

Designing for Services - Multidisciplinary Perspectives:
Proceedings from the Exploratory Project on Designing for
Services in Science and Technology-based Enterprises,
Saïd Business School

Edited by Lucy Kimbell and Victor P. Seidel

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Introduction

Lucy Kimbell and Victor P. Seidel

This collection of perspective essays is a product of the exploratory research project on Designing for Services in Science and Technology-based Enterprises (D4S) – a multidisciplinary effort that ran from December 2006 through October 2007 at the Saïd Business School, University of Oxford. As an exploratory project on a form of designing, it was a uniquely-designed research project, featuring two main areas of focus.

Bringing together design and enterprise

A first area of focus was on the designing that happens when practitioners within science- and technology-based enterprises work with service designers on projects to design (or re-design) their services. As pointed out in the perspective by Bruce Tether, this is an economically important area. The opportunities for service design are great, but so too are the challenges of applying design in a service context, especially when this takes place at the leading edge of science and technology.

There were three pairings of enterprises and design consultancies, as summarized in Figure 1.

Each pairing provided the opportunity for members of the enterprises to become familiar with service design approaches and techniques and for members of the design consultancies to test their craft in a new setting. Pairs were asked to define and agree how they wanted to use the six days the consultancies were paid to work with their paired enterprise. There was no expectation on the part of the researchers that the design consultancies would or could undertake a full design process in this time. Rather we hoped to learn from the ways the service designers and entrepreneurs went about their engagements with each other. Together, these pairings provided a focused “petri dish” of sorts to examine issues relevant to service design in this context.

Engaging a multidisciplinary community

The second area of focus was on how a multi-disciplinary community of practitioners, designers, and academic researchers evolved their understanding of the process and language involved in designing for services. Unlike most research projects, the design of the D4S project allowed our multidis-

Figure 1: overview of D4S projects

Enterprise - market - key people	Design consultancy - approach - key people	Base technology	Joint project	Service design proposals
Prosonix <i>Ultrasound process solutions</i> David Hipkiss Christian Jones	IDEO <i>Desirability, feasibility, viability</i> frame Fran Samalionis Neil Martin Anna White	Particle engineering technology based on controlled crystallization	Review of service offerings and exploration of new markets	- Developed a “service toolkit” with two areas to prototype: - <i>Business impact assessment</i> (viability focus) that could be used to facilitate customer engagement - <i>Future implementation scenarios</i> (desirability focus) explored using “adcepts” (advertising concepts) illustrating possible impact of technology
g-Nostics <i>Personalized medical treatment</i> Mark Tucker Pablo Toledo Mark Allman	live work <i>Service innovation & design</i> Ben Reason Chris Downs Paul Sims	Library of pharmacogenetic profiles	Examine NicoTest smoking cessation service trial within NHS	- Focused on customer journey and touchpoints in the trial service leading to recommendations for improvements to customer experience through redesigning some elements - Used sketching to generate new service ideas
Oxford Gene Technology <i>Micro-arrays for clinical research and diagnostics</i> Mike Evans James Clough Marcus Harrison	Radarstation <i>Design-led futures</i> process Ré Dubhthaigh Toke Barter	Micro-array fabrication based on ink jet in-situ synthesis (IJIS5)	Reviewed customer experience of existing service and touchpoints	- Synthesized several interviews to produce a customer journey diagram and developed two main profiles, “Newbie” and “Collaborator” - Developed proposals to improve touchpoints by making - process more visible; handholding; and extending relationships

disciplinary community to gather at regular intervals to discuss with the pairs the process that was underway. Figure 2 provides an overview of the timing of these project events. This element allowed a wider community to examine the petri dish at regular intervals and discuss the implications of what was transpiring. At three of these events the designers and enterprises provided accounts of their organizations and work practices and, as they began to work together, of what they were doing in their projects. At regular points, we asked the wider group, including the academic researchers, to reflect on what they were hearing and provide perspectives to help make sense of it. At the final event we asked a number of the academic researchers to offer reflections on the project drawing on their disciplinary lenses, which provide the basis of the essays in this volume.

By bringing into the research both practitioners who refer to themselves as service designers, as well as science and technology entrepreneurs who have designed and offer services, along with researchers from a range of disciplines with an interest in services, we understood from the beginning that the project would be exploratory as these diverse constituencies grappled with each other’s motivations, worldviews, cognitive maps, practices, methods and language. The D4S project was designed to provide opportunities for the exchange and capture of such different vantage points – through such designed elements as reflective exercises, wall scribing, and the use of video documentary. The different members of this community will be described briefly in turn.

The design consultancies

Taking part in the project were consultancies that represent some of the leading practitioners working in the emerging field of service design. IDEO is a major international consultancy with roots in product and industrial design and more recent initiatives in service design. The IDEO designers used

a framework of examining “desirability, feasibility, and visibility” across their paired enterprise’s current and potential offerings.

UK-based live | work was established specifically to focus on the area of service innovation and design. In their work with their paired enterprise, live | work designers used ideas of the customer journey, touchpoints, stakeholder maps and the service ecology.

London-based Radarstation offers consultancy that focuses on a “design-led futures” approach. Its designers examined the current touchpoints offered by its paired enterprise and made recommendations for improvements. Ben Reason of live | work and Anna White from IDEO provide perspectives in this volume on their approaches to service design and their engagement in this project.

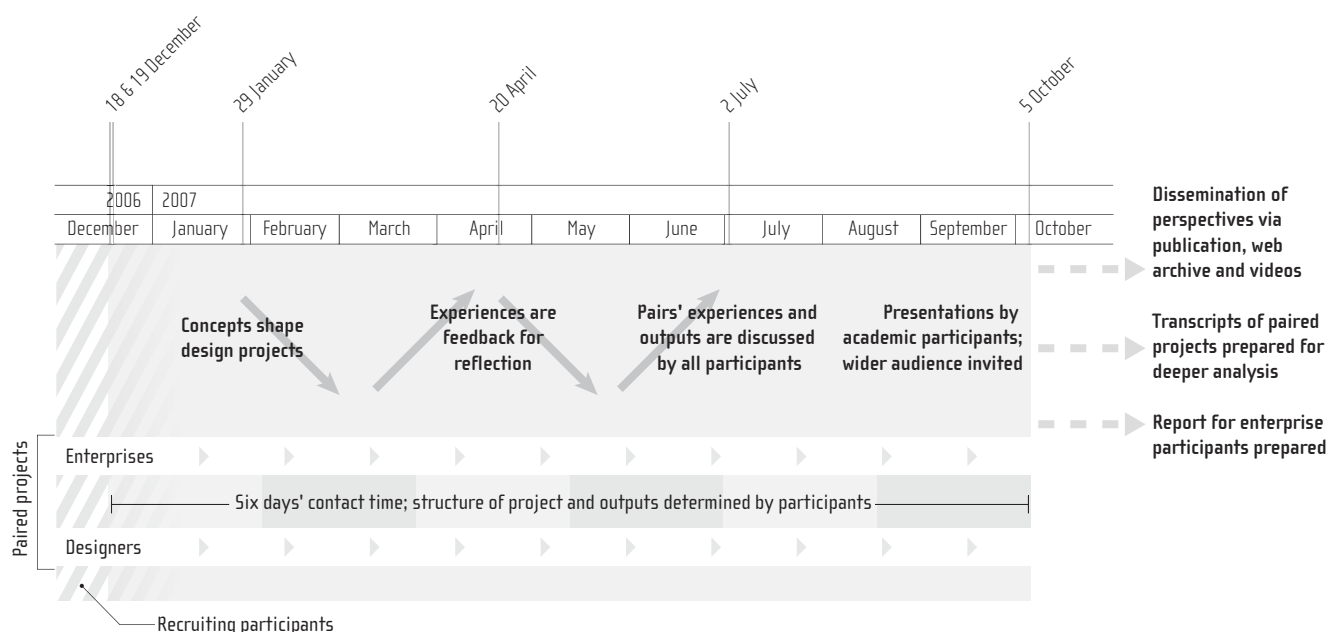
The enterprises

We had three Oxford-area enterprises that represented a variety of leading edge offerings. Prosonix is a leader in ultrasound process solutions, often applied to the chemical and pharmaceutical industries. g-Nostics is a firm that uses genetic profile technologies to offer personalized medical treatment; the service of interest for the project was a trial within the National Health Service of a smoking cessation service delivered via pharmacies. Oxford Gene Technology is a leader in microarrays that help in providing clinical research and diagnostic services. These three enterprises presented complex bundles of potential or existing product and service offerings – some business-to-business, some aiming directly at end users – that provided unique settings for considering both the challenges and opportunities for service design.

The academic community

We engaged a broad section of the academic community, both within Oxford and beyond, as listed elsewhere in this volume.

Figure 2. multidisciplinary conversation – five events at Saïd Business School

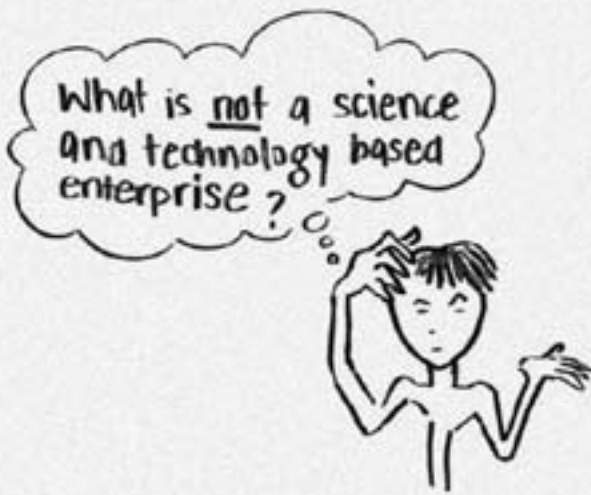




Project workshops at Saïd Business School



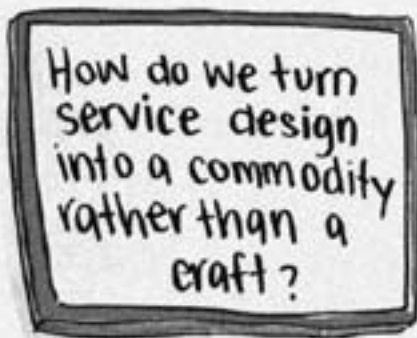
Close-up from scribing at workshop



Scribing: Sefi Amir



Scribing: Sefi Amir



Scribing: Sefi Amir



Scribing: Josh Knowles

Customer Service vs. Technology product:



Scribing: Sefi Amir

Terminology Landscape



Scribing: Sefi Amir

Participants came from several management disciplines grounded in the social sciences, including strategy and innovation, operations management and service operations; from design research including interaction design; and from emerging interdisciplinary areas of study such as complexity science. A number of these colleagues have provided the perspectives gathered in this volume, which we hope provides the opportunity to reflect on the designing of services enacted in the study. The contributions draw on the disciplines represented among project participants; with different colleagues we would of course have a different volume. The value of these ideas is that they have emerged from a multidisciplinary conversation generated from observing together what happened in this exploratory context. As such the D4S project provides a contribution complementing other efforts to understand and describe the emerging field of service design.

A platform

This study has provided a platform for further research in service design, especially that which is coupled with leading edge science and technological innovation. Within the multidisciplinary engagement we were able to explore the use of service design methods, the evolution of a service design vocabulary, and the types of issues – such as complexity, scalability, quality, and interdisciplinarity – important in this domain. There is much opportunity in this emerging field. Academic research into the emerging field of service design as practised by consultancies such as IDEO and live | work has so far been limited. As described elsewhere in this volume, hours of footage of the engagement between designers and enterprises has been collected and will provide the groundwork for further research on the designing of services. The project has provided a platform for the future work to be undertaken among the different academic communities that gathered together over the course of eight months to discuss designing for services. For now, please join with us in considering the varied perspectives generated among this community, as we look forward to the developments to come in this interesting and challenging domain.

Service design: time to bring in the professionals?

Bruce Tether

Who designs services and who should design services?

Two years ago, the UK Design Council commissioned a survey on the use of design in UK firms. Asked about the importance of various factors to their competitiveness, the difference between manufacturing and service firms was stark. Whereas nearly half the manufacturers recognized design as crucial to their competitiveness, this was true of only one in ten financial and business service firms and one in eight consumer service firms. Manufacturers were also significantly more likely to recognize creativity, R&D and innovation as crucial to their competitiveness. Service firms, by contrast, tended to place slightly greater emphasis on financial management, operations management, communications, and human resource management. When asked about the role played by design in their firm, 40% of manufacturers claimed design was integral, compared with one in ten of the service firms; by contrast, only one manufacturer in ten claimed design had no role to play in their firm, whereas a third of the service firms considered this was the case.

Another stark difference emerged in the role played by design and designers in new product and service development. Amongst the manufacturers, nearly two-thirds claimed design was used throughout the process, with designers playing a leading role. This behaviour was very rare amongst the financial and business service firms, where only one in eight consumer service firms claimed this was the case. Meanwhile, the vast majority of financial and business service firms – and over half the consumer service firms – claimed design and designers had no role to play in their new product and service development processes; an approach shared by just one manufacturer in eight.

The role of design and designers appears to differ sharply, therefore, between manufacturing and service firms. We should note that this is not due to underlying differences in their competitive model – more than half the businesses in all sectors claimed to be competing on added value, with less than a third competing on price or cost. Also, there do not appear to be substantial differences in the interpretation of what design is. A majority of businesses in all sectors recognized design was more than aesthetics: two-thirds of both manufacturing and service firms considered design to be “about products working well to meet clients’ needs”, and over half of both manufacturing and service firms perceived design to be “a creative process that enables ideas to come to life”. Meanwhile, a quarter of manufacturers and a third of service firms recognized design as a “strategic business tool”.

It seems the main barrier to using design (as well as creativity- and innovation-related practices more generally) in service firms was the perception that it was not relevant: half the service firms expressed this opinion. This aside, the more important barriers were the cost of these activities and the lack

Figure 3: the role of design in manufacturing and service firms

	Manufacturers	Finance & business services	Consumer services
It is integral to the firm's operation	41%	15%	6%
It has a significant role to play	35%	18%	15%
It has a limited role to play	15%	39%	42%
It has no role to play at all	9%	28%	37%

(Design Council survey of 1,500 firms, 2005)

Figure 4: how design is used in firms' new product and service development

	Manufacturers	Finance & business services	Consumer services
Design Manager/ design team leads and guides whole process	63%	3%	13%
Designers are used in all stages	41%	12%	5%
Designers are used in some specific stages	19%	2%	28%
Designers are not included in the process	13%	84%	55%

(Design Council survey of 1,500 firms, 2005)

of clear tangible rewards. The lack of clear tangible rewards was identified by about a fifth of service firms, twice the corresponding proportion amongst manufacturers.

Silent design, the undertaking of design activities by those not trained as or recognized to be designers, appears to be the dominant approach to design in service firms in the UK (Gorb & Dumas 1987).

When we consider that three-quarters of the UK economy is due to services, and that this share is growing whilst manufacturing output is essentially stagnant (and declining as a share of economic activity), then the findings of the Design Council's survey give cause for concern – at least to the design community, if not to consumers and policymakers. Also notable here is that the productivity of services is lower than the productivity of manufacturing activities: we produce more wealth per hour worked in manufacturing than we do per hour worked in services.

One of the reasons design is much more widely used by manufacturers is that manufactured products are tradable at a distance: production and consumption occur in different places, so increasingly products are being produced in low cost locations like China and imported to the UK and other advanced economies. To survive and prosper in a high cost location such as the UK, manufacturers have to add more value, and they do this through product differentiation and innovation (including the development of complementary services), in which design usually has a significant role to play.

By contrast, the production and consumption of services has traditionally occurred in the same place – think of a haircut, you can't outsource that to China! This means that customers of many services have been stuck with a choice amongst a set of local, cottage industry, providers, all of which have similar costs. But increasingly services are tradable. The European Commission is seeking to enhance trade and foreign direct investments in services through the Services Directive, the objective of which is to achieve a genuine internal market in services by removing legal and administrative barriers to the development of service activities between member states. Meanwhile, powerful information communication technologies are increasingly facilitating the decomposition and recombination of services, both by function and location of where service activities are undertaken. It may very well be that the next decade or so sees dramatic change in the economics of services, and companies and governments would be well-advised to be prepared and get ahead of the curve.

In my view, design, design processes and design thinking have great potential to make a significant difference to the development of new and better services. But there are several difficulties to be tackled, primarily on the supply side. One is the variation in understanding what design is and what it can provide. By contrast, there is little confusion as to what architecture is, and what architects do.

A second related difficulty is that design tends to be what economists call a complementary asset: that is, design is an activity that tends to enhance the value of other assets (such as marketing and engineering departments) and in turn to be enhanced by these same assets. As such, attempting to identify the "contribution of design" to a company's bottom

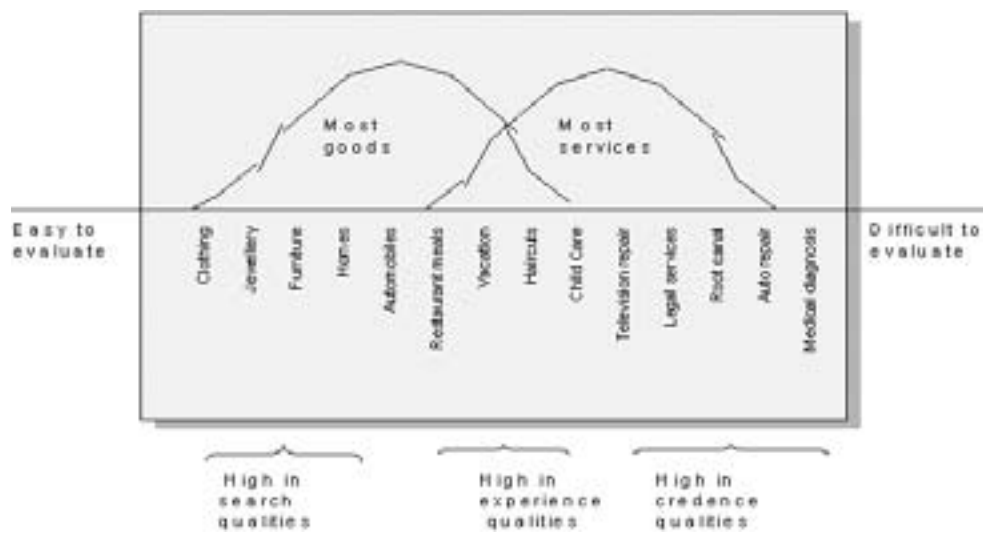
line can be difficult, and attempts to do so can be seriously misleading. A third problem is that, to my knowledge, whilst there are an enormous number of design students in the UK (perhaps too many) few are focused on services as economic activities. It seems here that private design consultants – such as Bill Hollins, IDEO, live | work, the Engine Group and Radarstation, are leading the way and developing new insight and understanding through working closely with clients. Much of the knowledge they produce is however proprietary. A challenge for academia is to pool this knowledge, test it, and make it more widely available. This project on Designing for Services in Science and Technology-based Enterprises has been a valuable contribution to that broader exercise.

References

Gorb P., & Dumas A. (1987). Silent design, *Design Studies*, Vol. 8, No. 3, July, 150–6

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Figure 5: different types of products



Source: Zeithaml, V. (1981) How consumers evaluation processes differ between goods and services in Donnelly, J. and W. George (Eds) *Marketing of Services*. Chicago: American Marketing Association

Services innovation and operations: learning from services marketing

Antti Ainamo

The strategic framework in manufacturing industry sectors such as information technology (IT) has been recently experiencing a transformation in at least two ways. Industry newcomers such as Dell, Lenovo and Acer have expanded as their product sales have grown rapidly. Meanwhile, IT industry incumbents IBM and Hewlett-Packard (HP) have migrated to “business services” with physical hardware now constituting only a diminishing share of the key offerings to their clients or of their overall innovation output.

While it is clear this transformation is taking place, a considerable lack of clarity still surrounds the design rules and principles that the incumbents are using in their services operations and innovation. The root cause of this obscurity can be said to be that there has been much research on innovation and operations, and much research on service operations, but very little on services innovation. This essay approaches this research gap from the perspective of services marketing. I compare data on services operations, innovation and marketing across three different kinds of offerings – the “search offering”, the “experience offering” and the “credence offering” – with a view of understanding services operations and innovation.

Business services based on *search*, on *credence*, and on *experience*

The research on services marketing suggests that the central point of departure for incumbent manufacturers such as IBM and HP ought to be in making comparisons between their IT hardware and the business services they intend to deliver to their clients. In this view, a service offered to a customer or client is at the core more intangible than tangible, when compared with a good. A service involves a greater involvement of customers in the production process, greater difficulties in maintaining quality control standards, an absence of inventories, the relative importance of time factors, and a particular structure of distribution channels. A service is an offering that is simultaneously produced by the service producer and consumed by the customer or client. The production and delivery processes need to be more integrated than the physical good manufacturing and distribution processes. As a result, a service is less standardized and less uniform than a good.

While it is useful to agree on the above basics of what constitutes a service, this essay argues that such agreement ought to be only a platform on which to build further understanding of how services differ in relation to one another – not just in relation to goods. Just as there are many kinds of goods involved in offerings to customers, ranging from basic commodities that are the sole offering, such as basic white t-shirts at a supermarket, to the scissors that are part of a haircut service, there are also many kinds of services. Services range from restau-

rant meals, where food is a material element of the offering, to medical diagnosis, where no material element changes hands in the journey from service provider to customer. Many qualities of services are, moreover, “lumpy”; yet goods and services fall along a continuum of features that make some qualities easier to evaluate than others, as shown in Figure 5.

Information technology-based business services as *search offerings*

Many of the early business services of IBM and HP resembled a value-added approach in the model of distribution of commodity clothing. A supermarket delivers value-added to commodity or low-involvement clothing by delivering it closer to a consumer’s home, for example. In an interesting contrast to such a supermarket, IBM and HP in this respect have attempted to be more efficient than their rivals in automating labour-intensive processes of software services delivery.

Information technology-based business services as *experience offerings*

Recently, IBM and HP have begun to sell business services not only as part of hardware delivery but also on an ongoing stand-alone basis. Like a premium car service in a car manufacturer’s repair shop, such service provision by HP and IBM adds value to a physical good that might otherwise be a simple search offering or a commodity. In symbolic terms HP and IBM are performing a similar role to that of brand communications and public relations; that is, they are adding value with communications to create an “enhanced” user experience. A good brand reputation requires that the total product-and-service offering be experienced as a high quality one. To what extent might we expect IT product-based business services to provide the kind of experience that we expect from a high-end restaurant meal, being first and foremost, a hybrid between a place and the service staff?

Information technology-based business services as *credence offerings*

Within IT, IBM for example has recently had an ambitious goal of reframing its hardware business, threatened by search and commodification, into service offerings high on credence qualities. IBM has communicated the need for “services science”, mandated a specific kind of services science-based education, and advocated the creation and sustenance of the boundaries of a new service science “profession” vis-à-vis other professions and the non-professionals. Global distribution of scientific research teams and publications among the scholars, students and members of a profession make for a platform for global convergence of services production and consumption so that the universalism certifies the credence

and quality that the profession represents. Indeed, scientization is the classic way by which professions such as medicine, law and consulting have created and expanded upon their credence. These professions have since their early years applied supposedly universally-valid abstract knowledge to client or patient cases that have remained very particular. The particular nation-states in which they exist have guaranteed the existence and survival of these particularities with local norms, laws and regulations.

Discussion

On the basis of the offering qualities presented in this essay, high quality business services such as restaurant meals exist in the place and formation the customer or client believes they can be found, based on their own experience and the experience of those the customer trusts. Rather than all services being “searched”, “experienced” or “having credence”, one service may often be ephemeral, and different in time and place, vis-à-vis another.

Both services firms and services researchers need to understand the various kinds of ecosystems of services operations and innovation, qualities, and marketing that exist in and around different offerings and different industries. The goal must be to understand why, how and to what extent innovators and operators of information technology-based business services can improve the ways in which they grapple with issues, such as how to offer many service offerings from one platform, and how to socially scale offerings from that platform. Clearly, participating in such research ought to be on the service development agendas of IBM, HP, and firms competing with them.

I therefore conclude with a call for researchers to carry out comparative research in services innovation and operations, drawing on the basis of the framework discussed above.

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Outputs from workshops at Saïd Business School

Designing high-technology services, or not: a bittersweet tale of love and loss

Steve New

What makes the design of high-technology services any different from other services?

Once upon an only-partially-elaborated-anecdote there was a large multinational company that made Special Stuff. The Special Stuff was especially complicated, and although everyone wanted it, very few people really understood it. So the large company had not just factories but also research labs. These developed all sorts of ways for the firm to make better and better Special Stuff; they were constantly coming up with new ideas and inventions. The more things they made up, the more Special Stuff got sold, and the more the large company spent on research. The engineers and scientists in the laboratories wore white coats and heavy spectacles and safety shoes, and smelled vaguely of industrial lubricant. They were happy.

One of these labs was in a town called Quite-Close-to-Here, and the scientists were especially happy. They liked to work hard in the lab during the morning, and then at lunch time they would often saunter over to the Special Stuff factory on the same site, and enjoy watching the production process. They liked the feeling that they were part of something important and exciting, and that the world was a better place for all the Special Stuff that they knew so much about.

One day the scientists woke up and found that the manufacturing plant next to the laboratory had been closed down and moved to Indonesia. They were gloomy at first, but then realized that they now had room for more expensive and complicated equipment, so they could do even more research. In fact, they could become one of the most important labs in the large firm's global network, doing projects and providing expertise to the firm's plants around the world. They missed their friends in the factory, but they liked being referred to as a *Global Centre of Excellence*.

A year or three later, across the ocean, at the big firm's headquarters, a man in much more elegant shoes, smelling of eau-de-cologne, scribbled some words on a flip chart. These words included: "market saturation", "cost consolidation" and "margin protection in a declining sector".

Then something strange started to happen to the projects that the lab in Quite-Close-to-Here was given to do. First, the projects became smaller. Then, they became less frequent. Then, the lab started getting angry letters from the firm's headquarters complaining that it was too expensive. Because it was doing less work, it had to spread its overhead costs over a smaller number of projects. And because the lab was costly, it was given fewer assignments. After a bit, the scientists decided to have a Meeting. At the Meeting they decided they had a Crisis. And then they decided they needed a Plan.

After much discussion, they concluded that the Plan should

be to transform themselves from an internal research and development lab, serving only the needs of the big firm, to a technical consultancy company, serving anyone with a problem to do with Special Stuff, or maybe anything a bit like Special Stuff. They began to think about how they would do this, and they did three things. Each one is amazing, because (and I forgive you if you begin to think I'm being a little judgemental here) each one is astonishingly stupid.

The first thing they did was to make a list of all the things they really liked doing. They thought of all the equipment they had, and all the experiments they had done over the years, and produced a long catalogue of things they would like to do for other people. In particular, it gave everyone a chance to make a case for the activities that they found interesting and exciting. When they'd finished making this inventory, they were thrilled; it was very long and it was full of brilliant ideas. Some of the suggestions involved dusting off some equipment they'd bought over the years but not had the chance to use very much, and this pleased them.

The next thing was to take their list and turn it into a PowerPoint presentation, and send off a team of the most respected and long-serving scientists to head office to present the plan. The head office listened, and then said, yes – give it a go. You've become very expensive, maybe this will help. But always remember that if we ask you to do something, we must take priority. And the scientists agreed that they'd always fit in the work for external customers around the work for the big firm.

The way this story is being told is obviously biased: of course, as I'm telling the tale, I can put whatever spin I like on it. But for now, assume I'm being reasonably accurate, and pause for a moment to ask yourself exactly why were the two actions just described quite so absurd. You should have a clear idea before I go on to the third, most gloriously ridiculous, stage of their stupidity.

This was to take on an engineering undergraduate student for a six-month placement and ask her to design an operating model of how the new business would operate. The undergraduate had to: undertake a competitor analysis; develop a marketing strategy; design market research; develop marketing and sales processes; devise a costing and budgeting system; establish an accounting and scheduling system; and, work out how the new operation would handle the conflicts between the demands of the big firm and assignments for the new, external customers. Meanwhile, the scientists began the task of thinking about how they could use a state-of-the-art Knowledge Management System to keep track of all the new exciting findings they would uncover. The student was clever, but inexperienced, and could make no headway.

Of course, soon the prevailing odour of industrial lubricant

was swamped by (initially) a whiff and (soon after) the sour stench of impending disaster. After a year of insanely impractical muddling at the lab, the big firm lost patience and everyone lost their jobs; most of the scientists were so steeped in Special Stuff that it was not easy to find other suitable employment. The redundancy packages were generous, but not enough to take away the misery from men and women in their forties and fifties who were essentially at the end of their hard-won scientific careers. The scientists were in a daze. The expensive equipment was scrapped. A year or two later the site was cleared. Not one external customer was ever served.

As a peripheral player in this tragedy, as the supervisor of the heroic but unlucky student, I was utterly shocked by the whole train of events. I like to think I've seen life, including management incompetence, redundancies, closures, and so on. *But this was the first time I'd seen scientists cry.* This wasn't a case study. It was real people having their lives broken, their hearts broken. They had given their souls to Special Stuff, and were now bereaved.

So why tell this story here? Three things stand out, and each one is essential to understanding why the words *design* and *high-technology* have some inherent contradictions.

First, the notion of design is about meeting needs, and thinking about customers or users. But many areas of technology are dominated by technical experts who are really not very interested in customers, but in the technology. In this case, the scientists were so enraptured with what they did (the high-technology), they couldn't make any progress about thinking how to serve a market (in other words, to design a service). They loved their technology so much that they couldn't see that having a lab was not the same as having a business.

Of course, academically, this is old news: the polarities of producer-led versus customer-oriented, and between technology-push and market-pull, are well documented. Stories of scientists who lack business savvy are commonplace. But the twist here is that the blockage which stopped these clever and accomplished technicians from prioritizing the needs and desires of their putative customers was not just intellectual. These people were so emotionally attached to their technical obsessions; it was entirely impossible for them to even begin any kind of honest design process for the service they aspired to offer. Who knows what was really going on in these scientists' heads? A reasonable hypothesis is that the organization's inability to start from the customer stemmed from a terror that the customers might ask for the wrong things, things that the scientists didn't want to do. "Technocentrism" stopped them designing the *content* of the service.

Secondly, the lack of empathy regarding what the customers might want or desire was matched by an apparent inability for the scientists to see themselves through the eyes of the would-be clients. Essentially, they believed that clients would rush to their door because they were a *Global Centre of Excellence*. But they found it hard to imagine that future customers might be interested in things like customer service, or cost-effectiveness; surely, the *important* thing was that the scientists knew loads about Special Stuff? Technocentrism stopped them designing the *presentation* of the service.

Thirdly, the scientists' obsession with the technical aspects led them to trivialize the process of working out how the

whole thing was going to work. Hiring a student greenhorn to deal with all the key elements of the business model was an indication of how the scientists perceived the importance of that element of the whole venture. Serious scientists worried about Special Stuff; business processes were minor irritations. Technocentrism stopped them designing the *design* of the service.

What can we learn from this unusually dismal story? Perhaps its main value is that it serves as an extreme case of a phenomenon which, in more diluted form, is more common. "Technology", "service" and "design" can be as much about love and heartache as about rational choice.

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Service design modularity and technological innovation

Victor P. Seidel

Inventions – whether from the university lab, the corporate research centre, or the entrepreneur’s garage – become useful innovations only when integrated into broader technological and social systems. The most successful technology entrepreneurs are adept at thinking not only about the product technologies underlying their initial invention but also about the broader system needed to bring an invention to market. However, even experienced entrepreneurs have difficulty considering the full array of potential services that may be combined with their product technologies to create added value. In this short perspective essay, I draw on the Saïd Business School exploratory project on Designing for Services in Science and Technology-based Enterprises to make some initial observations on service design innovation in the context of modular systems.

Technological and service innovation

Studies of technological innovation have for many years looked at technical systems from a modular perspective. A modular approach considers how product components of technological systems may function as semi-independent modules and the associated rules by which they can be combined. Both “closed systems” of product components developed within firms and “open systems” of firm products within markets can exhibit modularity. Modularity within the firm can provide platforms upon which to base myriad product variations, as in the example of the Swatch wristwatch. At a market level, the computer industry of the past quarter-century provides ample examples of how individual product components – data memory, displays, data entry devices – often move from integrated to modular systems as firms develop unique competencies, establish standards and interfaces, and optimize production processes around modular components. Much of product innovation can be understood through a modular lens. Likewise, service innovation studies, drawn primarily from the marketing and operations management literature, have also used concepts of modularity, where service and product components intermix (Shostack 1982). While the analogy to the product component world is helpful, service components are not identified as readily as product components and the “rules” by which they are combined are still open to investigation.

Design domains within modular systems

One of many possible means to segment the product and service world is with a modular view, and design practice can be applied in a range of products and services domains differing in their degree of modularity. Figure 6 illustrates a range of product component complexity (degree of novel interlinkage among product components) and service component intensity (relative number of service components). In the predominantly product domain, featuring few service components, design practice may be focused on innovations that use fairly well-

established combinations of components, such as are found in fashion industries. It can also be focused on opportunities for more novel product configurations, such as in the realm of traditional technology products – the innovations that brought in-lens image stabilization to consumer digital photography, for example. In contexts where the relative number of service components is large, but the underlying physical world is less complex, design is applied in such traditional service domains as hospitality or professional service industries. At the extreme, design practices may be brought to bear on complex technology-based services. The introduction of iris scanning technology at British airports is one example, which raises issues of combining novel technological product components (optics, signal processors, etc) and many new service components (for registering data, protecting data, etc).

Figure 6: examples of design domains in modular systems

Many novel service components	Traditional services <i>hospitality</i>	Technology-based services <i>biometric screening</i>
Few novel service components	Fashion goods <i>clothing</i>	Technology products <i>digital cameras</i>
	Few novel product components	Many novel product components

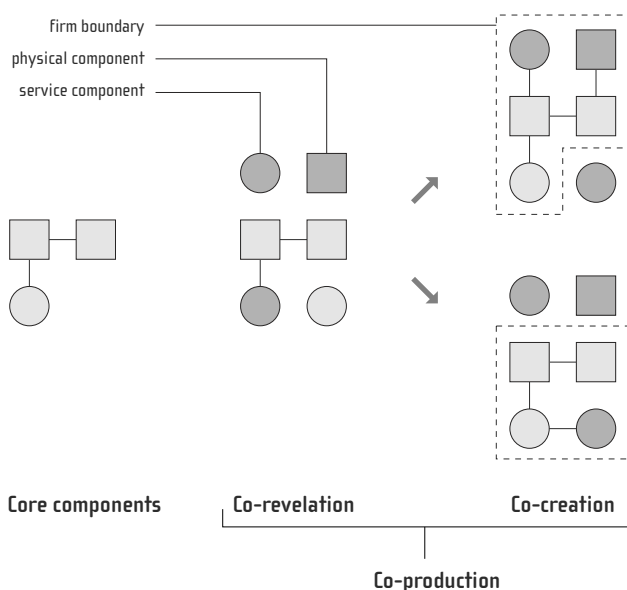
Studies of design practice, many of which have been focused on the sphere of technology products, have yielded many insights, two of which stand out. First, designers’ visual training provides not only the means to give form to products but also opportunities for understanding more hidden elements such as current and potential capabilities (Seidel 2000). Second, consultancy-based designers are especially positioned to broker technologies and solutions across industry contexts (Hargadon & Sutton 2000). In the current exploratory project, the practices of visualization and brokering were brought to bear on projects that entailed both technological components and emergent or re-designed service components. By pairing service designers with technology-based companies, and by

applying a modular lens, three areas of observation worth further exploration emerged.

Co-revelation within a co-production process

Collaboration between design consultants and clients can be described using the language of co-production (Ramirez 1999). This perspective helps to distinguish the designer–client relationship from a simple purchasing decision such as for obtaining finished goods, or from a process of advice-seeking. However, the co-production frame needs to be further broken down for the case of service components – many of which are obscure, ill-defined or hidden – until engagement between designer and entrepreneur can bring them to the fore. Both service and technological components need to be revealed before they can be recombined and ultimately “produced”. It may help to break the co-production process apart, while still continuing to adopt the collaborative prefix, highlighting the co-revelation seen in such service design contexts as separate from the co-creation of determining which components to perform within the firm. This is illustrated in Figure 7. While processes of discovery are at the heart of all design techniques, highlighting the joint nature of the early revelatory process may be particularly important in the case of technology-based services.

Figure 7: co-revelation within a modular co-production process



The language of service design modularity

While the language of service design has become more formalized and institutionalized in recent years (indeed, at least one British rail operator has begun to refer to the “touchpoints” of customer engagement in their marketing material), such language is not likely wholly shared between designers and client entrepreneurs at the start of engagement. A language of service design provides a framework for thinking about the process of surfacing service concepts. These concept components themselves may be embedded in language unique to the situation, through stories, metaphor or analogy (Seidel 2007). Engagement on projects between designers and technology entrepreneurs has demonstrated the co-revelatory process of

using terms unique to service design as well as the means by which service design concepts are then defined, debated and engaged with as part of the co-production process.

Making the extraordinary ordinary

Design projects start from different stages of completion. In the case of an existing bundle of service components tied to product components, the task may be one of re-design. There may be an assessment of the exiting service in practice and activity may be primarily concerned with the deletion of existing components and the substitution of new components. However, in the early stage of technological system development there may be little in the way of service components. Here the task may be to develop an array of service offerings that facilitate access to the new technology, as new bundles of component technologies require familiarity and a point of access for the user. The task for designers in such contexts may be in terms of making the extraordinary potential provided by such technology translatable to the ordinary domain of desired users. This is a very different proposition, but one of great importance in allowing new technologies a route of access to consumers.

Considering service design modularity and technological innovation

The means by which design practice contributes to the development of technological systems has a long history of exploration. But the means by which such practice helps to reveal and re-imagine more complex bundles of product and service components is just beginning. This is important work, as services increasingly form a greater proportion of our consumption and provide access to complex product technologies. Many of these complex product technologies have the chance to greatly improve quality of life, but only if they are embedded in the proper service framework. By honing our modular approach to both products and services, we may be better able to investigate the practices that underlie the generation and recombination of such components, providing a pathway to understanding competitive advantage and the speed by which such new technologies can be best employed.

References

- Hargadon, A., & Sutton, R. I. (2000). Building an innovation factory. *Harvard Business Review*, 78(3), 157–166.
- Ramirez, R. (1999). Value co-production: intellectual origins and implications for practice and research. *Strategic Management Journal*, 20(1), 49–66.
- Seidel, V. P. (2000). Moving from design to strategy: the four roles of design-led strategy consulting. *Design Management Journal*, 11(2), 35–40.
- Seidel, V. P. (2007). Concept shifting and the radical product development process. *Journal of Product Innovation Management*, 24(6), 522–533.
- Shostack, G. L. (1982). How to design a service. *European Journal of Marketing*, 16(1), 49–63.

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- Please take a photo
- 6 Of a favourite product
 - 7 Of a favourite service
 - 8 Of a terrible product
 - 9 Of a terrible service
 - 5 Of a service that is based on an emerging technology
 - 10 Of a service based on a 19th century technology
 - 2 Of a service that is very ethnically or nationally specific
 - 11 Of a service that is business-to-business
 - Of a service that confuses you
 - Of a service in which you hate being the user
 - Of a service in which you wish you were the user

35mm Single-
Camera.
Film & flash in c
27 Exp

**Designing 4 Services
in science and
technology based
enterprises**

Returned disposable cameras

Design research method – cultural probes

Lucy Kimbell

Drawing on a design research method called “cultural probes”,¹ we designed a probes pack, which was sent out to 30 project participants ahead of the first event. The pack arrived inside a white cardboard Chinese food pail (as it is known in the catering industry) – an emblematic artefact from a well-established service industry. Such packs are designed to elicit empathetic responses from participants, in this case to stimulate them to reflect on what they were bringing to the project and expecting to get from it.

Among other things the food pail contained:

- a disposable camera, with some suggestions of photos to take
- an imaginary invoice for the participant’s services to the research project
- a napkin with an area for writing about the sorts of messages that happen in service design and provision.

Here we present some of the “data” returned by participants which both helped stimulate thought when entering this project. It also provides material for further exploration.

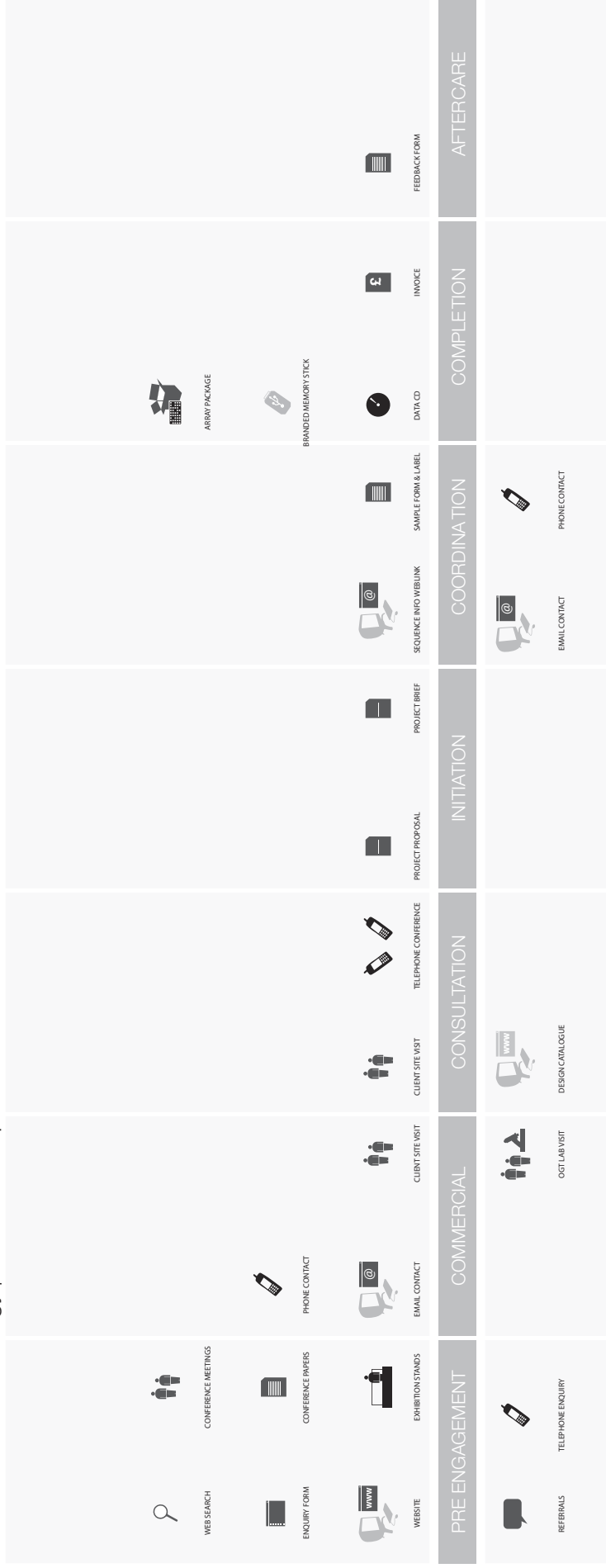
1. Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: cultural probes. *Interactions* 6, 1 (January 1999), 21–9.



Photos taken by project participants in response to receiving a disposable camera

Credit: University of Oxford

Oxford Gene Technology | Service touchpoints



Output by Radarstation showing how they illustrated Oxford Gene Technology's customer journey and service touchpoints

Experiential service design and innovation

Chris Voss and Leonieke Zomerdijk

We have recently completed a case-based study to understand the process and content underlying the design and innovation of experiential services. Our research aimed to build our understanding of service design through study of experiential services – services where the focus is on the experience of the customer when interacting with the organization. These services are often designed from the perspective of the customer journey rather than as a single product or transaction. The journey perspective implies that a customer experience is built over an extended period of time, starting before and ending after the actual sales experience or transaction. During a customer journey, numerous touchpoints occur between the customer and the organization or the brand. These touchpoints need to be carefully designed and managed, and our research shows that innovation takes place at each of these touchpoints as well as in the overall journey itself.

The customer journey perspective highlights the central role of the customer (as opposed to technology, for example) in innovation and design. It takes into account aspects of the experience such as building anticipation and facilitating transport to the core experience. It also integrates the common distinction between service product innovation and service process innovation, as a journey has elements of both.

In the cases we studied, innovation took place in five distinct design areas that directly or indirectly influence the customer experience: the physical environment, the service employees, the service delivery process, fellow customers and back office support. Although these areas are relevant to any service, they generally do not receive the same amount of attention as experiential service designers pay to them. Examples include sensory design for the physical environment, encouraging employees to engage with customers, using fellow customers to make an experience more enjoyable and connecting back office employees to the front stage experience.

Many innovations were driven by detailed customer insights. Organizations in our study invested significantly in conducting research into customers' behaviour, needs and preferences. As well as traditional market research techniques, they used "empathic research" to understand customers at an emotional level, trend watching and learning from companies in different industries. This indicates that experiential innovations are typically customer- rather than technology-driven.

The research highlighted the occurrence of both "tight" and "loose" methodologies in the design and innovation process. Tight methodologies entail a relatively fixed set of steps, activities, tools and techniques that can be used across projects, whereas in loose methodologies the required steps, activities, tools and techniques are determined individually for each project. Whilst some organizations had well-developed and tight methodologies, many successful innovators preferred a more flexible approach. They feared that tight methodologies

would inhibit the creativity required for experiential service design and would increase time to market unnecessarily. This suggests that the relatively tight and rigorous methodologies typically found in product innovations may not always be applicable to service innovation.

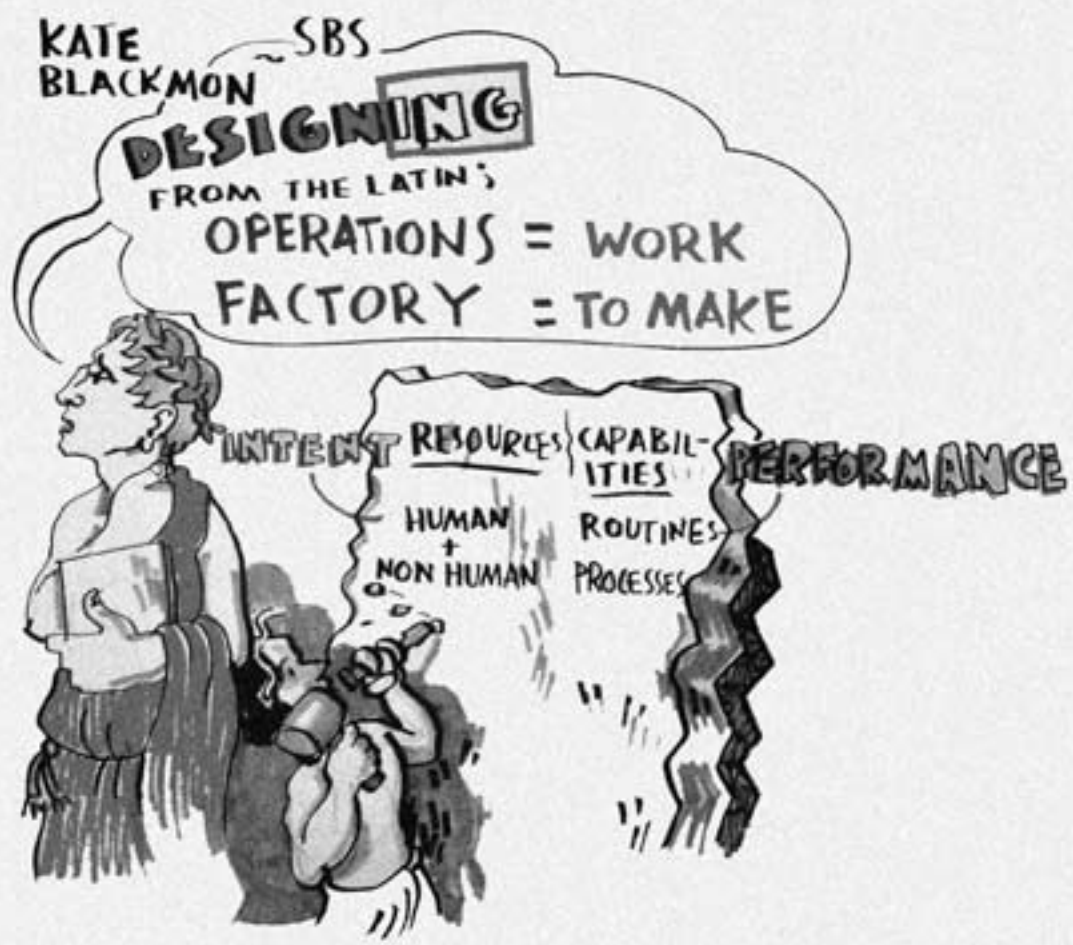
One of the difficulties in innovation in experiential services is predicting the outcome in financial terms. Companies devote much effort and use multiple methods to capture the outcomes of innovation through measures such as footfall, dwell time, revenue growth, customer satisfaction and customer loyalty. Nevertheless, it can be difficult to measure the impact of improvement of a particular customer experience on company performance. The difficulty in predicting financial returns can not only cause an unwillingness to invest in service innovation, but also make it easy to over-invest in a great and innovative service that is actually losing money.

Finally, the research found that a significant proportion of innovation came from incremental process innovation – much of it associated with innovation in business models. Identifying the role of process innovation provides insights into the problems of studying and measuring service innovation. Process innovations are embedded in a wider operational process and are frequently incremental rather than radical. They take place in operational areas, not separate R&D departments, and activity and expenditure are thus hard to measure. Rather than product leading process or vice versa, the research indicated that service innovation in general and not just in experiential services is an iterative process where product, process and business model innovation are all intermixed.

The detailed outcomes of the research are available in the report *Innovation in experiential services – an empirical view*, at <http://www.london.edu/mso/>.

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Leonieke Zomerdijk is a research fellow of the Advanced Institute of Management Research, working with Chris Voss at London Business School.



Scribing: Josh Knowles

Designing for services: design thinking and operations management – converging or parallel worlds?

Kate Blackmon

How can Designing for Services in Science and Technology-based Enterprises point us to a potential way forward for service management? In this perspective essay I examine the extent to which design and operations share complementarities through reflecting on the D4S project, which offers a chance to examine how both design and operations focus on practical problem-solving in the context of innovation and technology.

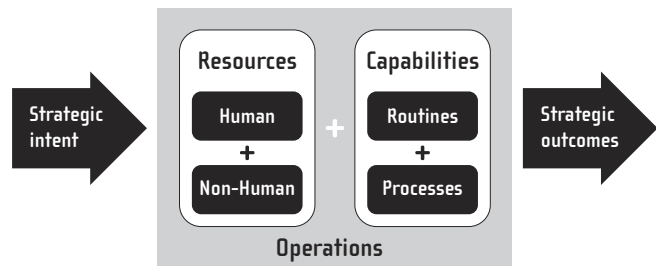
At least superficially, the underlying principles of design and operations thinking appear incompatible. Design has been described as a set of principles and a way of thinking that enable people to manage and create in a world of material objects. Design thinking – thinking broadly about problems, developing a deep understanding of users, and recognizing the value of the contribution of others – has been argued to be as applicable to management problems as to design (Dunne & Martin 2006). Operations deal with the transformation process for turning inputs into outputs of products and services.

Design thinking tends to draw on visual images and to have a highly stylized visual language drawing on a shared set of visual symbols, whilst operations thinking draws on highly abstracted and mathematical modelling. Within the design literature, design thinking and operations thinking are often portrayed as antithetical in a dialectic pitting such visual thinking and intuition against engineering and logic. In the UK, the Arts and Crafts movement made a virtue of antagonism to the “factory” ethic (Crawford 1997), whilst on the other hand, with the exception of the Progressive era in the US, designers have mostly ignored workers and work. Furthermore, design thinking focuses more on the means – the experience of designing. Whilst operations thinking focuses more on the ends – the creation of a viable process meeting pre-specified operational and economic targets.

Such antithesis is not useful, however, as the D4S project has illustrated. Both design and operations thinking have more in common within the management academy than either has with other management disciplines. There is increasing interest from both sides in issues of design-led problem solving, for example, in Herbert Simon’s work on ill-structured problems (Simon 1973), and the work by Joan van Aken on design-led approaches within management (Van Aken 2004, 2005).

Furthermore, both design thinking and operations thinking focus on the relationships between resources and capabilities that are used to operationalize the strategic intent of the organization, as shown in Figure 8. Design thinking can be described as focusing on resources embodied in people and enacted at the level of routines, whilst operations thinking

Figure 8: the relationships between resources and capabilities



can be described as focused on resources embodied in non-human resources and enacted at the level of processes.

If we dig deeper, however, both design and operations thinking focus on solving problems in the material world. As illustrated in D4S, designers are increasingly moving from the design of artefacts – objects, images and the built environment – to the design of interfaces and of processes. Both design thinking and operations thinking provide both users and designers with languages that describe what is going on in these interfaces and processes, although each draws on considerably different epistemologies and ontologies. It may be, therefore, that there is some common ground where design thinking and operations thinking meet and enrich each other. Roger Martin, Dean of the Rotman School of Management at the University of Toronto, describes the role of design as looking for innovative solutions that are different from and superior to existing solutions to a problem (Dunne & Martin 2006). Design thinking may provide an alternative conceptual approach to problem solving; therefore, cross-training and/or cross-functional teams may enrich the range of solutions considered and selected.

One particular aspect where this complementarity may exist is scalability. Designers are trained to see systems from the perspectives of individuals, whilst operations are trained to see systems from the perspectives of masses. Whilst design solutions may not scale up, operations solutions may not scale down. The second area is complexity. Design thinking may not work as a way of designing a service system when systems are complex and interactions are unpredictable. In these circumstances, however, design thinking at the end of the process may be useful for optimizing the user interface and helping minimize the complexity faced by users. As illustrated in D4S, scalability may be a particular challenge for small and medium-sized science and technology-based enterprises. The transition zone between custom and mass processes may be particularly salient here.

Design thinking is well-suited to dealing with complexity,

but complex solutions tend to be highly particularistic and non-reproducible. Such idiosyncrasy limits the development of transferrable business models, for example. Operations thinking is particularly strong in reductionist thinking, where each element of a problem is broken down into the smallest feasible unit, solved, and then reassembled at the system level. Whilst suited for rational problem-solving and well-structured problems, it may be that ill-structured, so-called “wicked”, problems may be particularly resistant to this approach. Design thinking may offer a way of overcoming reductionism, by offering a more holistic viewpoint, whilst operations thinking may help improve the robustness of design solutions.

To conclude, design and operations thinking may become a natural pairing within the management academy, if they can find a common meeting ground. There has been a call for more design-led thinking within management, which both could offer. It may be, however, instead of a synthesis that there needs to be resonance (Brown & Blackmon 2004), oscillating back and forth between these two areas.

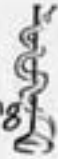
References

- Brown, S. & Blackmon, K. (2005). Aligning manufacturing strategy and business-level competitive strategy in new competitive environments: the case for strategic resonance, *Journal of Management Studies*, Vol. 42, No. 4, 793–815.
- Crawford, A. (1997). Ideas and objects: the arts and crafts movement in Britain, *Design Issues*, Vol. 13, No. 1, 15–26.
- Dunne, D. & Martin, R. (2006). Design thinking and how it will change management education: an interview and discussion, *Academy of Management Learning & Education*, Vol. 5 No. 4, 512–523.
- Kaner, M. & Karni, R. (2007). Engineering design of a service system: an empirical study, *Information Knowledge Systems Management*, Vol. 6, No. 3, 235–263.
- Simon, H.A. (1973). The Structure of ill-structured problems, *Artificial Intelligence*, Vol. 4, 181–201.
- Van Aken, J. (2004). Management research based on the paradigm of the design sciences: The quest for field-tested and grounded technological rules, *Journal of Management Studies*, Vol. 41, No. 2, 219–246.
- Van Aken, J. (2005). Management research as a design science: articulating the research products of mode 2 knowledge production in management, *British Journal of Management*, Vol. 16, No. 1, 19–36.

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Prosonix

Pharmaceuticals
chemical engineering



Strategic partnerships



"Prosonix Technology
needs to be matched up
with appropriate partners
to become a world
beating innovation."



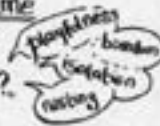
Scribing: Sefi Amir

IDEO

Insight / Synthesis /
Prototyping



How do we frame



Identifying unmet needs,
Assessing feasibility.

Question: Is the final result
always a product?



Reflections on the designing for services project

Anna White

Successful service design has three outcomes: the creation of a service that can be brought to market, that people fall in love with, and which makes good business sense for the provider.

Service design is fundamentally a multidisciplinary approach; it simultaneously needs to address consumer desirability, technical feasibility and commercial viability. It is a process which demands close collaboration with the client, which places people at the heart of the process and where prototyping is crucial to success. The Designing for Services in Science and Technology-based Enterprises project offers interesting insights into how academics from different disciplines see service design, where clients were actively engaged with service design consultancies.

Companies are increasingly turning to service design as a means of generating differentiation and growth. As a first step to developing new services for Prosonix, a world leader in ultrasound processing solutions for industries, our engagement consisted of understanding and articulating what desirability, feasibility and viability mean for Prosonix, for their potential business partners, and what desirability might look like for the end consumer. To achieve this, IDEO, a world leader in human-centred innovation and design of products, services, spaces and experiences, focused its human-centred techniques inside Prosonix to get to grips with their business needs and culture and observed their service interactions first-hand using shadowing techniques.

The four key learning outcomes from the IDEO and Prosonix project are:

- conducting human-centred research inside a client organization and observing the service from the provider's point of view is critical to the generation of implementable ideas
- making ideas and key service moments visual and tangible via prototyping is often the turning point for clients in understanding the creative outcome of service design
- a common language is needed to create a shared platform of understanding between the client and the service designer
- successful innovation requires the understanding of the needs of all stakeholders in the entire service ecology, including end consumers.

The D4S project has not changed my perceptions of service design as a discipline. It has, however, re-enforced the importance of and need for closer collaboration and involvement across disparate academic disciplines in the successful creation, design and implementation of new services.

Anna White is a design strategist at IDEO London, where she leads the human factors team. She brings to IDEO over ten years' experience in human-centred design, working both in the public and private sectors. At IDEO she focuses on identifying new opportunities for growth by revealing people's latent needs, behaviours and desires.

Aesthetics

Architecture

Artefacts

Back office/stage

Blueprint

Brief

Boundary object

Co-creation

Co-production

Complexity

Concept

Customer

Customization

Design management

Experience

Experience prototype

Front office/stage

Human-centred

Insights

Inspiration

Institution

Intangible

Interdisciplinary

Customer journey

Logic

Mash-up

Measurement

Methods

Multidisciplinary

Networks

Notation

Observation

Orchestration

Ownership

Designing for services – a vocabulary

Part of the intention of this research project was to pay attention to language, or rather languages – those of the different communities of practice and interest involved in D4S which included service designers, science and technology entrepreneurs offering services, and academics studying services and service innovation coming from a range of disciplines. The vocabulary list presented here might be thought of as a sketch for a future piece of work that explores what meanings different kinds of practitioner and academic attribute to these words. Boland and Collopy (2004) have drawn attention to the role of vocabularies in mediating between the disciplines of design and management and have provided definitions of some key terms. Elsewhere, a number of service design glossaries exist on the web, drawing primarily on practitioners' work. In this list we can appreciate the items that appeared and had relevance in the multidisciplinary community that was involved in designing for services.

Participant

Perpetual beta

Personalization

Process

Productization

Productivity

Prosumer (producer-consumer)

Prototyping

Resources

Rights

Scaleability

Script

Servitization

Servuct (service-product)

Service ecology

Service designer

Service system

Sketching

Significance

Silent design

Specification

Stakeholder

Tangible

Translation

Touchpoints

Usability

User

Utility

Value

Value constellations

Visualization

“What if?” thinking

Designing value-creating systems

Rafael Ramirez and Ulf Mannervik

The service economy has been emerging over several decades of increasing liquidity of resources and competences – and more possibilities of new connections. This liquidity and connectivity challenge service design where the focus shifts from linear moments of truth to dynamic networks of value constellations.

As opposed to the object-centric design that underlies interface design, lasting designs have always had a service-centric approach, regardless of whether the design was for goods or services. Service-centric design has not been about interfaces of stuff and users but instead about enabling interaction. It has focused on and explored what users could achieve when liberated to do their best, generating solutions that are clear, meaningful and effective.

The focal point of designing services has typically been the supplier–client interaction, the moment of truth where customer and supplier co-produce and where the client thus tests the supplier. To succeed in the interaction, good services have had to communicate what they will enable the client to do before the moment of truth occurs – and then deliver on that promise.

This principle still holds. But the nature of the moment of truth changes with the transition towards the service economy. And this means new and profound challenges for design.

Towards the service economy

We are still moving, and for a few decades have been moving, towards the service economy. It has been suggested that the liquidity of assets and information brought about more connections, and with more connections, more risks (Gadrey 2005). The rise in risk management and quality control are driven by this liquidity. More connections and more risks give rise to demand for connection, quality and risk mitigation services, which produce more liquidity. Consumers have more information about connections and resource liquidity. Risks add quality issues and demand more effective service configurations. This increases connections, risks and quality issues, again fuelling demands for services.

Increased travel and communication change the constraints of time and space in liquidity enhancing the service environment we inhabit and produce. We outsource and offshore, and we import and sub-contract more and more. Alliances, joint ventures, commerce and the hedging of risks with novel financial instruments all surround us. More than 85% of the value sold by leading car makers is bought in by them from their suppliers, who in turn buy in from so-called second-tier suppliers, and so on. Everyone has become, in relation to someone else, a supplier, partner, competitor, client or co-producer, with legal arrangements attempting to secure accountabilities and

responsibilities in complex networks. Patenting services, for example, have become much more complex with patent tangles, patent thickets and cross-licensing common.

More and more resources, actors and relations become involved in value-creating activities. Unique combinations of these – like the digital rights, software and hardware-enabling innovations in Apple's iTunes, or the link between Vodafone and Tom-Tom in Holland and the UK to provide real-time traffic information to drivers – involve not the design of "moments of truth", but of co-evolving dynamics.

Service design is no longer a step in a production process, as was the case when designing retail banking outlets, or a specification of a relationship between two parties, as was the case in figuring out how many smiles would sell a burger. It is no longer a noun, but has instead become a verb which must be reflexive: it has to re-design itself constantly.

Prime movers and new design challenges

The most crucial competence in the service economy is to organize systems of value creation, redistributing capabilities to increase value creation (Normann & Ramirez 1993 and Normann 2001). These re-definers of systems of value creation are called Prime Movers (Ramirez & Wallin 2000 and Normann 2001). Prime Movers are entrepreneurial companies or organizations who, like Apple, Vodafone or Tom-Tom, imagine and realize that untapped or underutilized links can be released to co-create innovative value if they are better organized. Prime Movers enhance value creation through reallocating capabilities, getting them to work together more effectively, and ensuring the client benefits by becoming a more effective value creator. In doing so, they can change the playing field and the rules of the game in a strategically profound way.

Prime Movers recognize that customers create value in using what they buy, and mobilize capabilities and resources to help customers do that better. Customers may destroy what they buy (eg milk is drunk), but the focus of Prime Movers such as Tetra Pak is not on the destruction of what they sell (milk) but in the value creation (growing healthy kids) that the customer is involved in.

eBay and PayPal combine to help sellers and buyers have secure payments. The design of this co-evolution masters two fundamental design challenges of the service economy: to help others navigate in the new complexity, and to design stability enclaves that help control or reduce the complexity for those in the enclave.

Google is another well-known example. It has designed a clear and straightforward customer experience. First, Google adjusts its interface and interaction according to users' behaviour. Second, it learns from it. Google is designed to co-evolve with the behaviour of its users – eg advertisers and

people searching the web. It not only “surfs” the new universes of complexity, connectivity, risks and potential new value constellations for which its users provide links; it also helps to make them navigable and stable enough so that all concerned can profit from them.

The changing roles of design in the service economy

The focus on the moment of truth in the supplier–client interaction developed in the 1980s, most famously with the creation of business class in SAS, which put service design on to the strategic agenda.

The key design competence had been to shape the interface between the objects, processes and people, provided by the supplier and the user. The implicit view of customers had previously been that they destroyed the value built up by the supplier in the production process of the object (Ramirez 1999).

A big advance in the decades that followed was to view the customer as the source of the value which the service provider would enable. Service-centric design moved to focus on the moments of truth, the series of key interactions that enables the promised value to be co-produced by client and supplier (Langeard & Eiglier 2000).

With the recognition of the service economy as the Gadreyian co-evolution of connections and services, design again changes. In a world of greater complexity and connectivity, the main challenges for design are navigation (or sense-making) and enclave (or formation) so that customers can not only co-create value, but also participate actively and positively in the co-design and co-construction of their value constellations. Design in the service economy encompasses co-evolving, partially overlapping, networks of value creating systems.

We believe the understanding of design’s role in this context is a journey that has just begun. We articulate it graphically in Figure 9 below.

The service economy is a world where collaborative advantage is at least as important to success as competitive advantage – and perhaps even more so. It is a world of business where players who design collaboration opportunities better than others may shape the game as Prime Movers. The less successful will see the game and its offerings as being designed and defined by others.

Design here is not only designing objects, interfaces and contexts, it also means designing dynamic systems of relations – and reflective attention to re-designing design itself.

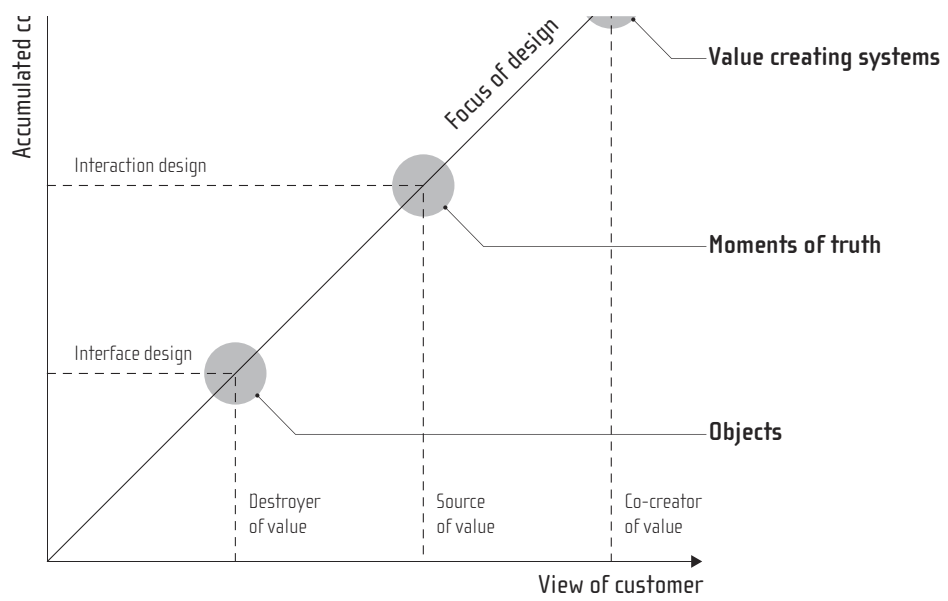
References

- Gadrey, J. (2005). *L'économie des services*. Paris: Editions la Decouverte (Broché).
- Normann, R. & Ramirez, R. (1993). Value chain to value constellation – designing interactive strategy. *Harvard Business Review*, July–August.
- Normann, R. (2001). *Reframing business – when the map changes the landscape*. Chichester: John Wiley & Sons.
- Ramirez, R. & Wallin, J. (2000). *Prime Movers – Define your business or have someone define it against you*. Chichester: John Wiley & Sons.
- Ramirez, R. (1999). Value co-production: intellectual origins and implications for practice and research. *Strategic Management Journal*, No. 20, 49–65.
- Langeard & Eiglier (2000). *Servuction – le marketing des services*. Paris: Dunod.

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Figure 9: the changing role of design as the understanding of customer roles evolves





Detail from the pack used by the pharmacy assistant to deliver the service

Photo: live|work

Designers from live | work did a walk-through of the Nicotest service with pharmacy assistant Cherry Osborne at a pharmacy where it was being trialed



Photo: live|work

They know it in their gut

Ben Reason

Having been involved in Designing for Services in Science and Technology-based Enterprises as one of the participant-subjects, I would like to turn the mirror slightly and reflect on how the initial academic observations struck me as a design practitioner. My reason for this is that it was the academics that were the new and different factor in this project – we work with technology companies regularly, our experience with g-Nostics was a familiar one – so it is the academic interpretation of this project that I got a lot from and find most interesting to comment on. Below I refer specifically to the final event held in Oxford in October 2007 and the academics' brief presentations on that day, many of which are reflected in this publication. The question we were all presented with was: "How has our understanding of service design changed through the D4S project?"

First, some background. live |work is a service innovation and design company. We have been in business for six years and have a story about our inception that is relevant to the D4S project.

Our three founding partners – Chris Downs, Lavrans Løvlie and myself – came together while we were all working in internet design and production agencies. We had all found ourselves in this boom (and later bust) industry soon after graduation and had become old hands in a young field. In our work we were hired to design websites but often had to define the service proposition for our dotcom or corporate clients first as they were unsure what the internet meant for their businesses. So we were in the business of service design. We also saw projects fail because there was no consideration for the service as a whole. Each channel was being developed in isolation whereas modern services cross channels, such as from web to phone and from store to mail, and the customer experience crosses all of these. A web agency is not in a position to define a holistic vision so we saw the need for service design.

If we were going to be a service design company, who were the competition? We went online to find other service design companies but didn't find any. There were service design academics – such as Ezio Manzini in Milan and Birgit Mager in Cologne – but not service design consultancies. So we became the first.

There were disciplines that informed us – interaction design with its focus on the relationship between humans and computers; branding, concerned with managing the image and perception of a company, and the emerging world of participation co-design & action research. We were also into actor network theory (Callon 1986), interested in the complexity of systems and how actors can affect them, we read *Natural Capitalism* (Hawken, Lovins and Lovins 1999) and were keen to bring design to the green agenda of dematerialization and resource efficiency. We were aware of the UK Labour government's agenda of public service reform. We thought, as Bruce Tether stated during the D4S project, that as 72% of

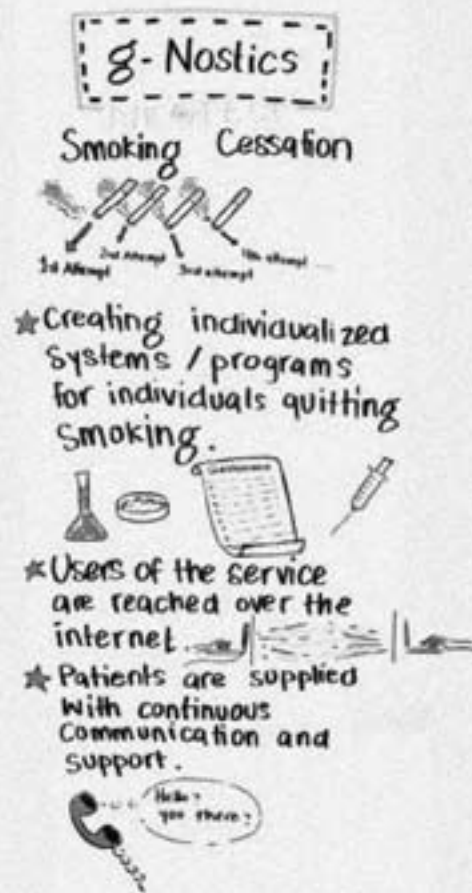
the UK economy was services but only 14% of R&D spend was in the service sector, that there was a huge market for service design.

We thought that to succeed we needed to create a market and a language. We felt that if we didn't have competition then the discipline wouldn't exist. During the D4S project Marc Ventresca discussed the role of language in the creation and growth of markets and institutions. Since founding live |work, we have diligently promoted the words "service design" and other terms in a highly motivated manner.

We were aware that we had a deep understanding of network technologies – and we often work with high-tech clients such as telecoms, financial services or emerging technology providers. Victor P. Seidel has described the relationship between complex product and service components and the fact that the D4S project brought together both complex product and service component sets. We feel that service design thrives on complexity and an ability to translate between different groups such as technologists, customers and businesses. It is no accident that service design has emerged when services are becoming more complex due to their use of network technologies. We have compared this observation to the emergence of robust industrial design methods and the professionals who used them during the dissemination of mechanical reproduction technologies in the early 20th century. Perhaps independent designers are only required once systems reach a certain level of complexity.

We aim to be a consultancy rather than a design production agency. We talk about using design methods rather than being designers as we feel that our approach – one that uses rich materials, photography, interviews and observations for our customer insights, employing sketches, models and visualization to communicate ideas and service propositions – is a way to create a shared understanding about ideas within project teams. We argue that design tools help move innovation through an organization as everyone involved is able to share and critique proposals. We have always talked about deliverables rather than processes and believe that what we now know to be "boundary objects" support successful service development. We have experienced this in action directly with a client who literally took a model from the table and ran off to deliver the idea. When Jennifer Whyte describes how designers use visual material to facilitate discussions with clients, or other "communities of practice", she is describing our pivotal role on many projects as translators between different teams or organizations. We create these "boundary objects" deliberately to enable discussions about what to do next. We often append them with the words "what if..."

We evangelize for the customer/patient/user point of view and a human-centred approach to design as Bob Young describes in this volume. We try to convince the world of service operations which, as Kate Blackmon described, is



Scribing: Sefi Amir

Service designers from live|work worked with the senior team from g-Nostics, offering personalized medicine including a smoking cessation service, Nicotest

focused on techne, that its service will be more efficient and effective if it delivers a more coherent episteme. We try to quantify this, and are getting there, but luckily find that people are convinced by the intuitive argument – they know it in their gut!

The final discussion of the D4S October event was about the role of academics in the development of our understanding of service design. The conclusion was that service design may be a field where design practitioners are currently leading the development of that understanding and social scientists are able to make sense of it from external viewpoints and various disciplinary perspectives. It was an interesting experience to have our work interpreted and reassuring that the interpretation felt accurate – if using different words – and that there is an emerging framework for our approach to business development.

References

Callon, M. (1986). Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. In John Law (Ed.), *Power, action and belief: a new sociology of knowledge*. London: Routledge & Kegan Paul.

Hawken, P., Lovins, A. B. & Lovins, L. H. (1999). *Natural capitalism: the next industrial revolution*. London: Earthscan.

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BOB YOUNG ~ NORTHUMBRIA UNI.

'MOSAIC THINKING' INTERGRATING STRATEGY

WHAT ARE DESIGN METHODS

PRODUCT TO SYSTEM SHIFT
5TH WAVE TECHNOLOGY
MULTI DISCIPLINARY DESIGN



CRITICISMA OF CENTRIC APPROACHES

ANYTHING
ORGANIC MODELS

- ARTEFACT CENTRED RATHER THAN HUMAN
- OR ECO
- TOO BUSINESS CENTRED
- TENSION BETWEEN HUMAN SERVICE VS. BUSINESS STRATEGY MANAGEMENT



A perspective on design theory and service design practice

Robert Young

This essay discusses the discipline of service design from the perspective of design method and theory. It follows an argument about the role of method in support of design practice, as advanced by Hugentobler, an academic at the University of Bremen. Hugentobler, along with his colleague Wolfgang Jonas, has written various insightful papers concerning the development of design methods theory (Hugentobler 2004). Further, I use references to Jones to illustrate standpoints (Jones 1977, 1992). Jones is widely recognized as a progenitor of design methods thinking in the early 1960s.

In his reassessment of the nature and utility of design methods in the late 1970s, Jones asked what design methods were and proposed they were “anything one does while designing... any action whatever that the designer(s) may decide is appropriate”, emphasizing the relevance and utility of methods to the practice of design (Jones 2003). In his consideration of the usefulness or purpose of design methods and processes, which consisted of several methods in a chosen sequence or in parallel, Jones wanted to provide an adequate way of “listening to the users and to the world in such a way that the new design becomes well fitted to people and to circumstances” (Jones 1977).

Jones elaborated: “I sometimes think of designing as a meta-process, occurring before the product exists, that can predict enough of the future to ensure that the design can have the same quality of rightness that we see in natural organisms that have evolved naturally, without design.”

We may ask whether this analogy is appropriate for the design of services, as opposed to products and artefacts. Jones was perhaps one of the first design researchers to model the different levels of complexity of design beyond components and products, to encompass systems, services and communities. For a graphical representation of Jones’ levels of complexity, see Bull 2003, p. 38. In the opening of his book *Design methods, seeds of human futures* is a passage exhorting the deficiencies of existing design, which are manifested in the appalling problems exhibited in our society (Jones 1970). Design theory highlights the important role that design plays in our lives. The design methods movement first addressed these issues over 40 years ago (Cross 1984; Heskett 2002).

Since then, design research has largely concentrated on the formulation and successive refinement of design process models. Various models have been developed over the years in the fields of architecture, engineering design, product design and industrial design. Whilst these devices have proved useful for describing and explaining design as a phenomenon of human social interaction, they have not had an instrumental effect on the way design is carried out. Nor have they revealed, in a scientific sense, to design practitioners the essential structure of the design process, either what it is, or should be.

More recently there has been much criticism of design’s focus on products and artefacts. One example is that there

has been more of an “artefact-centred” focus, which is concerned with function, technology and aesthetics, rather than a “human-centred” focus concerned with user experience and well-being (Hugentobler 2004; Marzano 2003). Or else on design that is eco-centred and concerned with sustainability (Jegou 2004; Thackara 2005). Similarly there is criticism that design is too business-centred. At some of the events in the D4S research project there were at times palpable tensions when the relative merits of human-centred service design thinking and business-centred strategic management consultancy were discussed, flowing from rivalry between disciplines, and contributors’ anxiety to be heard.

An interesting observation may be made about the development of doctoral studies programmes in the field of service design at Northumbria’s Centre for Design Research. Here, the intentions and proclivity of the design and business management professions have been considered in terms of the nature of the philosophical base supporting the respective disciplines, compared to the locus of their activity.

The nature of conspicuous consumption in service of product and artefact creation in the world of global business, as opposed to inconspicuous consumption in the context of service transformation in the world of public sector services, polarizes the debate. It has raised questions as to the relationship and natural leaning of business to private sector contexts, and design to public sector service development. The growth of service design thinking and practice may or may not find a natural host in the emergence of the need for improvements in the design of public services. The other research questions running parallel to this debate concern learning from public service explorations that include diverse communities of interest. The vectors of inquiry here are the instructive nature of “edge services”, based on inconspicuous consumption, and the connection of people to policy through service design methods on behalf of communities of interest.

However, there is also potential to criticize the nature of design that is self-centred: where the expression of self is advanced; rather than an approach based upon responsible service for a communal good being adopted in place of self-gratification. Hugentobler terms this “author-centredness” (Hugentobler 2004). The rise of service design thinking and practice may also reflect a shift in thinking from design as a tool to promote consumption, to becoming a tool for the construction of new relationships between people in society (Manzini 2007).

The shift in focus from product- and artefact-centred design theory to system- and service-oriented thinking has followed the advent and growth of services in our economy and society, accompanied by corresponding changes in technology. We are now into the 5th wave of new technologies,¹ focusing on a new generation of integrated sensor and monitoring systems (Castellacci 2006). These combined changes have integrated

design more into strategic processes, where more reflective, projective and systemic methods and processes are required, based on knowledge routines complementing former intuitive approaches. Ironically, as design has moved in this direction, the emergent generation of “Mosaic thinkers” in society has been increasingly adopting what may appear as a non-rational thinking style, more in keeping with “designerly” modes of thinking and doing (Sharp 2007).

In the context of the de-materialization of technology and evanescent products in our lives (Marzano 2003), examples of poorly executed product systems and service development based on inexplicit design process and methods prevail. Experience-based approaches are inadequate for the current rate of contextual change. These methods may support the development of a conceptual idea, but they do not provide the tools and techniques required to analyze complex service ecologies, or to develop more human-centred solutions while dealing with multidisciplinary design situations (Hugentobler 2004).

I met Jonathan Ive, Vice President of Apple, in the US in July 2007. We discussed rigour in the extended design and innovation process, which had become a burning issue for Jonathan. He believes that conventional product design is demanding and many appear to be jumping onto the bandwagon of service design, because they cannot contend with the rigour and craft of product design. Yet service design methods are formative and largely unproven. This author has noted a potential corollary here with the sociologist Richard Sennet on craftsmanship in society (Sennet 2008), who argues that the global economy makes conventional notions of craftsmanship redundant.

Design researchers are asking how we make the shift from designers-as-executants to designers-as-executives in the context of designing services. Hugentobler foresees that this cannot be done without the introduction of systems thinking. Most designers involved in service development projects have adopted and adapted interaction design methods to contend with the complexities of the duality of problem-framing and solution-finding (Moggridge 2006).

Designers mainly work as executants in the role of corporate and social value creation, where interaction with other disciplines is typically poor. Herbert Simon proposed in *The sciences of the artificial* that design could be the model for emulation by other future-shaping disciplines (Simon 1969). But, according to Donald Schon (1983), the opportunity for design resulting from the “decay of expert cultures” since the 1970s is difficult to realize. There have been doubts and reversals of thinking on the part of the protagonists of the design methods movement (Archer 1985; Alexander 1964). However design research still labours under the belief that theory and method, or a rational knowledge-supported approach, are able to improve the quality of the design process and its outcomes, together with a capacity to connect with other disciplines. Herein lies the dichotomy of theory and method with design practice. More recent work, which sets out to conceptualize and visualize the content and context of complex designing, rather than concentrating exclusively on the rationalization of its process, has gained much ground (Young 2001).

My work in the education of design practitioners indicates that there is better understanding of this kind of thinking,

and connection with its portrayal of design. In the world of design research, reasoning may yet catch up with conceptualization. Meanwhile, service design practice will continue, or not, regardless. Exhortation by design researchers will continue to be made (Young 2001).

Notes

1. 5th wave technologies include: sensors cameras, microphones, motion detectors, accelerometers, electrical resistance monitors and geo-positioning devices. The previous four waves have included: computer processing, miniaturization-distribution, networking and web-based services.

References

- Bull, K., (2003). *Industrial design within system operated product*, PhD thesis, University of Central England, Birmingham, p. 38, Figure 1.
- Hugentobler, H.K., (2004). Designing a methods platform for design and design research. In Redmond, J., Durling, D., De Bono, A. (Eds.), *Futureground*, Design Research Society, International Conference, Monash University, Australia.
- Jones, J.C., (1977). How my thoughts about design have changed during the years, *Design Methods and Theories*, 11,1.
- Jones, J.C., (1992). *Design methods, seeds of human futures*. New York: Van Nostrand Reinhold.
- Cross, N., (1984). *Developments in design methodology*, Chichester, NY: John Wiley
- Heskett, J., (2002). *Toothpicks and logos: design in everyday life*. Oxford: Oxford University Press.
- Marzano, S., (2003). *The new everyday*. The Netherlands: V+K Publishing.
- Jegou, F. & Manzini, E. (2004). *Sustainable everyday: a catalogue of promising solutions*. Milan: Edizione, Ambiente.
- Thackara, J. (2005). *In the bubble, designing in a complex world*. Cambridge, MA: MIT Press.
- Manzini, E. (2007). Keynote Presentation, Dott 07 Creative Community Awards 16 October, BALTIC Centre for contemporary art, Baltic Square, Newcastle upon Tyne (unpublished).
- Castellacci, F. (2006). Innovation, diffusion and catching up in the fifth long wave, *Futures Journal*, Vol. 38, No. 7, September 2006, 841–863, Oxford and Amsterdam: Elsevier.
- Sharp, M. (2007). Clubbers, mosaic thinkers and design process. In Bohemia, E., Clarke, A., Hilton, K., McMahon, C. (Eds). *Shaping the Future*, 9th International Engineering and Product Design Education Conference, Newcastle upon Tyne.
- Sennet, R. (forthcoming 2008). *The craftsman*, (forthcoming publication, reviewed in THES, 27 July 2007).
- Moggridge, B. (2006). *Designing interactions*, Cambridge, MA: MIT Press.
- Simon, H.A. (1969). *The sciences of the artificial*. Cambridge, MA: MIT Press.
- Schon, D.A. (1983). *The reflective practitioner, how professionals think in action*, New York: Basic Books.
- Archer, B. (1985). Systematic methods in design. In Cross, N., *Developments in design methodology*. Chichester: John Wiley and Sons.
- Alexander, C. (1964). *Notes on the synthesis of form*. Cambridge, MA: Harvard University Press.
- Young, R.A., Cooper A.M. & Blair N.S.P. (2001). Re-designing design education. Keynote address in *Emerging design paradigm*, ICSID Educational Seminar Publication, Seongnam, Korea, 2001.

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Figure 10: a snapshot of the knowledge work involved in design



Source: project work within Edward Cullinan Architects, discussed in Ewenstein and Whyte (forthcoming).

Visualization and the design of services

Jennifer Whyte

The idea of “design” is intimately connected with the idea of visualization. The word “de.sign” comes from the Latin “designare”, to mark out, or devise. Its roots are “de-” meaning “out”, and “signare” meaning to mark, from “signum” a mark, or sign. Modern use dates back to the Industrial Revolution and is associated with a division of labour and specialization that allows for the separation of design activities from manufacturing.

Thus, the relatively new idea of “service design” draws our attention to questions of holding separate and of visualizing in another domain. The empirical focus of the Designing for Services in Science and Technology-based Enterprises project is on the relationships between design and the services provided by high-technology spin-outs. This raises interesting questions about the broad relationships between science, technology and design; the nature of design expertise (the extent to which it is connected with knowledge of the domain); and the role of visualization in the design of services.

In an unusual move, events were held right through the data collection process, allowing a wider group of designers, service providers and academics from various disciplines to discuss these questions and to explore the findings of the project in their emergent forms. We brought a variety of perspectives to our conversations. In reflecting on the emergent findings and the process of inquiry I draw on my own research on visual practices and propose that it offers useful points of departure for this ongoing analysis.

Research that colleagues and I have conducted has explored the role of visual representations in the evolution of knowledge in design (Whyte et al. 2007). It used two in-depth case studies of contrasting design settings: an architectural design firm and the design department of a “high-tech” manufacturing firm. I suggest that, using the data from this project, one of the areas that could be further explored is the various ways that visual representations are used to achieve stability and change in the development of designs for services.

The multi-dimensional nature of visual representations as objects

A term that came up repeatedly in workshop conversations was that of “boundary object”. This term was originally introduced by Star and Griesemer (1989) in their study of a museum. They used it to discuss co-ordination of diverse communities around museum artefacts, including stuffed animals and a map of California. It has since become widely used in organization studies (eg Bechky, 2003; Carlile 2002; 2004).

However in our empirical study we found that, on its own, the term did not allow us to fully interrogate how visual representations were used. In our setting, we found that visual representations are characterized by a “lack” or incompleteness. Aspects of the representation are treated as fixed and frame and focus the conversation, while others are in flux,

open and changing as part of the dialogue (see Figure 10 p.46). Thus the practices around changing visual representations are quite different from practices around stable museum artefacts.

To explain their nature we drew on a literature that looks at objects as parts of an experimental system, based on empirical work in the sciences (Rheinberger 1997; Knorr Cetina 1997). Thus, we discuss the multi-dimensional nature of objects and the different characteristics of visual representations as epistemic objects, technical objects and boundary objects. Figure 11 summarizes uses of the different terms.

Figure 11: key characteristics of boundary objects, epistemic objects and technical objects

Boundary objects: concrete, stable, used in interaction between communities	Objects as part of an experimental system	
	Epistemic objects: abstract, in-flux and used in expert work	Technical objects: unproblematic instruments, static used in expert work

Source: modified from Ewenstein and Whyte (forthcoming)

These analyses could be extended using the rich data collected on this project. The aim of such an analysis would not be to develop generic laws, but rather to develop situated understandings that allow us to develop the vocabulary for a more precise conversation about service design.

Words and pictures

The conversations that we developed through the D4S workshops in Oxford also raised related questions about how meaning is made. Words and pictures can both be used as stable reference points that facilitate interaction across communities or practitioners, or they can inhibit dialogue. They are often used together. Productively used, they can frame knowledge development. They can be evolved and developed through the knowledge work.

The challenge then is to learn from the project to improve the performance of design and research interaction. Many things were going on in parallel as we sat together around a large horseshoe-shaped table. At times the process of data collection was obstructive to the experience. (In the final workshop we witnessed a strange and comic dance between presenter, a man with a large shoulder-mounted video camera and a woman with the connected sound boom.) However this data, (both the type captured in the videos and blog and our experiences of breakdowns in communication and their resolution), may help us to reflect on the experience. Where was there constructive dialogue? How were roles constructed in that conversation? Who was given a voice?

The professional design industries in the UK are changing user focus. (Whyte and Bessant 2007) Interest in service design is a part of this change, as well as the renewed interest in design and creativity in UK policy-making (Cox 2005). This research has within it an implicit assumption about the importance of design training, but it also contributes to policy-relevant debates by focusing attention on the question: what constitutes a designer? In IBM's involvement in the early stages of this work there was a clear contrast between their approach to design and that of other design firms, some staffed with relatively young graduates from the Royal College of Art. What do we mean by expertise in design? Can we, as Boland and Collopy (2004) suggest, think of managing as designing? And how should design be organized in service sectors?

In this article I suggest that a useful way to start addressing these questions is to look at how things are held separate and visualized in the processes of design. The detailed data collected in this project will help us in that task.

References

- Bechky, B. A. (2003). Object lessons: workplace artifacts as representations of occupational jurisdiction. *American Journal of Sociology* Vol. 109, No. 3, 720–752.
- Boland, R. J. & Collopy, F. (2004). *Managing as designing*. Stanford, Stanford University Press.
- Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: boundary objects in new product development. *Organization Science* Vol. 13, No. 4, 442–455.
- Carlile, P. R. (2004) Transferring, translating and transforming: an integrative framework for managing knowledge across boundaries. *Organization Science* Vol. 15, No. 5, 555–568.
- Cox, G. (2005). Cox review of creativity in business: building on the UK's strengths, UK Treasury.
- Ewenstein, B. & Whyte, J. (forthcoming) Knowledge practices in design: the role of visual representations as epistemic objects. *Organization Studies*, accepted.
- Knorr Cetina, K. (2001). Objectual practice. In T. R. Schatzki, K. Knorr Cetina & E. von Savigny (Eds.), *The practice turn in contemporary theory* (pp. 175–188). London: Routledge.
- Rheinberger, H. J. (1997). *Toward a history of epistemic things: synthesizing proteins in the test tube*. Stanford: Stanford University Press.
- Schön, D.A. (1983). *The reflective practitioner: how professionals think in action*. Basic Books.
- Star, S.L., & Griesemer, J.R. (1989). Institutional ecology, translations and boundary objects: amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–1939. *Social studies of science*, Vol. 19, 387–420.
- Whyte, J., Ewenstein, B. Hales, M. & Tidd, J. (2007). How to visualize knowledge in project-based work, *Long range planning*, Vol. 40, No. 6, accepted.
- Whyte, J. K., Ewenstein, B. Hales, M. & Tidd, J. (2007). Visual practices, and the objects of design, *Building research and information*, Vol. 35, No. 1, 18–27.
- Whyte, J.K. & Bessant, J. (2007). Making the most of UK design excellence: equipping UK designers to succeed in the global economy, *Tanaka Business School Report*. http://www.auidesignfoundation.org/files/ReportSummary_Jan07.pdf

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Cameraman Mike Yorke from the Oxford Academy of Documentary Film filming a visit by Pablo Toledo of g-Nostics with designers Ben Reason and Paul Sims of live|work to a pharmacy where the Nicotest service was being trialed, demonstrated by assistant Cherry Osborne

Designing for services: videos as research outputs

Lucy Kimbell

This publication is one of the outputs of the Designing for Services in Science and Technology-based Enterprises (D4S) exploratory research project. Another primary output is a series of short videos available via a web archive, which also includes some of the artefacts produced during the project. They are designed to be complementary. The publication gathers a number of short essays that offer perspectives from different academic disciplines about the D4S project. The videos also offer perspectives, but do so by using edited footage both from the paired projects between the service design consultancies and the science enterprises as well as from the five events held at Oxford.

How can video function as an exploratory research output? There is, of course, a tradition of using film or video as a way of communicating findings in anthropology and other social science disciplines that draws on documentary formats and the notion of the film essay. In anthropology, making a video offers one way of producing a “thick description” (Geertz 1973) of human behaviour that places it within a local cultural context. In the social sciences, video is also increasingly used to record the research process. As John Law (2004) has argued, researchers should be attentive to the ways methods craft realities and should acknowledge the messiness of research practice. The use of video provides a way of capturing some sense of this messiness.

Within design disciplines, video has also become a tool for doing research and, to a lesser extent, a means for making public its results. Moreover, some design researchers have recently argued that documentaries are a valuable resource not just for recording what goes on but also as a means through which to explore, understand and present research, using film’s capabilities to preserve ambiguities and paradoxes (Raijmakers, Gaver and Bishay 2006).

The videos produced for the D4S project draw on these discussions by offering a series of short audiovisual assemblages that describe some aspects of the process of the D4S project. Drawing on design theory and design management research, they are intended to direct the viewer’s attention to what the director or researcher considers are the key moments in the designing of services enacted during the project. Through disseminating them on the web, the director/researcher acknowledges that they will play a role not just in contributing to a discussion about the designing of services but also about how to do research into the designing of services. On a more pragmatic level, they also serve to show how some of the service designers, entrepreneurs and academics involved in D4S went about understanding the designing of services, and what themes and vocabulary emerged during the process.

The D4S videos therefore contribute to the project in these ways:

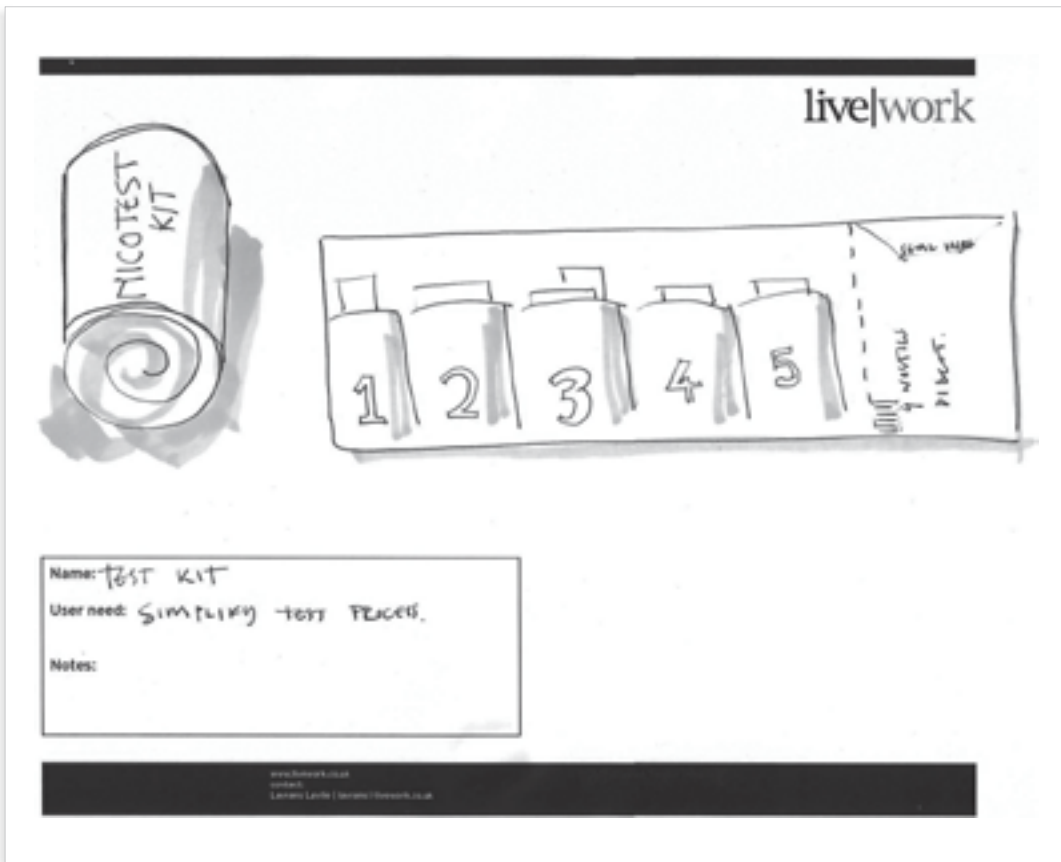
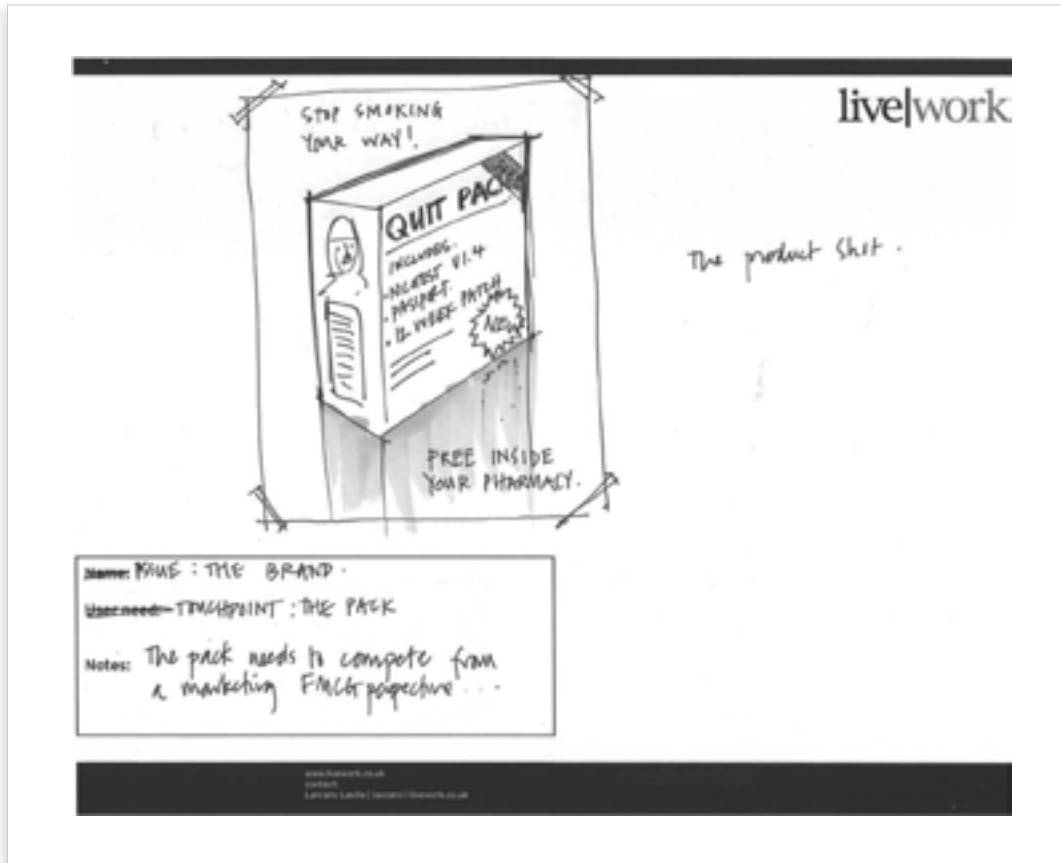
- prototyping a way of doing and disseminating interdisciplinary research
- making public perspectives about the designing of services by showing it happening in context
- reaching audiences who are unlikely to access academic journals, including design practitioners and science and technology entrepreneurs.

Like the essays in these pages, the videos should be understood as offering perspectives and observations. They are tentative rather than definitive and – in the tradition of some design research – produced with the aim of inspiring others and opening up questions that might lead to a better understanding of designing for services.

The videos will become available during 2008 on the D4S web archive <http://www.sbs.ox.ac.uk/D4S>.

References

- Raijmakers, B., Gaver, W. W., and Bishay, J. 2006. Design documentaries: inspiring design research through documentary film. In *Proceedings of the 6th ACM conference on designing interactive systems*. University Park, PA, USA, 26–28 June 2006. DIS ’06. ACM, New York, NY, 229–238.
- Geertz, C. 1973. Thick description: toward an interpretive theory of culture. In *The interpretation of cultures: selected essays*. New York: Basic Books, 3–30.
- Law, J. 2004. *After method: mess in social science research*. London: Routledge.



Some of the sketches by live|work designers suggested improvements to the design of the existing service, but some of them suggested innovations in g-Nostics' business model.

Service design: a 21st century interdisciplinary?

Lucy Kimbell

That a field of practice called service design is emerging is not in doubt. Scan the pages of design magazines, the web-pages of design festivals, or the glossy prospecti of design schools, and you are unlikely to find the term “service design” appear. Where service design has become visible is at conferences which draw together practitioners and researchers from several disciplines, including the Emergence conference series at Carnegie Mellon University in 2006 and 2007 and the Intersections conference in Gateshead (2007). Meanwhile the influence of design, design management and what some people call “design thinking” is increasingly visible in non-design contexts such as business schools and in magazines such as *Business Week*. A further development is a shift within design research and theory away from the legacy of modernism and the traditional divide between form and function, towards a greater attention to semantics as is seen in the influential book by Krippendorff (2006).

These developments during the early years of the 21st century raise questions for those who are involved in different ways in the designing of services, whether they call themselves designers or not, and for those whose research is concerned with the study of services and service innovation in particular. It is not yet clear that service design is a distinct category – but there are designers who successfully sell and practise service design, including contributors to this publication. It is not clear what intellectual resources this emerging discipline can or might draw on, whether it lives in design, or services management, or services marketing, or service operations or a “services science”. And there is evidence, as Bruce Tether describes in these pages, that a lot of the designing of services going on within organizations is “silent design” – that many services are being designed without the benefit or constraint of a discipline of service design.

In this context, the exploratory research project from which this publication is an output might offer some insights, even at this early stage of analyzing the data it assembled. The comments that follow should not be considered findings, but rather perspectives and provocations for the work that colleagues involved with the project have been considering and will be developing further.

One thing to think about is the extent to which service design is distinguishable from other kinds of design practice and theory. In their engagements with their science enterprise pairs, and in the accounts they provided in five project events held in Oxford, the service designers involved in Designing for Services in Science and Technology-based Enterprises made use of processes and methods that would be immediately recognizable to non-service designers. They sought to understand context and user needs, they observed, they mapped opportunities based on insights they gathered, they sketched, they made prototypes, they balanced requirements and constraints, they asked “what if” questions. They not only

paid critical attention to artefacts but also focused intently on the human users and providers of services. True, they had some specific vocabularies and tools, evident in their uses of the term “touchpoints” and the notion of the customer journey. But in the ways that they went about their engagements with the enterprises, much of their practice will be familiar to design practitioners and to design theorists.

Secondly, it was clear from watching the video recordings of the meetings between these service designers and their science enterprise pairs, quite how issues of business strategy were entwined with the design of services. That designers have something valuable to contribute to strategy is one of the key elements in the recent interest in design in both management academia (in for example Boland and Collopy 2004; Liedtka 2004; and Dunne and Martin 2006) and among some contemporary design practitioners (van Patter 2006). The empirical data from this exploratory project supports this. Even in their very first discussions with the science enterprise they were working with, the designers slipped repeatedly between service artefact and corporate strategy, between exploring the present service offered and imagining alternatives. For these service designers, the design of the service, its operations and the business model it enabled, were all entangled. This insight is echoed in empirical research in experiential services by Chris Voss and Leonieke Zomerdiijk, summarized within this publication.

An example of such interconnection comes from a conversation during a meeting between service designers from live | work and the team at g-Nostics, a company offering personalized medicine based on molecular profiling of individuals. After a brief study of the g-Nostics smoking cessation service, Nicotest, offered within a National Health Service trial, three designers used design methods such as mapping out the customer journey and sketching to identify what they saw as problems in the current offering and suggestions for improvements and new ways of designing the service, resulting in a series of sketches. In the interaction below, designer Ben Reason has been presenting these sketches to CEO Mark Tucker and his colleagues Pablo Toledo and Mark Allman. Some of the sketches Reason presents are of possible changes, but some of them suggest a new way of conceiving of the service, implying a different business model.

Mark Tucker

How much has this been drawn by suggestions we’ve been creating and how much has been created by your own people...by saying this is a gap that you’ve got?

Ben Reason

Good question. I think we work quite collaboratively so some of these things have come from observation...some of them are issues that Pablo’s told us about.

A few minutes later, Mark is again struck by the implications of one of the sketches.

Mark Tucker

Where's that thinking come from of a physical [...] pack ...you're bundling the solution into that ...is that one of your guys?

Ben Reason

Yeah.

Mark Tucker

Well that's very interesting. [...] You've arrived at the same conclusion independently.

A third observation is the extent to which products and services are, perhaps necessarily, mixed up with each other. In some of the D4S project workshops, some participants argued that agreeing on definitions of product and service was essential. But the self-described service designers, some educated in product design, seemed untroubled by their repeated shifts between the tangibles and intangibles in the services they were examining. In live |work's project with g-Nostics, designers paid considerable attention to the physical and digital artefacts through which users engaged with the Nicotest service. In IDEO's project with Prosonix, a company offering ultrasonic processes for a range of industries, much of the work was concerned with helping the company think through and develop its "B2B2C" services which involved use of its innovative technologies, which are sometimes sold as "products". Radarstation's work with Oxford Gene Technology (OGT) saw the service designers focus on the customer journey and customers' touchpoints with the organization, which offers both "products" such as micro-arrays as well as customized services based on its technology. In all three cases, product and service, artefact and experience were entwined in ways that were hard to distinguish.

The fourth observation came from a theme that emerged in the project events, raised in particular by academics whose work is concerned with complexity and value constellations, such as Jeff Johnson and Rafael Ramirez, a contributor to this publication. The service designers involved in D4S used the terms "stakeholders" and "service ecology" and seemed to conceive of services having multiple users, of different types, not all of whom were involved economically in the service provision or its consumption, and who engaged with the service through different configurations of space and time. However the representational tools they used, and sometimes their accounts of their activities, suggested to some participating academics a reliance on binomial sets of relations grounded in traditional economic and manufacturing models of production and consumption. A question was raised several times about the extent to which the service designing within D4S fitted within these binomial relations or forged new ones.

A number of issues follow from these initial insights. By framing the project as "Designing for Services..." rather than "Service Design..." the project investigators from the outset wanted to be attentive to the various design activities going on within the science enterprises, silent or otherwise. The short

discussion above and within these pages suggests that the designing of services undertaken in the project, and made visible to participants, can be viewed through a number of lenses, drawing on design theory and design management, as well as management theory, the social science disciplines, and newer areas such as complexity research. It is likely to be fruitful, then, to conceive of an emerging discipline of service design as necessarily an *interdiscipline* (Barry, Born and Weszkalnys 2008). We hope that future streams of research, based on this and other projects, will begin to contribute towards it.

References

- Barry, A., Born, G. & Weszkalnys, G. (2008). Logics of interdisciplinarity, *Economy and Society*, Vol. 37, No.1.
- Boland, R. & Collopy, F. (Eds.) (2004). *Managing as designing*, Stanford: Stanford University Press.
- Dunne, D. & Martin, R. (2006). Design thinking and how it will change management education: an interview and discussion, *Academy of Management Learning & Education*, Vol. 5, 4, 512–523.
- Gorb P. & Dumas A. (1987). Silent design, *Design Studies*, Vol. 8, No. 3, July, 150–156.
- Krippendorff, K. (2006). *The semantic turn*. Taylor and Francis.
- Liedtka, J. (2004). In defense of strategy as design, *California Management Review*, Spring, 2000, 42(3), 8–30.
- Van Patter, G. K. (2006). Design 3.0: making sense of design now, presentation viewable at http://www.nextd.org/media/qt/NextD_Design3_0.mov accessed 24 October 2007.

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Further reading

Readings contributed to this list have been summarized in broad categories. Many could fit into multiple categories, but each is only listed once along with the initials of the contributor adding the reference to the list.

Design and design theory broadly

- Beyer, Hugh & Holtzblatt, Karen (1997). *Contextual design: defining customer-centered systems*. San Francisco, CA: Morgan Kaufmann Publishers. (BY)
- Boland, R. & Collopy, F. (2004). *Managing as designing*. Stanford: Stanford Business Books. (LK)
- Buchanan, R. & Margolin, V (Eds.) (1995). *Discovering design: explorations in design studies*. University of Chicago Press. (LK)
- Cross, N. (2006). *Designerly Ways of Knowing*. Springer. (LK)
- Csikszentmihalyi, M. (1996). *Creativity: flow and the psychology of discovery and invention*. Harper Collins. (LK)
- Dumas, A. (1994). Building totems: metaphor-making in product development. *Design Management Journal*, Winter, 71–82. (VS)
- Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: cultural probes. *Interactions* 6, 1, 21–29. (LK)
- Gorb, P. & Dumas A. (1987). Silent design. *Design Studies*. Vol. 8, No. 3, 150–156. (LK)
- Hargadon, A. (2005). Leading with vision: the design of new ventures, *Design Management Review*, Winter, 33–39. (LK/JW)
- Heskett, J. (2002). *Toothpicks & logos*. Design in everyday life. OUP. (LK)
- Krippendorff, Klaus (2006). *The semantic turn*. Taylor and Francis. (LK/VS)
- Lidwell, W., Holden, K. & Butlet, J. (2003). *Universal principles of design: 100 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design*. (LK)
- Margolin, V. & Buchanan R. (Eds.) (1995). *The idea of design. A design issues reader*. MIT Press. (LK)
- Mau, B. (2004). *Massive change*. Phaidon Press. (LK)
- McCormack, D. (2003). An event of geographical ethics in spaces of affect. *Transactions of the Institute of British Geographers*, 28, 4, 488–507. (AB)
- Mitchell, C. T. (1993). *Redefining designing: from form to experience*. New York: Van Nostrand Reinhold. (BY)
- Ravasi, D. & Lojaco, G. (2005). Managing design and designers for strategic renewal, *Long Range Planning*, 38, 51–77. (JW)
- Schon, D. (1987). *The reflective practitioner: how professionals think in action*. New York: Basic Books. (LK)
- Scott, J. (2006). *Artists-in-labs: processes of inquiry*. Springer. (TK)
- Seidel, V. (2000). Moving from design to strategy: the four roles of design-led strategy consulting, *Design Management Journal*, 11, 2. (VS)
- Seidel, V. & Pinto J. P. (2005). Social science strategies for user-focused innovation and design management. *Design Management Review* 16, 4, 73–79. (VS)
- Shedroff, N. (2003). Research methods for designing effective experiences, in Laurel, B. (Ed.). *Design research: Methods and perspectives*. Cambridge: MIT Press. 155–163. (VS)
- Simon, H. (1996). *The sciences of the artificial*. Cambridge, MA: MIT Press. (BY/LK)
- Thackara, J. (2005). *In the bubble. Designing in a complex world*. Cambridge, MA: MIT Press. (LK)

Wasson, C. (2000). Ethnography in the field of design, *Human Organization*; Winter 59, 4. (DN)

Whyte, J. K., Ewenstein, B., Hales, M. & Tidd, J. (2007). Visual practices, and the objects of design, *Building Research and Information*, 35, 1. (JW)

Services and service design

- Alonso-Regardo, M., Thompson G. & Dannemark O. (2004). *State of the art in service design and modelling vivace*. University of Manchester. (BH)
- Arnould & Price, (1993). River magic: extraordinary experience and the extended-service encounter, *Journal of Consumer Research*, Vol. 20. (KB)
- Berry, L.L, Zeithaml V. A. & Parasuraman A. (1990). Five imperatives for improving service quality, *Sloan Management Review*, Vol. 31, No. 4, Summer, 29–38. (BH)
- Berry, L.L. & Parasuraman, A. (1993). Building a new academic field – the case of services marketing, *Journal of Retailing*, 69, 1, 13–60. (LK)
- Bitner, M. et al. (1990). The service encounter: designing favourable and unfavourable incidents, *Journal of Marketing*, 54. (SN)
- Buchena, M., & Suri, J. F. (2000). Experience prototyping. Symposium on designing interactive systems. In *Conference Proceedings on designing interactive systems: processes, practices, and techniques*, 424–433. New York: ACM Press. (LK)
- Celsi, R. & Leigh (1993). An exploration of high-risk leisure consumption through skydiving, *Journal of Consumer Research*, Vol. 20. (KB)
- Christensen, Clayton M. & Anthony, Scott D. (2004). *Cheaper, faster, easier: disruption in the service sector*. Harvard Business Review Publishing. (CD)
- Dougherty, D. (2004). Organizing practices in services: capturing practice-based knowledge for innovation, *Strategic Organization*, 2, 1, 35–64. (JW)
- Firat & Venkatesh (1995). Emancipatory postmodernism and the enchantment of consumption, *Journal of Consumer Research*, Vol. 22. (KB)
- Fitzsimmons, J. A. & Fitzsimmons, M. J. (2000). *New service development: creating memorable experiences*. Thousand Oaks, CA: Sage Publications. (LZ)
- Fleiß, S. & Kleinaltenkamp, M. (2004). Blueprinting the service company: managing service processes efficiently, *Journal of Business Research*, 57, 392–404. (BT)
- Froehle, C.M., Roth, A. V., Chase, R. B. & Voss, C. A. (2000). Antecedents of new service development effectiveness. An exploratory examination of strategic operations choices, *Journal of Service Research*, Vol. 3, No. 1, 3–17. (LZ)
- Gabbott & Hogg (2000). An empirical investigation of the impact of non-verbal communication on service evaluation, *European Journal of Marketing*, Vol. 34, No. 3/4. (KB)
- Gronroos, C. (2000). *Service management & marketing: a customer relationship management approach*. 2nd edition, Wiley. (BH)
- Haksever, C., Render, B., Russell R. & Murdick, R. (2000). *Service management and operations*. Prentice-Hall. (BH)
- Hart, S. (1996). *New product development: a reader* (especially the section: The development of new services by Lynn Shostack, Axel John, and Ulrike de Brentani). Thomson. (BH)
- Hawken, P., Lovins, A. & Lovins, L. H. (1999). *Muda, service & flow* (especially chapter 7). *Natural Capitalism*. (CD)

- Hollins, G. & Hollins, B. (1991). *Total design. Managing the design process in the service sector*. London: Pitman Publishing. (LZ/LK)
- Hollins, W. & Shinkins, S. (2006). *Managing service operations: design and implementation*. Sage. (BH/LK)
- Levitt, T. (1976). Industrialization of services, *Harvard Business Review*, 54, 5, 63–74. (BT)
- Lovelock, C. & Gummesson, E. (2004). Whither services marketing?: in search of a new paradigm and fresh perspectives, *Journal of Services Research*, 7, 1, 20–41. (LK)
- Mannervick, U. & Ramirez, R. (2006). Customers as co-innovators: an initial exploration of its strategic importance. In Edvardsson, B., Gustafsson, A., Kristensson, P., Magnusson, P. & Matthing, J. (Eds.), *Involving customers in new service development* (pp. 57–75). Imperial College Press, Series on Technology Management. (LK/RR)
- Meyer Goldstein, S., Johnston, R. Duffy, J. A. & Rao, J. (2002). The service concept: the missing link in service design research? *Journal of Operations Management*, Vol. 20, No. 2, 121–134. (LZ)
- Moggridge, B. (2006). *Designing Interactions*. Cambridge, MA: MIT Press. (LK)
- Morelli, N., (2002). Designing product/service systems: a methodological exploration, *Design Issues*, Vol. 18, No. 3, 3–17. (LK)
- Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1988). SERVQUAL: a multi-item scale measuring consumer perceptions of service quality, *Journal of Retailing*, Vol. 64, No. 1, 12–37. (BH)
- Ramaswamy, R. (1996). *Design and management of service processes: keeping customers for life*. Reading, MA: Addison-Wesley Publishing Company, Inc. (LZ)
- Sako, M. (2006). Outsourcing and offshoring: implications for productivity of business services, *Oxford Review of Economic Policy*, Vol. 22, No. 4. (MS)
- Sako, M., et al. (2006). *Grand challenges in services workshop* (available at <http://www.sbs.ox.ac.uk/faculty/Sako+Mari/GCS.htm>). (MS)
- Shostack, L. G. (1977). Breaking free from Product marketing, *Journal of Marketing*. (CD)
- Shostack, L. G. (1982). How to design a service, *European Journal of Marketing*, 16, 1, 49–63. (BT/CD)
- Shostack, L. G. (1984). Designing services that deliver, *Harvard Business Review*, 62, 1, 133–139. (BT/CD)
- Sawhney, M., Balasubramanian, S. & Krishnan, V. V. (2004). Creating growth with services, *MIT Sloan Management Review*. (CD)
- Tether, B. S. (2005). Do services innovate (differently)? Insights from the european innovometer survey, *Industry and Innovation*, 12, 2, 153–184. (BT)
- Thomke, S. (2003). R&D comes to services: bank of America's pathbreaking experiment, *Harvard Business Review*. (CD)
- Tidd, J. & Hull, F. M. (Eds.) (2003). *Service innovation: organizational responses to technological opportunities and market imperatives*. Imperial College Press. (BH)
- Verganti, R. & Buganza, T. (2005). Design inertia: designing for life-cycle flexibility in internet-based services, *Journal of Product Innovation Management*, 22, 223–237. (VS)
- Verma, R., Fitzsimmons, J. A., Heineke, J. & Davis, M. M. (2002). New issues and opportunities in service design research, *Journal of Operations Management*, Vol. 20, No. 2, 117–120. (LZ)
- Voss, C. & Zomerdijk, L. (2007). *Innovation in experiential services – an empirical view*. London Business School/ Advanced Institute of Management, available at http://www.london.edu/assets/documents/PDF/Innovation_in_Experiential_Services_with_cover.pdf
- Zeithaml, V. A., Parasuraman, A. & Berry, L. L. (1990). The customer view of service quality, *Delivering quality service*, The Free Press. (CD)
- Clark, K. B. (1985). The interaction of design hierarchies and market concepts in technological evolution, *Research Policy*, 14, 5, 235–251. (VS)
- Crowston, K. (1997). A coordination theory approach to organization process design, *Organization Science*, 8, 2. (SN)
- Ewenstein, B. & Whyte, J. K. (forthcoming). Beyond words: aesthetic knowledge and knowing in organizational contexts, *Organization Studies*. (JW)
- Flood, R. L. & Carson, E. R. (1993). *Dealing with complexity: an introduction to the theory and application of systems science*. New York, NY: Plenum Publishing. (BY)
- Gershenfeld, N. (2005). *FAB: the coming revolution on your desktop – from personal computers to personal fabrication*. Basic Books. (TK)
- Gharajedaghi, J. (1999). *System thinking: managing chaos and complexity: a platform for designing business architecture*, Washington, DC: Library of Congress. (BY)
- Hatchuel, A., Le Masson, P. & Weil, B. From knowledge management to design-oriented organizations, *International Social Science Journal*, Vol. 54, No. 171, 25–37. (LK)
- Lampel, J. & Mintzberg, M. (1996). Customizing customization, *Sloan Management Review*, Fall, 21–30. (MS)
- Liedtka, J. (2000). In defence of strategy as design, *California Management Review*, Spring, 42, 3, 8–30. (MV)
- Liedtka, J. & Rosenblum, J. W. (1996). Shaping conversations: making strategy, managing change, *California Management Review*. (MV)
- Nardi, B. A. & O'Day, V. L. (1999). Information ecologies – using technology with heart, *Information Ecologies*. Cambridge MA: MIT Press. (CD)
- Normann, R. (2001). *Reframing business: when the map changes the business landscape*. Wiley. (RR)
- Ramirez, R. (1999). Value co-production: intellectual origins and implications for practice and research, *Strategic Management Journal*, 20, 49–65. (RR)
- Ramirez, R. & Normann, R. (1994). *Designing interactive strategy: from value chain to value constellation*. Chichester: John Wiley & Sons. (RR)
- Von Hippel, E. (2005). *Democratizing innovation*. Cambridge MA: MIT Press. (TK)

Industry, consultancy, think tank and government reports

- Bessant, J.K., Neely, A., Tether, B., Whyte, J. & Yahqi, B. (2005). Intelligent design: how managing the design process effectively can boost corporate performance, *Advanced Institute of Management*. (JW)
- Burns, C., Cottam, H., Vanstone, C., Winhall, J. (2005). *RED paper 02: Transformation Design*, <http://www.designcouncil.org.uk/mt/red/transformationdesign/TransformationDesignFinalDraft.pdf>. Design Council (LK)
- BS 7000-3 (2007). Guide to managing the design of services, *British Standards Institution*, London. (BH)
- BS 7373-3 (2005). Guide to identifying criteria for specifying a service offering, *British Standards Institution*, London. (BH)
- BS 7000 – 10 (1995). Glossary of terms used in design management. *British Standards Institution*, London. (BH)
- Parker, S. & Heapy, J. (2006). *Journey to the interface*, Demos. (BH)
- McIntyre, A. (2004). *Improving public services*, CBI Publications. (CD)
- Starr, C. E., Standbridge, D. J. & Sprague, B. M. (2003). Turning service into a growth engine, *Accenture Outlook*. (CD)

Science and technology studies

- Barry, A. (2005). Pharmaceutical matters: the invention of informed materials *Theory, Culture and Society*, 22, 1, 51–69. (AB)
- Callon, M. (2005). The economy of qualities. In A. Barry & D. Slater (Eds.), *The technological economy*. Routledge. (AB)
- Jasanoff, S. (2005). *Designs on nature*, Oxford: Princeton University Press. (JT)
- Hughes, J. A., Somerville, I., Bentley, R. & Randall, D. (1993). Interacting with computers, Special issue on CSCW: part 3, *Designing with Ethnography: Making Work Visible*, Vol.15, No. 2, 239–233. (DN)

Innovation management and organization theory perspectives

- Amin, A. & Cohendet P. (2004). *Architectures of knowledge: firms, capabilities and communities*, Oxford University Press. (AB)
- Baldwin, C. Y., & Clark, K. B. (2000). *Design rules: the power of modularity* (with a related working paper, Where do transactions come from?) Cambridge, MA: The MIT Press. (VS/MS)

- Law, J. (2004). *After method: mess in social research*. Routledge. (AB/LK)
- Molotch, H. (2003). *Where stuff comes from*. Routledge. (LK)
- Renn, O. (1998). Three decades of risk research: accomplishments and new challenges, *Journal of Risk Research*, 1, 1, 49–71. (JT)
- Robinson, J., (1988). Unlearning and backcasting: rethinking some of the questions we ask about the future, *Technological Forecasting and Social Change*, 33, 325–338. (JT)
- Star, S. L., & Ruhleder, K. (1996). Steps toward an ecology of infrastructure: design and access for large information spaces, *Information Systems Research*, Vol. 7, No. 1. (DN)
- Tansey, J. (2004). Risk as politics, culture as power, *Journal of Risk Research*, 7, 1, 17–32. (JT)
- Tansey, J., Carmichael, J., VanWynsberghe, R. & Robinson, J. (2002). The future is not what it used to be: participatory integrated assessment in the Georgia Basin, *Global Environmental Change - Human and Policy Dimensions*, 12, 2, 97–104. (JT)

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