new outpatient appointment slots per consultant surgeon per year', and increased patient satisfaction: '95 per cent of patients prefer the new online process to the traditional pen and paper method' (PwC 2013: 47). Finally, HealthUnlocked for Research offers the opportunity to evidence and examine the current system to support on-going and similar innovation.

SuperBetter

A game-based method for encouraging recovery and building resilience, developed in the US by Super Better Labs.

- <https://www.superbetter.com/about>

Description: SuperBetter was developed alongside 'guidance from doctors, psychologists, scientists, and medical researchers' to help players develop key skills for recovery and general wellbeing. The game particularly aims 'to help build personal resilience: the ability to stay strong, motivated and optimistic even in the face of difficult challenges'. Super Better Labs developed the game in collaboration with researchers and doctors at Stanford, University of California at Berkeley, University of Pennsylvania and Ohio State University Medical Research Center.

Impact: According to the supporting documentation for the game: '[R]esilience has a powerful effect on health – by boosting physical and emotional well-being. Resilience also helps you achieve your life goals – by strengthening your social support and increasing your stamina, willpower and focus. Every aspect of the game is designed to harness the power of positive emotions and social connection to live, feel, and act better.'

Swiftkey Healthcare

A medical-specific auto-correct enabled keyboard for smartphones and tablets, developed by London-based Swiftkey.

- <http://www.swiftkey.net/en/healthcare/>

Description: Swiftkey provide an auto-correct enabled keyboard function that recognises specialist medical terminology that can be installed on tablets and smartphones for use by practitioners.

Impact: As increasing numbers of clinicians and health and care practitioners input and use patient information via smart phones and tablet devices, time and errors can be saved through installing an auto-correct system that recognises medical terminology.

My Asthma Log

An app for children and young people with asthma, developed in London by Queen Mary Innovation Ltd at Queen Mary University.

- <http://www.qappsonline.com/apps/my-asthma-log/>

Description: Developed specifically for young people and children, this app for Android allows the user to track their asthma symptoms, understand trends in their symptoms, set up and follow actions plans, and log GP appointments. This activity also builds up a log, providing a useful personal history that can be presented to a healthcare professional.

Impact: Understanding symptoms, planning how to deal with the condition, and being able to provide GPs and other health professionals with detailed information about personal history could all contribute to fewer hospital admissions for asthma.

2.2 Pioneering

MedFacts

The first in a series of seven web apps for young people with mental health issues, developed by Brighton and Hove-based Young Minds, due to launch in early 2014.

- <http://bit.ly/medfacts>

Description: Young Minds, a Brighton-based charity working for young people's mental health and wellbeing, were awarded a substantial grant by Innovation Labs to develop a series of web apps supporting young people with mental health issues. The first to be developed will be MedFacts – an online app for providing young people with accessible information on mental health prescriptions.

Impact: A 2011 survey of six EU countries discovered that almost one-third of young people consider the internet as a first port of call for information on health (Di Antonio 2011: 22). Particularly in stigmatised and complicated areas such as mental health, reliable, accessible online resources can help to ensure young people are better informed and better able to maintain their treatment.

Personal Care Planner

An online care planner, developed by London-based Digital Life Sciences alongside West Midlands care professionals.

- <http://www.digitallifesciences.co.uk/care-planning/>

Description: The Personal Care Planner is an online tool enabling users to make such a plan. It is hosted on NHS Local and was developed alongside West Midlands lead practitioners working with long-term conditions (such as diabetes) following the Department of Health *Year of Care* principles for the delivery of personalised care. The tool allows users to develop understanding of their conditions, decide which aspects of their care is important to them, and plan actions to help reach goals based on those priorities, in order to achieve a greater quality of life.

Impact: Digital Life Sciences explain that amongst high risk groups, GP visits and hospital admissions can be reduced when people make a personal care plan. More accessible and distributed guidance for creating a care plan could have a significant impact on personal care plan uptake, meaning a significant reduction in GP visits and hospital admissions for those with long-term conditions.

The T-Haler

An inhaler training device, developed in Cambridge by university department spin-off organisation Cambridge Consultants.

- <http://www.cambridgeconsultants.com/projects/t-haler-inhaler-training-device>

Description: The T-Haler is an inhaler training device for children. Asthma is an increasingly large problem for young people in particular: as well as increasing rates of incidence, up to 75 per cent of young people aren't using their inhalers properly, according to T-Haler. The device looks like a normal inhaler but includes a simple visualisation game that teaches children how to use it more effectively, by offering real-time feedback.

‘The T-Haler measures three key factors for proper inhaler use – shaking the inhaler prior to breathing in, inhalation flow and timing of actuation.’

Impact: According to its developers, the T-Haler’s effectiveness is substantial: ‘With just three minutes of training with the T-Haler, proper use of inhalers skyrockets from 20% to 60%.’ They suggest that the training ‘game’ is roughly twice as effective as other methods of training. These effects appear to last: ‘A week later, 55% were still correctly using the device – showing that they retained what they learned.’

lifeIMAGE Medical Image Sharing

A system for secure sharing of imaging and information by patients and practitioners, developed in Massachusetts by lifeIMAGE.

Description: lifeIMAGE has developed a system of patient information and medical imaging-sharing which enables patients to choose to share their imaging histories with clinicians over a secure network, thereby speeding up and widening access to (and personal control of) images such as x-rays and ultrasounds. The network system also speeds up the delivery of imaging information between clinicians and allows them to discuss treatment in view of the record access.

Impact: This system opens up access to patients’ records while returning control of that access to the patients themselves. Clinicians can share information and collaborate ‘in real time’, and costs are reduced by avoiding repetition of tests and making decisions more quickly. Also, it has the benefit of reducing a patient’s exposure to radiation.

2.3 Leading edge

Multifunctional epidermal electronics

A temporary tattoo that can take health measurements. A prototype was developed in the US and China by university research centres at University of Illinois, Dalian University of Technology in China, and University of California at San Diego.

- <http://bit.ly/trackingtattoo> (Yeo et al 2013)

Description: A combination of fine micro-circuitry with the qualities of a temporary tattoo, epidermal electronics are being developed to prototype by research-led spin-off company MC10.²¹ The silicone electrode network is arranged in a highly flexible woven pattern and then protected by a material similar to a spray-on bandage. After use, the device will come away in the same way a temporary tattoo does. This provides a non-invasive way of taking measurements related to health and wellbeing, from hydration levels to heart rate and temperature.

Impact: This technology allows constant health metrics to be gathered, reducing the amount of testing (and arranging and waiting for tests) that health professionals and patients have to undertake. Also, more accurate measurements taken over a number of days or even weeks would produce much more reliable data and flag potential issues up earlier. Likewise, this technology would allow patients to monitor their own health and behaviour.

²¹ <http://www.mc10inc.com/>

MyHomeHelper

A screen that displays reminders, alerts and photos for people living with memory loss, currently being developed in Hull by Simpla Solutions.

- <http://www.myhomehelper.co.uk/home/home.aspx>

Description: This particular service is designed for those living with memory loss and requires little to no input from the person in need of care. It takes the form of a large screen in the home, on which a series of minute-long alerts are shown – including a calendar/clock, a diary of upcoming events, general reminders, personal photos, and news headlines. These can be interrupted with instant messages or reminders sent by the carer. The whole sequence is set by the carer, and depending on the package that the carer has purchased it can be managed locally (the free service), via the MyHomeHelper website (by monthly subscriptions) or through one of two hardware-inclusive options for those who don't have a suitable PC or screen device in the house.

While the technology itself is by no means groundbreaking, this application of the technology is beginning to be recognised by several providers across the UK and US as a viable means of keeping families and carers in contact with those they care for more efficiently and more constantly, by creating personal social networks around those in need of care.

Impact: Targeting the specific case of those living with memory loss, this service allows carers to tailor the remote delivery of reminders, images and other messages to help deal with anxiety as well as the practical challenges of memory loss. Crucially, offering a free level of access is in tune with online purchasing habits (the 'freemium' experience), and providing remote access to the service helps to sustain increasingly dispersed support networks.

MiniMe

A personal recovery app, developed in Liverpool by FACT (Foundation for Arts and Creative Technology), RedNinja and Mersey Care NHS Trust.

- <http://bit.ly/minimelink>

Description: Designed for and by young people in association with developers, artists and the Mersey Care NHS Trust, MiniMe is an app to support young people in managing their mental health and wellbeing. Development began in June 2013 and the app will launch in July 2014. The MiniMe specification describes the app as 'reactive and proactive', aiming to 'promote independence and strengthen resilience ... The app uses a 3 tier traffic light system to guide [users] through a series of supportive activities in response to how they are feeling'. This project was part of the Innovation Labs grants programme in 2012.

Impact: The specification document sets out the aims of the app: 'as a result of using MiniMe users will experience improved mental health, fewer periods of 'crisis' and require less professional intervention. Service providers will see improved recovery outcomes and reduced costs per patient.'

3. IMPACT ON QUALITY AND PRODUCTIVITY

Public services are facing a squeeze between rising demand and flat budgets. The slow growth of the economy and a cost of living crisis means that the British public is unwilling to give up more money in taxes, and austerity will be a reality in public services for many years to come. All services are looking to do more with less. In health and social care in particular, the ageing population and rise of chronic conditions is creating new demands. There is therefore an imperative for innovations to not only improve quality but to increase productivity as well. In this section, we consider what the case studies in this report demonstrate about the potential for technology to do just that.

3.1 Tech-powered public services are more joined-up and empowering

The innovations we have documented improved the quality of public services, above all by transforming the experience of people delivering and receiving them. It is a common complaint of people coming into contact with public services that they are not 'joined-up', that people 'fall through the gaps' and that they have to repeat their story over and over. Digital technology can drive integration and a shift towards prevention. Examples like Patchwork show the power of technology to connect professionals so that they can coordinate around users' needs. When services share information, they not only provide a more seamless experience, but they can raise issues quickly so the appropriate practitioner can intervene straight away to prevent problems worsening.

Innovations like HealthUnlocked connect people with others who can provide peer support, which has been shown to have an impact on clinical outcomes (Da Silva 2011). Technology can also connect neighbours. Casserole shows how contacts that are at first web-based can grow into face-to-face relationships, helping to build open, friendly and resilient communities. Casserole not only ensures that older people get a hot meal, it means that they have someone visiting them, providing social interaction and able to alert other services if there is a problem. Innovations in other public services have sought to harness the power of engaged communities to solve problems, as the example of Shaped by Us shows.

Shaped by Us

- <http://cornwall.shapedbyus.org/>

Shaped by Us is a platform, developed by Cornwall Council, Nesta, the School for Social Entrepreneurs and Volunteer Cornwall, that allows people in local communities to propose ideas to solve the county's problems.

Description: Shaped by Us invites local inhabitants to set 'challenges' and suggest solutions. It describes itself as '... bringing local people together with the Council, Public Sector and Third Sector groups to turn problems in your local area into radical new approaches and innovative solutions through social enterprise.' Ideas are reviewed, and the council and partners select the best ideas to develop alongside local entrepreneurs. Ideas can be developed in collaboration with the online community; developing solutions independently of the council is also encouraged, and advice on funding and development support is provided.

Impact: Shaped by Us aims to encourage grassroots engagement and satisfaction, as well as solving problems through user-centred design, which is more likely to result in better service provision. There are currently 21 challenges and 71 ideas on the website. The challenge with the most ideas is 'how can we set up a community food hub' to promote healthy eating and cooking with locally sourced produce.

On an individual level, the innovations explored here have the potential to create more active, engaged and empowered users. The internet provides a popular resource: 75 per cent of people consult the internet before a health appointment, and 70 per cent after an appointment. Over half (53 per cent) say that the information they find leads them to ask the health professional new questions (Gann 2013). Many of the innovations in this area take the form of mobile apps that are marketed directly to individuals for personal use, often with a free basic package and the option to pay for additional features.

For example, Mental Elf targets both professionals and patients, with an engaging and fun approach that makes complex scientific evidence accessible with no loss of depth or quality. The Mental Elf Twitter account has over 10,000 followers. Apps that help people to get the most out of a health appointment (such as MedFacts) open the door to greater shared decision-making, which has been shown to improve people's satisfaction and self-confidence (De Silva 2012).

This is particularly important for people with a chronic condition, for whom the vast majority of their treatment is self-care. Supporting effective self-management of chronic conditions so that people avoid flare-ups and complications that require hospital care is the major challenge facing the health service, and digital technology has a huge part to play.

Of course, prevention begins before any health condition is diagnosed. Apps like MyFitnessPal can help people to maintain a healthy lifestyle and are hugely popular; in 2012, MyFitnessPal had 30 million users (Ha 2012). Our understanding of what motivates people to change their behaviour is growing, and these technologies build on the latest evidence from behavioural science – such as the power of making a public commitment (see for example Dolan et al 2010) or the appeal of gaming (see for example McGonigal 2011).

Other innovations are focused on freeing up professional time. It is important to acknowledge the perception that these technologies can damage service quality, especially in the caring professions, where relationships are the most important element for service users (see for example National Voices 2012). We have already noted that not all aspects of public services require face-to-face contact and that it is these non-relational, *transactional* elements that should be the main focus for labour-saving technologies. However, even where relationships are central to service delivery, technology need not undermine the experience, as the ADL Smartcare example shows. In this case, technology enables users to be more involved in decisions about their care and means that different kinds of staff (such as those with foreign language skills) are able to carry out tasks that previously only those with specific professional training could have done. Designing and implementing technologies with the staff and patients who will eventually use them is important in creating a product that will enhance the service delivered.

In general, bearing down on bureaucracy and making routine and administrative processes as efficient as possible should enhance service quality by freeing up staff time. While it may be naïve to suggest that labour-saving devices will allow professionals to spend more time with users, they can influence other factors that matter to patients, such as waiting lists. For example, the digital pen enabled professionals to see more patients, thus reducing waiting times.

These technologies imply change and tend to be disruptive: the fear of job losses came up repeatedly in our interviews. Other industries that have seen big productivity gains have benefited from labour-saving technologies, and this has often meant redundancies, for example in manufacturing (Baumol 2012). Public services, however, will always require a

high degree of labour-intensive, face-to-face delivery. Labour-saving technologies should help public services to cope with rising demand without costs spiralling, which could mean changes to the way that staff work, including redeployment, but is unlikely to mean a large reduction in the workforce.

3.2 There is a potentially large impact on productivity but this is hard to measure

Technologies like the digital pen and ADL Smartcare have a clear impact on productivity by enabling staff to do more – we have estimated that these types of innovations could create staff time cost savings of £22 million and £8.8 million respectively, if rolled out nationally. Technologies that join up staff, like Patchwork, could generate large savings through earlier intervention and avoiding more expensive demands on public services, such as a hospital admission, a prison sentence or a child being taken into care. These events cost the taxpayer around £1,700, £45,000 and £2,700^{22, 23, 24} respectively, so even a small reduction in how often these happen represents significant savings.

Innovations that create more active and engaged users have a similar potential. Emerging research suggests that targeted interventions to improve self-management as part of an integrated care pathway, for example, could save around £1,800 per patient per year by reducing their use of healthcare (Expert Patient Programme 2010). The greatest potential savings would come about if monitoring apps like MyFitnessPal could help people to maintain a healthy lifestyle and avoid developing illnesses in the first place. Lifestyle factors like being overweight or physically inactive, smoking, and drinking excessive amounts of alcohol are responsible for a significant proportion of chronic conditions (Sassi and Hurst 2008), which account for 70 per cent of healthcare spending (DoH 2012).

Technology can create services that are more coordinated and thereby empower users and prevent problems developing. This is not only what people want, it is also the best chance we have to manage rising demand and ensure valued services are sustainable for the future. However, it is difficult to measure the impact of interventions that seek to *prevent* things from happening. This requires knowledge of the counterfactual – what would have happened without the intervention. This usually involves creating a control group for the sake of comparison. For instance, a group of patients randomly allocated to use an online peer support forum can be compared to a group of similar patients who did not use the innovation. Health outcomes and healthcare usage can be compared between the two groups to understand what potential future scenarios were avoided. If the costs of the future scenarios avoided are known, such as the cost of a hospital admission, then these can be attributed as savings resulting from the intervention.

Randomised controlled trials – or any forms of comparison with a control group – are rare when new policies are introduced in public services. Generally, the public sector is poor at measuring impact, especially when the impact in question is cost savings. In a recent example, the chair of the science and technology select committee criticised the government for being unable because of poor data to state with certainty what savings have been made from moving services online, saying: ‘this is surprising because a key justification of the strategy is savings to the taxpayer. It is not evident to the Committee that the Government has a handle on measuring these savings’ (Miller 2013).

22 Average cost of emergency hospital admission for a condition where effective management and treatment should prevent admission to hospital (Tian et al 2012).

23 Average cost per prison place, including costs met by the National Offender Management Service but excluding costs met by other government departments like health and education (PRT 2011).

24 Average weekly cost of care in a local authority children’s home (Berridge et al 2010).

The interviewees in this report were committed to building a stronger evidence base for their innovations and we recommend more rigorous use of techniques like randomised controlled trials to build the case for the impact of technology on the productivity of public services.²⁵

3.3 The potential scale of impact depends on the local context

Innovations like the digital pen and ADL Smartcare would seem to offer benefits to healthcare organisations across the country, potentially affecting a large number of patients and producing significant savings in staff time costs. We would recommend that all local commissioners and providers consider whether these types of innovations could create quality improvements and savings for them. Despite their apparent wide applicability, however, successful implementation will still depend on a process of user-based design to fit solutions to specific contexts. For example, Anita Cooper describes how the digital pen will not be rolled out to certain areas of practice in the United Lincolnshire Hospitals NHS Trust because the printers they used were not compatible. This example illustrates how top-down programmes to implement standardised solutions everywhere are unlikely to deliver the quality improvements or cost savings that might be achieved in a specific case. If a national digital pen roll-out had forced trusts to replace large numbers of printers, the potential cost savings would probably have been cancelled out and staff left demoralised and frustrated.

Other examples like Patchwork and Casserole Club could also offer benefits across the country, but this depends on the specific local challenges. In the next section we consider how to encourage the spread of such innovations, primarily by raising awareness of both the problems that public services face and the potential of digital innovation to offer solutions. Many of the technologies we have looked at are marketed directly to individuals, so their spread is not limited by take-up by institutions or commissioners. However, there is a role for practitioners (especially clinicians) to recommend applications like MyAsthmaLog or Re-mission – and to do so they need to be aware of them in the first place.

We have focused on health and social care as the public services that consume the highest proportion of government spending, but the insights here apply across public services. Digital technology can directly aid many of the shifts that policymakers are seeking, including integration, early intervention and prevention, and creating active, engaged communities and individuals.

²⁵ See chapter 4, lesson 5 below.

4. DELIVERING TECH-POWERED PUBLIC SERVICES

The case studies in this report are a rich source of insights into the challenges of implementing technological innovations in the public sector. The interviewees were remarkably consistent in the barriers that they identified and the factors they considered to be critical to success.

4.1 Five essential elements of successful innovation

Lesson 1: User-based iterative design

All the case studies are of grassroots initiatives. The interviewees attributed their success to iterative design with the individuals who would ultimately use the technology and in the environments where it would be used. This process has several advantages over a top-down imposed system: it is more likely to deliver appropriate solutions to specific problems than a standardised off-the-shelf product; it ensures that the product adapts to a changing environment and is not out-of-date by the time it is implemented; and it creates trust between the developer and the service.

There are well documented problems with large public sector IT projects, particularly in the NHS. The £10 billion National Programme for IT was criticised for failing to deliver, going over budget and failing to meet expectations where products were delivered (PAC 2013). Our interviewees described the challenge of lengthy public sector procurement processes with detailed specifications, saying that these could mean products were not relevant by the time they were implemented.

‘Procurement cycles, that’s what makes the progress so slow – in our experience it can take six to nine months to write the tender document, then another nine months to run the tender process. Even then, once you’ve bought it, it can be another 18 [months] before you implement. Something that when you started was innovative won’t be three years later.’

Dominic Campbell, FutureGov²⁶

Lesson 2: Public sector expertise

Just as public service professionals need a greater awareness and understanding of digital technology, technology developers need to understand the public sector. Our interviewees reported that ‘public sector know-how’ was key to success. Our case study entrepreneurs often had a background in health and social care that helped them to get their ideas in front of key members of staff and win their trust.

Schemes like the Public Service Launchpad²⁷ can help technology entrepreneurs to access the expertise they need. The Launchpad – led by FutureGov, working with the Cabinet Office and others – is a seven-month venture involving a scholarship and accelerator programme for public service staff, service users, researchers, technology developers and entrepreneurs. According to FutureGov’s Dominic Campbell, it aims to ‘build a movement for innovation in local public services’.

NHS England is working hard to develop showcasing opportunities, including the NHS Innovation Expo²⁸ and the NHS England Entrepreneurs Day.²⁹ The recent NHS Hack Days are another example.³⁰ These events help public services to gain an awareness

26 In interview with Hannah Nicklin on behalf of Hide&Seek, 13 May 2013.

27 <http://publicservice.hublaunchpad.net/>

28 <http://www.healthcareinnovationexpo.com/>

29 <http://www.england.nhs.uk/2013/06/26/tech-entre-event/>

30 <http://nhshackday.com/>

of the potential of digital innovation and help small projects to get visibility and pick up opportunities for expansion. They also match problems with solutions. For example, the NHS Hack Day website contains directories of problems and ideas. Jon Kingsbury of Nesta highlighted their role not just as funders of innovation but also as connectors of potential innovators:

‘The fact that we can convene networks of people together is terrifically important, [as is] the fact that we have credibility when it comes to talking to government or comes to developing policy, or we have quite in-depth relationships with industry as well.’³¹

As a useful resource, Peter Gore of ADL Smartcare has proposed a directory of which small technology companies are working with which local authorities and health trusts. Also, there could be merit in a specialist mentoring programme that links public servants, practitioners, clinicians or academics with those wishing to develop technology for the public sector.

Lesson 3: Access to seed and bridge funding

Funding was a barrier for some but not all of the interviewees. Seed funding for start-up projects was fairly readily available, with almost all of the case studies receiving support from organisations specifically focused on innovation, such as Nesta or the Technology Strategy Board. A gap was identified, however, around bridge funding to scale projects up and take them from proof of concept to roll-out. Getting stuck at the initial phase – suffering from ‘pilot-itis’ – is a risk for innovators. Building stronger business cases capable of persuading commissioners to invest and ‘mainstream’ technological innovations is crucial, but government should also consider reviewing the availability of bridge funding and publicising available funds.

Lesson 4: Strong public sector leadership

In our case studies, initial resistance from those working in public services was a significant barrier to deploying innovations. Strong leadership was essential to overcoming this barrier, and this a key area where we recommend government should focus its efforts. Greater understanding of the possible reasons for resistance will help.

For more on resistance to change, see the boxed text (over).

Lesson 5: A strong business case

The interviewees knew that building a strong business case that demonstrated impact on quality and productivity was crucial. Mainstreaming innovations means convincing commissioners to fund them, and they are rightly demanding, as Jon Kingsbury explains:

‘If you just breeze into a buyer of a new technology in the NHS, the first question is, “does it improve healthcare for my patients? Does it work? Is it better than what I have at the moment? What are the cost benefits? If I spend a pound here what can’t I spend a pound on elsewhere? What do I have to switch off to do this?” Technology developers in this sector are not used to presenting the answers to those question, and the best ones, the extraordinary examples, are those who work with the workers and people who understand the issues to develop better services.’

Jon Kingsbury, Nesta

31 In interview with Hannah Nicklin, 7 June 2013.

Why is the public sector resistant to new technologies?

'We talk about the organisational immune system rounding on you at points. It rounds on you at the beginning because you're new and a threat, and then it gets used to you. Then you launch something disruptive and a different immune system comes for you – normally under the banner of the IT department, who are terrified of this cloud-based open source technology (in our case). And you have to push through – but it's hugely challenging.'

Dominic Campbell, FutureGov³²

There are many potential reasons why people working in public services may initially display resistance to new technologies. These may include:

- **Fear of job losses:** This issue came up repeatedly in our case studies, especially where technology was being used to produce more efficient working processes. However, labour-saving technologies generally resulted in redeployment rather than redundancies. Allaying the fear of job losses (where it is misplaced) requires strong leadership and communication at the outset of a project.
- **Technophobia and change fatigue:** As Campbell describes it: 'Social care and health have been on the receiving end of the trailing edge of technology – councils and the public sector have received god-awful technology. So when you turn up and say "we're going to solve your problems with technology" – that's what they heard last time.'
- **Risk aversion:** Public services often operate in high stakes environments, with professionals making life and death decisions. Understandably, this can create a risk-averse culture. James Munro of Patient Opinion describes how 'there's always an ambivalence when you're trying to innovate around something that is fundamentally quite a cautious culture, like the NHS'.³³ If practitioners perceive new technology as a threat to service quality, they will oppose it. As Jon Kingsbury from Nesta explains: '[it's] not always an attitudinal problem, [it's] just that people believing they're doing the very best for their organisation don't view innovation as transformative or see it as risky.'³⁴
- **Threat of transparency:** Opening up practices for others to see can be a challenging process, as Campbell explains: 'People moan about the silos when they're in them and how disruptive they are to services, but if you give them the opportunity to join up those silos you realise that that kind of openness and connectivity terrifies them.'
- **Hostility to private sector or outside agency:** Similarly, the culture of public services can sometimes be hostile to outsiders, especially if they are perceived to be making profit from other people's work in the public sector. Munro explains: 'The NHS doesn't find it easy to trust third parties ... that's a particular cultural challenge working with the health service, persuading them that actually although we're not in the health service we might care very much about the health service and want to work alongside it.'

32 In interview with Hannah Nicklin on behalf of Hide&Seek, 13 May 2013.

33 In interview with Hannah Nicklin, 14 May 2013.

34 In interview with Hannah Nicklin, 7 June 2013.

- **Practitioner workload:** Public services tend to operate under high pressure with competing demands on practitioners, and some simply feel they do not have time to get used to a new technology. Iterative user-based design means that the need for time investment upfront is clear, but practitioners should also see value from the innovation from the very start.

4.2 What is the role for government?

This report has clearly demonstrated the potential for grassroots innovation and iterative user-based design to avoid some of the pitfalls that have been seen in large-scale top-down IT programmes. Nevertheless, there are times when a standardised approach is appropriate and can be implemented centrally. Where processes are purely or mostly transactional (such as online booking) a top-down approach to deliver a digital solution may be appropriate, and can have a big impact on productivity. The NHS estimates that every 1 per cent reduction in face-to-face interactions could save £200 million (DoH 2011). The National Programme for IT was ended in 2010 in favour of a decentralised approach, but the core infrastructure that enables online booking and electronic prescriptions was retained as a national system (DoH 2010). More generally, Patrick Dunleavy and Leandro Carrera (2013) describe the success of large public sector IT projects that focused on transactional services, such as self-assessment tax returns.

Beyond this national core, NHS England's national director of patients and information, Tim Kelsey, has enthusiastically endorsed an approach based on working collaboratively to encourage innovation.

'If we open up our doors to the rest of the community and say "this is everyone's problem", we can do that. And what I'm saying is that's what we are going to do.'

Tim Kelsey, quoted in EHealth Insider 2012

This approach has already helped to create a vibrant culture around public service digital innovation and has supported schemes like the NHS Hack Days and Public Service Launchpad (see lesson 2 above).

In a number of the examples we have considered, innovations were generated by technology developers who also had experience of the problems that public services face (such as Patchwork). Occasionally, public service managers (in commissioning bodies or provider organisations) invited bids for innovative solutions to specific problems (such as Woodland Wiggle). The majority of the examples bypassed the public sector altogether by responding directly to user demand (such as Mental Elf).

In considering how to spark innovation and create more successful examples like the ones in this report, there are three main areas where government can support action:

- demonstrating impact
- overcoming resistance in the public sector
- harnessing user demand.

Demonstrating impact

For innovations to penetrate beyond those people in public services who are already engaged, developers need to build strong business cases that talk the language of the public sector – and that is primarily about demonstrating quality improvements and cost savings. Government should team up with a digital specialist to produce guidelines on evidencing quality improvements and the cost-effectiveness of projects in this area.

Public sector commissioners are rightly rigorous in demanding that innovators present evidence of the impact their product can have. The NHS in particular is accustomed to the process whereby the National Institute for Health and Clinical Excellence (NICE) reviews evidence for the clinical and cost effectiveness of treatments, and recommends which ones the NHS should fund on the basis of a standard cost/benefit equation. Innovators need the same rigorous approach to demonstrating effectiveness, but this can be very demanding without standard tools to hand.

‘Drugs are approved on the basis of clinical trials, AB-testing, randomised control experiments, that kind of stuff. Without fetishising evidence, thinking about innovation in that context and building new stuff, adopting services elsewhere, and being rigorous about the application of those sorts of trials will be extremely helpful ... We just have to be careful that that doesn’t exclude very small organisations that have great ideas – and that’s where early-stage funding comes in, grant funding etcetera, and can be helpful.’

Jon Kingsbury, Nesta³⁵

Nesta’s ‘Standards of Evidence’ aim to balance the desire for academic rigour in evaluation against the need for a proportionate approach that supports innovation (see Puttick and Ludlow 2012). They hope that use of their standards could signal quality in the same way that evaluations in the private sector – such as a 5-star review by consumer group Which? – add value to products. Within the voluntary sector, there is a ‘Code of Good Impact Practice’ which sets out a cycle of activities that non-profit organisations should undertake to measure the impact they are having (see Inspiring Impact 2013). The Cabinet Office has produced a guide to setting up randomised controlled trials and has called for policymakers to begin using these systematically (see Haynes et al 2012).

The Cabinet Office should consider teaming up with a technology partner to develop a guide for demonstrating the impact of digital innovations. This would not only be a useful tool for innovators, it would also provide reassurance to public sector commissioners who could see that a standard process had been followed, making the mainstreaming and spread of innovations more likely.

Overcoming resistance in the public sector

The problems and challenges that frontline practitioners in public services face every day should be the spark for new innovations. Given the low baseline of knowledge and high level of initial resistance uncovered in our case studies, government should ensure that awareness of the potential of digital technology is built into training for public service workers. A set of principles for iterative user-based design that teams could sign up to at the outset of a project would help to educate public sector practitioners and managers. In the NHS, a number of promising initiatives have emerged from the report *Innovation, Health and Wealth* (DoH 2011) including the NHS Innovation Fellowship. These initiatives

35 In interview with Hannah Nicklin, 7 June 2013.

must be sufficiently focused on *digital* innovations, especially the participatory potential of the social web. This would also help frontline staff to develop their own ideas, as the ones who know best the problems they and the people who use their services face every day. NHS England is planning to launch Code4Health – based on Code For America³⁶ – which would teach frontline workers in the NHS how to programme (EHealth Insider 2012). Finally, a directory of the small technology companies who are currently working with local authorities and other agencies would help to showcase the opportunities for public sector managers.

Harnessing user demand

Individual-focused examples like Patient Opinion, Mental Elf, Re-Mission and MyFitness-Pal are not reliant on public service funding or take-up. Nevertheless, they could have a significant impact on the way that people use public services. There are challenges for these innovations in becoming financially viable, but many are developing successful ‘freemium’ models, where the basic offer is free but there are charges for optional, additional elements.

The government should consider how to harness consumer demand to better understand what would make a difference to community and individual wellbeing. Examples like Shaped by Us show the potential to capture in one place the challenges people face and the solutions they would like to see. In addition, government should raise awareness among users of public services and practitioners of the innovations that are available for them to use directly and free of charge.

Directories like the NHS Health Apps Library can not only reassure individuals that information in an app is clinically accurate but also reassure clinicians and raise their awareness of other apps, like Re-Mission. Efforts should be made to raise awareness with clinicians by using existing networks to publicise apps in their speciality area, for example, through Cancer Network bulletins.

The Health Apps Library

- <http://apps.nhs.uk/>

A library of NHS reviewed and approved apps for various health and care uses, developed in the UK by NHS England.

Description: The Health Apps Library is currently at public beta release stage – that is, it is unfinished but is being publicly used and tested. The online library lists apps for use on various devices or via websites. Apps are listed only after review by clinicians, who check that they are ‘safe’ and relevant to people who live in the UK. The library allows members of the public to browse by app category (Conditions, Healthy living, Health information and Social care) and to add their own reviews and comments.

Impact: Indi Singh introduces the app library on the NHS blog by explaining that by ‘providing a trusted listing of health application and online tools we can ... highlight to people new services that they otherwise might not be aware of’ (Singh 2013). Spreading useful tools for self-led care can reduce the burden on the NHS, and contribute to greater wellbeing for citizens.

36 <http://www.codeforamerica.org/>

CONCLUSION

Can technology improve the experience of people using public services, or does it simply mean job losses and a depersonalised offer to users?

Technology can improve people's experience of receiving public services, just as it has improved the user experience in so many other sectors. In health and social care particularly, the era of chronic conditions – which cannot be cured and are caused in large part by lifestyle factors – means that technology can play a critical role in placing power, responsibility and control in the hands of individuals to help them manage their own health.

Could tech-powered public services be an affordable, sustainable solution to some of the challenges of austerity?

Technology can help to bear down on bureaucracy and ensure that the transactional elements of public services are as efficient as possible. More significantly, it can make a contribution to delivering more preventative services that stop or delay problems escalating, costing the taxpayer more downstream. Nevertheless, public sector commissioners want to see the evidence that an innovation can make a difference and government should support the production of standardised business cases.

Public services tend to display initial resistance to new technologies (for understandable reasons) and government should take the lead in raising awareness of the potential of new technologies to improve quality. In particular, education on the process and methods of iterative user-based design would help those working in public services to develop trust in the process of digital innovation.

Given the pace of technological change and the rapid uptake of digital innovations by the public, it is a question of when not if public services become tech-powered. The focus must therefore be on how to ensure successful deployment and spread of innovations. As people become ever-more accustomed to using digital technology in other aspects of their lives, user demand may be an increasingly important driver of change.

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