Developing radical service innovations in healthcare – the role of design methods

John Bessant *

Imperial College of Science, Technology and Medicine,
South Kensington, London, SW7. United Kingdom
Email: johnbessant@btinternet.com

Lynne Maher

National Health Service Institute for Innovation and
Improvement, Warwick, United Kingdom.
* Corresponding author

Abstract: This paper looks at the management of ser vice innovation. In particular it explores the challenge of public services and argues that there is a need for new approaches to the ways which engage users as more active co-creators within the innovation process. It draws on wider research on radical innovation being carried out as part of a long-term international programme and reports on a series of case studies of experiments in the health sector in the UK using tools like ethnography and prototyping to enable innovation.

.

The paper argues that a potentially valuable toolkit can be found in the field of design methods. By their nature design tools are used to help articulate needs and give them shape and form; as such they are critical to the 'front end' of any innovation process. Methods like ethnography allow for deep insights into user needs, including those not clearly articulated whilst prototyping provides the possibility of creating a set of 'boundary objects' around which design discussions which include users and their perspectives can be carried out.

1 Introduction

Services have received relatively little coverage in research on innovation management. In part this is because of assumptions made about the transferability of lessons originally learned in a manufacturing context, a justifiable position but one which neglects some important differences around service innovation [1, 2]. Not all service innovation can work to the same prescription since there is – as in manufacturing – considerable heterogeneity across the sector and this has implications for the innovation management approaches used. Pavitt's typology can be usefully extended to cover services not only as end –users but also as generators of technology (for example in the field of IT where retailing has been a powerful force). Other models such as the 'product/process matrix' highlight differences between high volume and mass production services like banking and insurance and project-based/small batch service activity such as professional services [3]. .

Beyond such modulation of established innovation management approaches from manufacturing are some additional challenges. The first of these is the significantly different nature of innovative activity in services. Taking the original Frascati manual definition, R&D is *"creative work undertaken on a systematic basis in order to increase the stock of knowledge .... and the use of this stock of knowledge to devise new applications'*. This process is clearly taking place within services – search (albeit with a much stronger demand side emphasis), experiment and prototyping (which may extend the 'laboratory' concept to pilots and trials with potential end-users) and a gradual scaling up of commitment and activity leading to launch. Service businesses may not have a formal R&D department but they do undertake this kind of activity in order to deliver a stream of innovations [4].

Second, the close coupling of creation and consumption means that the role of users is much more significant. In particular services are hard to protect through formal intellectual property mechanisms like patents or copyright and so barriers to imitation are low. Preserving competitive edge requires close relationships with customers over the long-term.

These differences place emphasis on 'co-creation' of innovations with users as a source of sustainable competitive advantage. This fits with the logic of user-led innovation as a key driver in the current environment but begs the question of how to enable such approaches [5].

## 2	The challenge of innovation in public services

Public services represent an important additional challenge – that of dealing with multiple stakeholders and the 'contested' nature of innovation [6]. Whilst it may appear that the driver of competitiveness is lacking and people have little choice in public services, the reality is that there is increasing pressure for change but coming from multiple and often conflicting directions. Demands for cost cutting on the funding side push providers towards more efficient solutions but at the same time there are a number of different influencers including recent Government policy [7] and a range of advocates and lobby groups on behalf of users who are driving towards non-price aspects such as service quality, flexibility and customization. The result is increasingly a search for complex solutions to complex problems – and suggests that some of the most radical innovation is actually taking place in and around the public sector [8].

As a recent report put it, *'current approaches to public service reform are reaching their limits..... a wide range of prominent issues, including the environment, crime, and public health concerns such as smoking and obesity, cannot be adequately addressed by traditional services. Effective responses must encourage new norms of behaviour within society, developing approaches in which those who use services become involved in their design and delivery..... we need a radical transformation and a new approach: co-created services'.[9]*

## 3	A map of innovation search space
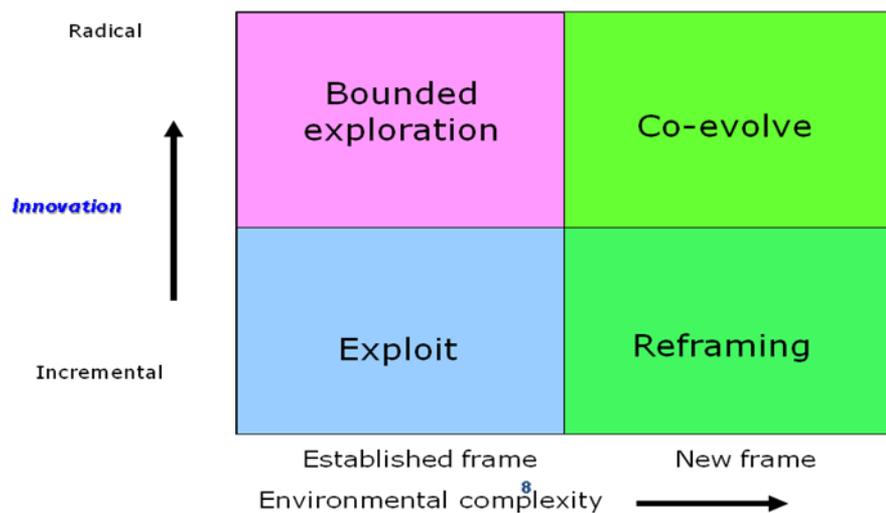
Figure 1 shows a map on which we can examine this innovation search challenge. Zone 1 is essentially the 'exploit' domain and presumes a stable and shared frame – 'business as usual ' – within which adaptive and incremental development takes place. Search behaviour is all about refining and sharpening tools for technological and market research and deepening relationships with established key players.

Zone 2 involves search into new territory, pushing the frontiers of what is known and deploying different search techniques for doing so. But it takes place within the same basic frame – 'business model as usual'. R&D involves making a few big bets on the front edge of an established technological trajectory (for example semiconductor firms using Moore's Law to target their activity and using patenting and other IP strategies to mark out and stake claims on the new territory they find). Market research similarly aims to push the frontiers of understanding the customer via empathic design, latent needs analysis, etc.

These first two zones represent familiar territory in search behaviour. They take place within a way of seeing the world which shapes perceptions of what is relevant and important – the 'box' that organizations occasionally talk about wanting to get out of. But this frame is not the only way of looking at the world – and zone 3 is associated with

reframing. It involves searching a space where alternative architectures are generated, exploring different permutations and combinations of elements in the environment. This process is risky and often results in failure but can also lead to emergence of new and powerful alternative models. Significantly this often happens by working with elements in the environment not embraced by established business models– for example, working with extreme users or fringe markets [10, 11].

Zone 4 is where new-to-the-world innovation takes place. It is the 'edge of chaos' – a complex environment where innovation emerges as the result of complex interactions between many independent elements. Processes of amplification and feedback reinforce what begin as small shifts in direction and only gradually define a trajectory. It resembles the 'fluid' state in the innovation life cycle [12].

Search strategies here are difficult since it is, by definition, impossible to predict what is going to be important or where the initial emergence will start and around which feedback and amplification will happen. Faced with this challenge the 'smart' strategy would be to try and position the organization in the centre of the debate, able to pick up early on possible trends and begin to influence the debate and the emergent innovation trajectory. Innovation search here is less about following a clear lead than placing a number of 'probe and learn 'bets.

4   Assembling a new toolkit for radical innovation

One approach appropriate to exploring the right hand side in figure 1 involves 'design methods' – essentially a toolkit for helping to articulate as yet unclear (and sometimes unimagined) possibilities. There is a long tradition of using design tools in product innovation, exemplified in a variety of handbooks and also in the insights gained from key design practitioners like IDEO and ?whatif! [13-15] Work by von Hippel and colleagues have shown over many years the power of user-led approaches [16] and case examples, such as that of Lego, testify to the growing importance of working with users in 'co-creation' mode [17].

Arguably less is known about how to adapt such approaches to service innovation although there are important precedents (for example the work on computer systems design pioneered by Enid Mumford and others had widespread application in the service sector) [18]. Work by Voss and

colleagues [19] has highlighted the importance of users in the design of 'experience innovation' whilst German research on a number of service sectors stresses the importance of customizing and tailoring the experience via forms of co-creation [20].

Some design methods are targeted at frame breaking – creative problem solving, imagination, etc – whilst others are about understanding users and bringing their perspective into the articulation – anthropology, empathic design, construct elicitation, etc. And an important third element is prototyping – creating boundary objects around which user perspectives can interact with an *emerging* reality [21, 22].

In the following section we explore some examples of using design approaches in the UK health sector to explore radical innovation opportunities.

(a) Zone 3 Reframing via experience-based design

Improvement collaboratives - where members of multidisciplinary health teams work together both within and across organisations with a commitment to improving services - have emerged as a popular method for change within healthcare. Their impact includes significantly reducing waiting times and streamlining services [23]. Typically such approaches – for example deployed in improving outpatient care –involve a range of staff including, nurses, clinic clerks, diagnostic services staff, doctors, secretaries and managers. Whilst they try to collect and integrate user's views into the redesign of services, there are fewer examples where patients and staff are jointly - and equally - involved in a *co-design* process.

Work at Luton and Dunstable hospital involves using design methods to create a user-led solution to the challenge of improving patient care amongst neck and head cancer sufferers. The approach involves patients and carers telling stories about their experience of the service; these stories provide insights which enable the team of co-designers to think about designing *experiences* rather than designing services [24, 25]. Importantly the role of 'designer' includes all of those involved in the collaborative process: patients, staff, researchers, improvement leaders as well as design professionals [26].

Experience-based design (EBD) involves identifying the main areas or 'touch points' where people come into contact with the service, and tries to identify areas of exceptional practice, and areas where systems and processes need to be redesigned to create a better patient experience of health services. These touch points effectively help to prioritise actions. Then, by working together patients, carers and staff in the front line – doctors, nurses, and hospital administrative staff – the team can begin to design experiences rather than just systems or processes [27]. The range of people involved as co-designers makes for an unusual mix of expertise in the context of traditional health care improvement efforts. However, the process was enriched by taking into consideration the different skills, views and life experiences of the patients, carers and others involved [28].

In the L&D such co-design has led to changes – for example patients and carers have changed project documentation so that it better reflects their needs, and clinic staff and patients have worked together to redesign the flow of outpatients in the consulting room. Various methodologies were used to encourage patient involvement in the process, including patient interviews, log books and film-making. This enabled patients to show their experience of the service through their own lens, and bring their story to life for others.

The initial co-design group identified 38 different actions to be taken, all based on user experience. Mapped on to figure 1 this approach is essentially around zone 3 – incremental innovation taking place within a different frame. Significantly it helps deliver a customized, user-centred experience without incurring major cost penalties when compared to the traditional NHS model. This supports the view taken in the Wanless Review of the NHS in 2002 which suggests that '*putting patients in control and helping them to be fully engaged in their healthcare is likely to be more cost effective and offer better value for money than if people are simply passive recipients of services'*. [29]

(b) Zone 3 - The Open Door Community Hospital

Sometimes innovation involves different combinations of elements in a new frame – an alternative *architecture*. The low cost airline example was not about new aircraft or airports but rather about focusing on an underserved market and developing a new configuration around that. In

the process a new model emerged with very different characteristics which then migrated to the mainstream and fundamentally challenged the core business model of airlines in general. In this example the needs of an underserved population in healthcare are addressed via a radically different configuration which may have considerable relevance for the 'mainstream' approaches currently used in the sector.

The Grimsby region in north east England has experienced a structural decline in industry and employment. Although some parts of the region are well-linked to the NHS there is a significant group with problems associated with social exclusion. For example the 2004 Indices of Multiple Deprivation show Grimsby in the worst quartile of local authorities, with 25% of the population living in the most deprived areas. Over the last 2 years the town has also received a large number of economic migrants (estimates as high as 6,000). Their desire for work has put even more pressure on employability and distanced many from the sources of economic recovery. The number of 11 year olds drinking alcohol regularly is almost 4 times the national average; a quarter of Grimsby's 11 year old boys are drinking every week. There were an estimated 1,440 problematic drug users in the Grimsby area in 2005/6, less than half were in treatment at that time. Estimates suggest that these people may be responsible for as many as 1,500 children.

From the NHS perspective, there is a need to look for innovative solutions which can address the needs of this group – but again to do so in ways which 'customize' solutions to their specific context whilst avoiding the financial penalties normally associated with personalized medical care.

The 'Open Door' project, originally commissioned by North East Lincolnshire Primary Care Trust, represents an attempt in this direction. A core principle was to reframe the problem and explore potential solutions via high levels of user input in design. It focused on vulnerable people who typically do not access mainstream or traditional health services on the basis that if the needs of this group were satisfied then the resulting model would also be inclusive of 'mainstream' needs. The groups involved were:

- Problematic drug users
- Homeless people
- Offenders (people leaving prison and youth offender institutions)
- Sex workers

- Asylum seekers & refugees
- Economic migrants
- People excluded from General Practitioner (GP) lists

A model of the user-centred design process involving four stages was used as a core template, involving:
- opening up a problem and investigating all issues
- focusing on what appears to be the key issue
- opening up a number of potential solutions
- focusing ,developing and delivering a preferred solution

Within this a variety of research techniques were employed to gather views, issues and problems. These included:

- participant observation using a variety of ethnographic techniques to work with users to identify and understand their problems, issues, motivations and beliefs

- giving disposable cameras to members of target groups such as unemployed youths or asylum seekers to generate images which provide a perspective on life in the area

- creating a web page for on-line discussion,

- generating press articles,

- sending out cards asking for feedback, asking potential users for "gripes" about their past experience of health care. The cards also pointed people towards the website for further comment.

- workshops with service users and providers,

- benchmarking visits in London, Manchester & Glasgow,

- interviews and observation with service users

The research was done by independent consultants and not by the core NHS project team to ensure a measure of objectivity. This work highlighted not only the core problem of particular needs for access to the health and social welfare system but also a strong sense of

disempowerment and a lack of trust in the NHS amongst members of this user community. Dealing with this became a key challenge – lack of trust in the formal health system engendered an attitude of non-involvement until emergencies developed, at which point the health care system would be required to deal in crisis mode. As one interviewee put it, *the prevailing view is 'only go when it's bad'. So large numbers of people are disengaged from primary care and turn up at A&E in distress. They expect nothing or they expect everything right now'.*

Developing the approach involved extensive use of prototyping methods to engage users in co-design of the proposed solution. Of particular importance was the use of scenario techniques and exploration of the current and potential experiences of a number of key characters – roles – of people who would be involved in service provision and consumption.

The outcome of this design-led exploration was the development of a bid to establish a radically different kind of Community Hospital in response to a national tender process. Whereas the majority of bids were along 'conventional' lines involving buildings and a fixed location the Open Door approach was to take the hospital to the community – specifically the excluded members identified above. Using a location in an abandoned shop front along a main street in the heart of the declining part of town the plan was to create an 'open door' allowing users to drop in and access a wide range of services. Staff would be drawn in based on their availability to work odd hours and with a motivation to help this community, whilst equipment would be small and portable. In other words the hospital would be designed and configured around the needs and ideas of the user community which it was designed to serve.

(c) The RED project

One of the major health issues identified by the UK Wanless report in 2002 is the rising challenge of chronic disease. The incidence of diabetes for example, has risen to 1.8 million people in just eight years, costing the NHS £10 million a day. It represents a complex problem in which a user-led approach might offer significant new opportunities. For example, the average person with diabetes spends about three hours a year with doctors, checking prescriptions and general health – but they spend thousands of hours a year self-managing their condition. Traditional approaches to

public service reform target innovations which give a diabetic more choice over their GP, a booked appointment or a patient's charter. But there is clearly considerable scope in focusing on the thousands of hours the diabetic self-manages, through offering peer-to-peer support, better training and tools to cope with diabetes. And further traction could be gained by emphasising prevention rather than treatment and increasing educational and other activities in this direction.

As the Wanless report argues the future of health care in an era of chronic disease, would turn on the 'full engagement' of people in their own health care. Whilst hospitals play a key role there is scope for much higher levels of engagement across the user community. But the emergence of a more integrated system will involve bringing in a wide range of stakeholders and working in the 'contested' innovation space out of which radical alternatives may emerge

One experiment in this direction has been work towards co-creation/co-evolution of new diabetes services within the Bolton area of north-west England. At present an estimated 10,000 residents suffer from diabetes (almost one individual in every ten households) in the area. This absorbs 5% of NHS resources locally, and 10 % of hospital patient resources. The area already has an impressive track record of 'traditional' innovation solutions to the problem but progress has been largely inspired by the professional managers and clinicians rather than diabetics themselves. This 'medical' model has some limitations and the interface between patients, professionals and workers in the diabetic centre has proven to be a particularly intractable problem. In the words of one clinician, improving this interface *'would make a good service fabulous'*, but professionals from various institutions involved in the system recognised that this would require radical re-organisation of a service around the patient.

The RED project was a prototype which looked at the ways in which the interface between people with diabetes and a range of required services could be improved and at how diabetics might support each other. Arguably such a co-created service would entail both participation and change on the part of the diabetics themselves and the professionals currently engaged in delivering services. There was also a focus on prevention since avoiding secondary complications depends critically on the person with diabetes, their lifestyle and their monitoring and self medication. Dealing with this issue highlights problems with the

organisation of the diabetes care service itself and for bottlenecks within it. In Bolton for example there is a two year waiting list for orthopaedic shoe fittings (cost £100) which can save the need for amputations (cost between £30,000 and £40,000).

Having advertised the project in GP surgeries in the area, the team found a group of 20 willing participants, all diabetes sufferers ready to share their experiences of living with the condition. The first stage of the project involved focusing on the group's individual lives, not just their disease, and building up an in-depth understanding of the real issues that affect sufferers' ability (or inability) to manage their diabetes effectively day to day. (Once again the design methods deployed here are essentially ethnographic in nature, using storytelling and related approaches).

Over time, common patterns began to emerge within the group, and it became possible to identify three profile categories based on how individuals approach and manage their condition; *'knowing struggler'*, *'determinedly naïve'* and *'able knower'*. Further work with these different groups and their carers involved extensive prototyping and experimentation.

5. Discussion and conclusions

A key feature of these experiments has been the promotion of active engagement with patients as co-designers. Other evidence suggests that the approach has considerable potential. For example Bate and Robert report on work by the Institute for Family-Centred Care, showing that the active participation of patients and carers in clinical care and quality improvement enhances outcomes [26]. Similarly, at the Cincinnati Children's Hospital, parents of children with cystic fibrosis are teaching hospital staff how to improve care and services on the basis of their own experiences in the hospital. The health literacy programme at the Iowa Health System includes patients ''teaching back'' to clinicians what they understand from the consent discussion and documents. The Evelina Children's Hospital in London has been experimenting with new ways of working with patients and their families in a project called ''Improving the Patient Experience''. Staff training uses scenes from children's real life experiences played by actors and enables staff to reflect on what makes a better experience [26]. Experience based design is starting to be used across a range of health services including renal dialysis, stroke and orthopaedic services and for those who live with multiple sclerosis. The insights and resulting actions are not what would have been seen or

anticipated through the use of more traditional improvement processes [27].

Importantly the process requires new approaches and tools – for example, the extensive use of scenarios and storytelling/narrative enquiry – which are better geared to capturing and exploring the 'system' level perspective where users and providers interact in complex fashion. Service improvement methodology often fails to deal with this interface but, as Bevan et al point out, design methods may be more effective [30]. They cite work by Nielsen highlighting a study which reported on 22 ways in which automated hospital systems can result in the wrong drug being dispensed to patients. Arguably these represent typical design flaws which exist and remain uncorrected because of the failure of healthcare designers to be aware or reap the benefit of the last 25 years' experience with usability research. The problem may in fact be worse than reported because the approach to the study itself involved a questionnaire survey rather than observing actual experience and may thus have considerably underestimated the true error rate. This theme is picked up in recent discussion of design methods in practice – for example the growing emphasis on ethnography and studying what users actually *do* in a context rather than what they say they do [13].

The examples reported above represent experiments towards an alternative approach to service innovation which moves away from linear supplier/consumer models to those with a 'co-creation' emphasis and suggest a trajectory both for further development and testing of the role of design methods but also for research into service innovation, especially in the public sector context. There is growing evidence for this in other work on healthcare – for example, in experiments towards workable telecare solutions, in co-evolution of chronic disease management approaches and in learning from radically different contexts via 'probe and learn' approaches , such as in the Aravind eye clinics in India [11, 31, 32] .

References

1.   Meyer, M. and A. DeTore, *Product development for services.* Academy of Management Executive, 1999. **13**(3): p. 64-76.

2.   Bessant, J. and A. Davies, *Managing service innovation*, in *DTI Occasional Paper 9: Innovation in services*, C. Connolly, Editor. 2007, Department of Trade and Industry: London.

3.   Hayes, R., S. Wheelwright, and K. Clark, *Dynamic manufacturing: Creating the learning organisation*. 1988, New York: Free Press.

4.   OECD, *Science and technology indicators*. 1987, Paris: Organization for Economic Co-operation and Development.

5.   Von Hippel, E., *The democratization of innovation*. 2005, Cambridge, Mass.: MIT Press.

6.   Hartley, J., *Innovation in governance and public services: past and present*. Public Money and Management, 2005. **25**(1): p. 27-34.

7.   Department_of_Health, *High Quality Care for All. NHS Next Stage Review Final Report*. 2008, HMSO: London.

8.   Albury, D., *Innovation in the public sector*. 2004, Strategy Unit, Cabinet Office: London.

9.   Leadbeater, C., *Personalisation through participation*. 2004, Demos: London.

10.   Christensen, C., S. Anthony, and E. Roth, *Seeing whats next*. 2007, Boston: Harvard Business School Press.

11.   Prahalad, C.K., *The fortune at the bottom of the pyramid*. 2006, New Jersey: Wharton School Publishing.

12.   Abernathy, W. and J. Utterback, *A dynamic model of product and process innovation.* Omega, 1975. **3**(6): p. 639-656.

13.   Kelley, T., J. Littman, and T. Peters, *The Art of Innovation: Lessons in Creativity from Ideo, America's Leading Design Firm*. 2001, New York: Currency.

14.   Kingdon, M.e., *Sticky wisdom - How to start a creative revolution at work*. 2002, London: Capstone.

15.   Bruce, M. and J. Bessant, eds. *Design in business*. 2001, Pearson Education: London.

16.   Von Hippel, E., *User toolkits for innovation.* Journal of Product Innovation Management, 2001. **18**: p. 247-257.

17.   Moser, K. and F. Piller, *Special Issue on Mass Customisation Case Studies: Cases From The International Mass Customisation Case Collection.* International Journal of Mass Customisation, 2006. **1**(4).

18.   Mumford, E., *Designing human systems*. 1979, Manchester: Manchester Business School Press.

19.   Voss, C., *Trends in the experience and service economy*. 2004, Advanced Institute of Management/ London Business School: London.

20. Reichwald, R., et al., *Services made in Germany - A travel guide*. 2007, CLIC - HHL University: Leipzig.
21. Schrage, M., *Serious play: How the world's best companies simulate to innovate*. 2000, Boston: Harvard Business School Press.
22. Thomke, S., *Experimentation matters*. 2002, Boston: Harvard Business School Press.
23. Kerr, D., et al., *Redesigning cancer care.* British Medical Journal, 2002. **324**: p. 164-166.
24. Pine, J. and J. Gilmore, *The experience economy*. 1999, Boston: Harvard Business School Press.
25. Schmitt, B., *Customer experience management*. 2003, New York: The Free Press.
26. Bate, P. and G. Robert, *Experience-based design- from designing the system around the patient to co-designing services with the patient.* Quality and Safety in Health Care, 2006. **15**: p. 307-310.
27. NHS_Institute_for_Innovation_and_Improvement, *Experience based design*. 2008, NHS Institute for Innovation and Improvement: Warwick.
28. Pickles, J., E. Hide, and L. Maher, *Experience Based Design: a practical method of working with patients to redesign services.* Clinical Governance 2008. **13**(1): p. 51-58. .
29. Wanless, D., *Securing our future health: taking a long-term view*. 2002, Department of Health: London.
30. Bevan, H., et al., *Using a design approach to assist large-scale organisational change.* Journal of Applied Behavioural Science, 2007. **43**: p. 135-152.
31. Tidd, J. and J. Bessant, *Managing innovation: Integrating technological, market and organizational change*. Fourth ed. 2009, Chichester: John Wiley and Sons.
32. Bessant, J. and B. Wesley. *Co-evolution of radical new servcies*. in *8th CINet annual conference*. 2007. Gothenburg, Sweden: CINET.