Design Thinking in innovation, in practice: the case of Kaiser Permanente

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Abstract

Design Thinking (DT) as an innovation approach is gathering interest in management and scholarly debates, yet its potential contribution to innovation is vague, and a holistic view on innovation in DT-related literature is lacking. This paper investigates the integration of DT in a large organization, in order to understand its potential contribution to innovation. It is based on a qualitative case study of Kaiser Permanente that is using DT since ten years. Two examples of use are presented and analyzed using the Discovery-Incubation-Acceleration framework for describing innovation competencies (O'Connor and Ayers, 2005). The paper presents three main findings: first, it shows that DT is used in all aspects innovation to various extent, contradicting the view that DT is useful mainly in the front end. Second, it shows overlap between DT and improvement science, questioning the view that incorporating design in managerial settings is difficult due to a clash between logics. Third, the paper puts focus on individuals and teams using DT, opening up for a competence perspective and a discussion of the embodied experience of design thinkers.

Keywords: innovation, design thinking, design methods, user involvement, health care, case study

Introduction

In an environment of fierce competition and increasingly complex innovation challenges, there is an emerging interest for design in management and innovation debates (Walsh, 1996; Bruce and Bessant, 2002; Beckman and Barry, 2007; Verganti, 2008; Bessant and Maher, 2009; Ward *et al*., 2009; Filipetti, 2011; Seidel and Fixson, 2012). Design management scholars and practitioners argue that design is suited for innovation as it represents a different logic; one that is human-centered, embraces ambiguity and has a wider and more forward-looking approach to solving problems (Borja de Mozota, 2010; von Stamm, 2010; Hobday *et al*., 2012, Cruickshank and Evans, 2012).

Recently, Design Thinking (DT) has emerged as a multidisciplinary human-centered innovation approach described as inspired by the ways in which designers think and work (Kelley, 2001; Brown, 2009; Martin, 2009; Kimbell, 2011; Johansson-Sköldberg *et al*., 2013), making similar claims. The concept has gained spread, and large firms in a variety of business sectors claim to have integrated DT in various ways into their operations (Lafley and Charan, 2008; Holloway, 2009; Martin, 2011; McCreary, 2010, Carlgren *et al*., 2014a).

In spite of an increasing interest in DT among scholars as well as practitioners, there is a scarcity of empirical research studying how DT is applied in various contexts in practice (Kimbell, 2011, Johansson-Sköldberg *et al.,* 2013, Cruickshank and Evans, 2012), although some studies are under way (e.g. Lindberg *et al.,* 2012; Seidel & Fixson, 2013; Carlgren, 2013; Carlgren *et al.,* 2014a; Schmiedgen et al., 2015, deVriesa et al., 2015). Thus, companies interested in DT typically have to rely on how the concept is described and marketed by its proponents – a generic and idealistic view that tells them what DT could be and what it could ideally do in their organizations. Given its fast spread, DT has given rise to critique for representing a simplification of design (Jahnke, 2013), lacking focus on aesthetics (Tonkinwise, 2011; Jahnke, 2013), being difficult to fit in corporate settings due to a clash of logics (Rylander, 2009) and leading only to incremental innovation (Verganti, 2008). From an academic point of view, the lack of empirical foundation with detailed use cases of how DT is used in practice makes it hard both to theorize and to connect the concept to existing theories and models (Kimbell, 2011, Hobday *et al*., 2012; Johansson-Sköldberg *et al*., 2013).

One area that is little described is the use of DT in innovation[1], with a few exceptions in practitioner-oriented journals (e.g. McCreary, 2010; Brown, 2008). Typically, DT is understood as equal to creativity (Johansson-Sköldberg *et al.,* 2013) or a way of coming up with "breakthrough ideas" (e.g. Brown, 2008). Yet, in innovation research a single-sided focus on idea and concept generation is disputed, and it is argued that more focus is needed on idea implementation (Govindarajan and Trimble, 2010) as well as competencies needed for an innovative concept to reach the market and gain spread (O'Connor and DeMartino, 2006). It is therefore of particular interest to expand the scope and investigate how the use of DT may contribute to innovation in a broader sense.

Given this background, *the aim of this paper* is to provide detailed examples as well as an analysis of how DT is integrated in innovation in a large firm, in order to understand its potential contribution to innovation. The paper is based on a qualitative single case study of Kaiser Permanente, an American healthcare provider that uses DT explicitly for innovation purposes and has integrated it with existing operations as a formal part of their innovation practice. With more than 10 years of experience, Kaiser Permanente was one of the first companies to collaborate with IDEO in order to learn their design-inspired innovation approach, which later became popularized as DT. In the analysis we lean on the framework proposed by O'Connor & deMartino (2006), describing three necessary competences a firm need in order to achieve breakthrough innovation: discovery, incubation and acceleration.

Theory

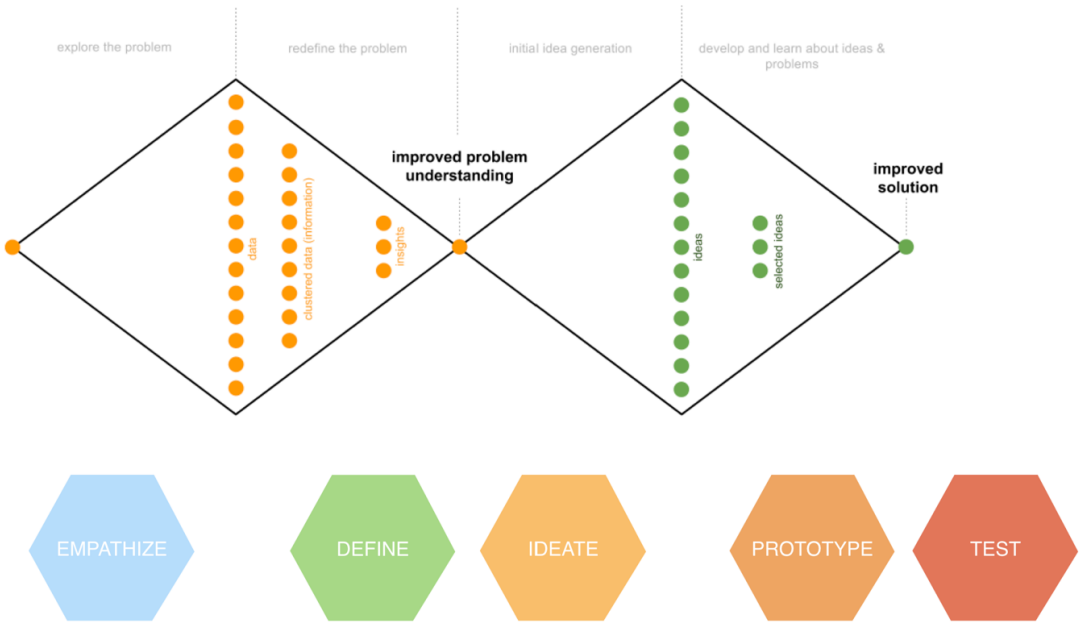
Design thinking descriptions

This paper deals with Design Thinking (DT) as it appears in recent managerial debates. As a management concept DT emerged in the early 2000s, mainly originating from the practice of the Californian design firm IDEO (Kelley, 2001; Brown, 2009), and the writings of management scholars who had been able to collaborate with or observe the work of designers (Martin, 2009; Boland and Collopy, 2004). While Martin (2009) as well as Boland & Collopy (2004) focus on DT mainly as a cognitive process, the most tangible and well-spread representations of DT are linked to IDEO (e.g.

[1] Innovation here refers to structures, processes and activities and competencies aimed at creating innovations in an organization; be they formal or informal, and targeting external users or the company itself.

Kelley, 2001, Brown, 2008, 2009; IDEO, 2009), as well as the d.Schools; academic institutions offering DT education for master students and executives (Stanford d.school, 2009).These proponents describe DT as a process where multidisciplinary teams apply a set of design practices to any innovation challenge or problem that needs to be solved. The process itself is described as a number of steps that can be iterated (Kelley, 2001; Stanford d.School, 2009) or a set of "overlapping innovation spaces" (Brown, 2008, 2009). According to Rauth (2015), despite some differences in presentation, the generic DT process typically consists of the following steps: *Understand* the prerequisites of the problem (market, client, technology, perceived constraints); *Observe* users in real life situations to develop empathy for the users; *Define* insights (create a point of view for redefining the problem); *Ideate and prototype* multiple alternatives in short iterations; *Test* by gaining feedback, then modify and reiterate solutions, and, if necessary, also the problem formulation (Kelley, 2001; Brown, 2009; IDEO, 2009; Stanford d.school, 2009). Some best practices are held forward, such as collaboration in multidisciplinary teams and having a dedicated space for creativity and visualization (Brown, 2009; IDEO, 2009; Stanford d.school, 2013). The first two phases are also often merged into "define", and the process is also described as a series of diverging and converging phases (IDEO & Riverdale, 2012; Design Council, 2005) (see figure 1).

Figure 1: The divergent and convergent nature of a design thinking process. Artwork by Ingo Rauth, building on Stanford d.school (2013) and IDEO & Riverdale (2012).



Scholarly perspectives on design thinking

Some scholars studying the use of DT in practice build their frameworks on these practitioner-based descriptions, such as Seidel & Fixson (2013) who conceptualized DT as three main methods: need finding, brainstorming and prototyping, and Efeoglu et al. (2013) who conceptualized DT as consisting of a 'problem space' and a 'solution space', each of which allows for divergent and

convergent thought processes. The divergent and convergent nature of the creative process have been discussed earlier (Lubart, 2001; Tschimmel (2010), starting with Wallas early work on mathematical creativity as a four-stage process, in turn inspired by French mathematician Henri Poincaré (1908, in Tschimmel, 2010). In order to explore DT as a concept empirically, in our earlier work we have performed research on how individuals in 15 large firms claiming to use DT perceive their use of the concept, leading to knowledge about varieties of use across firms (Carlgren et al., 2014a). Since we observed a great diversity in terms of how DT is understood - as a culture, as a set of mindsets, as principles guiding innovation work, as a process, as a bundle of methods, and as a mix thereof – we have argued that current process descriptions of DT are too simplistic to explain what goes on in practice under the name of DT in organizations (Carlgren et al., 2016). We have therefore argued that by shifting from a process view, DT can be seen as a management concept that is enacted in different ways within organizations when used by individuals and teams. Based on an empirically grounded analysis of the use of DT in organizations with more extensive experience, we proposed a framework for describing DT (Carlgren et al., 2016a) consisting of a number of *principles/mindsets, practices and techniques* that are embodied and enacted differently in local settings – sometimes manifested as a process, sometimes not. In the practitioners' descriptions, a number of core themes characterizing DT were also identified: *user focus, problem framing, visualization, experimentation* and *diversity*[2] *(see Table 1)*.

Table 1: Characteristics of DT according to the framework proposed by Carlgren et al., 2016, with some of the main principles/mindsets, practices and techniques.

Themes	**Principles/mindsets**	**Practices**	**Techniques**
User focus	Empathic, curious, social, non judgmental	Contextual user research to understand latent needs, user testing, user co-creation	Ethnography, journey mapping, empathy maps, informal meetings
Problem framing	Open to the unexpected, embrace ambiguity	Challenge and reframe the initial problem, synthesis of user insights	How might we, job to be done, five why
Visualization	Thinking through doing	Make ideas and insights tangible, create experiences, make rough representations	Physical mockups, sketches, storyboards, role play, ugly code
Experimentation	Learning-oriented Playful & optimistic Embrace failure	Iterate, diverge & converge Test solutions quickly to learn	Brainstorming techniques, creation of physical space for experimentation
Diversity	Open to differences Democratic, holistic perspective	Diverse teams External collaboration Seek broad inspiration	Personality tests, conscious recruitment, "360 degree research"

[2] Similarities with proponents' descriptions of DT are discussed in Carlgren et al (2016).

Perspectives from design research

A typical critique is that the managerial discourse on DT is disconnected from previous research on design and the practice of designers (Kimbell, 2011; Tonkinwise, 2011; Johansson- Sköldberg et al., 2013; Jahnke, 2013). In tracing the roots of DT as a management concept, Rauth (2015) found it influenced not by theory, but by the practices at Stanford University (at the Joint Program of Design at the department of Mechanical Engineering)[3], Apple, as well as the entrepreneurial culture in Silicon Valley during the late seventies. Still, since DT is often held forward as an approach that is inspired by "how designers think and work" (e.g. Brown, 2008, 2009), what could better explain issues around DT than research on how designers think and work?

Understanding the practice of professional designers has been part of the academic discourse on architecture and design for more than 30 years. Researchers have studied for example the design process (Simon, 1969; Cross, 1990) how designers think (Lawson, 2006; Schön, 1983), know (Cross, 1990), address problems (Buchanan, 1992) create meaning (Jahnke, 2013) and how design thinking can be seen as a form of aesthetic inquiry (Rylander, 2009). A few aspects from design research will be brought up here that are of particular relevance in relation to the findings of the paper: problem framing and visualization. They show direct similarities with how DT is presented and perceived by individuals in organizations using it, and are also aspects that seem to set DT apart from other popular management concepts (Carlgren, 2013; Liedtka, 2014).

Contesting Simon's (1969) analytical doctrine, Rittel & Webber (1973) suggested that design problems are often "wicked": open-ended and ambiguous, the opposite to "tame" problems which are clearly defined with well-defined goals and abiding to well-known rules (Coyne, 2005). Being wicked or 'ill-structured' (Simon, 1973)[4], it has been argued that this kind of problems can not be solved using analytical methods (Buchanan, 1992). As a result, the design process has been described as a "co-evolution of solution and problem space (Cross, 2011), and in descriptions of how designers relate to problems, focus is on problem setting rather than problem solving. Schön (1983) refers to the ability to continuously frame and reframe a problem or situation in different ways. According to Lawson (2006), designers question problems and try to get to the core of what is taken for granted and has been institutionalized, leading to wider problem definition and a larger solution space. Questioning and reframing rather than solving problems is, as shown above, a central element in DT (Johansson-Sköldberg et al., 2013; Carlgen et al., 2016), but there are few accounts of how this is to be done in practice. On the one hand, DT as a whole can be described as an approach for dealing with wicked problems, with its multiple iterations and experimentation (Eagen et al. , 2010). On the other hand, the practice of reframing problems becomes more explicit in specific phases, such as the complex and critical step where individuals explore and make sense of knowledge from user research or user testing. (often referred to as 'synthesis' or 'define'). Some tools are suggested for data analysis (see table 1), and using the walls of a project room, or a "creative space" is held forward as a way of making sense of large amounts of data (Carlgren et al., 2016).

[3] According to one of the founders of the Joint Program in Design, their visual problem solving and express testing process, was partly inspired by Newell and Simon's (1972) work on human artificial intelligence (McKim 1980, in Rauth, 2015).

[4] Simon (1973) later acknowledged that some problems are 'ill-structured', and Coyne (2005) stated that wicked or ill-structured problems are rather the norm, and tame problems the exception.

In design research, sketching and visualizing are described as key to developing an idea (Schön, 1983), making an idea tangible (e.g. Cross, 1990; Lawson, 2006; Cross, 2009), and communicating with other disciplines during an evolving design project. Stigliani and Ravasi (2012) note that product designers rely on a variety of material practices as they engage in future-oriented group processes such as strategy work and NPD. In a longitudinal intervention study of designers collaborating with 'non-designerly' firms, Jahnke (2013) found that aesthetic deliberation, the "hands-on meaning making", enhanced the dynamics in group work and helped groups frame new meanings and expand their horizons. In the DT discourse, Brown (2009) refers to prototyping as "building to think", and according to Liedtka and Ogilvie (2011:49), "visualization is the mother of all design tools" – not just for visualizing concepts, but for making any idea tangible. Common methods for visualization or prototyping held forward in relation to DT include techniques such as sketching, building scrap models, acting, role-play, storyboarding, storytelling, personas, metaphors and analogies (Stanford d.school, 2013; Liedtka and Ogilvie, 2011, Carlgren et al., 2016). Proponents of DT put emphasis on the quick and rough aspects of prototyping in quick iterations, something which, according to Rauth (2015) originates in the visual solving process at Stanford as well as in IDEO's collaborations with Apple in the early 80s.

One point of criticism points refers to the aesthetic component, for example Tonkinwise (2011), who argues that in the current DT rhetoric there is a "repression of style" which limits the concept, and Jahnke (2013) who points to the lack of focus on aesthetic values, something which designers are argued to be especially good at. This seems linked to a debate on what role DT comes to play – if it is to represent "design", or if its role in a firm is something completely different. At the bottom of this critique lies also a view that the managerial discourse of DT describes these aspects in a shallow way, suggesting that 'everyone can become a design thinker', (e.g. Brown, 2008) which is reflected in the often short executive workshops and trainings given to teach the concept.

A central aspect held forward by DT proponents is that it steps away from the active role of the designer, as it is suggested that firms can learn to apply a design approach to any innovation challenge on their own (Martin, 2009; Brown and Katz, 2011). This has been criticized by some design researchers who argue that DT reduces design to a toolbox of methods to pick and chose from, neglecting the embodied experience of the designer, and therefore risks damaging the understanding of how design may contribute to innovation (Jahnke, 2013; Johansson-Sköldberg et al., 2013; Kimbell, 2011). Although describing somewhat similar practices (e.g. prototyping) the DT rhetoric does neither mention the experience required for these activities, nor that some parts may be very difficult to master.

The promise of DT in innovation

DT is often promoted as a generic approach to problem solving that could be used in any situation that any type of organization or community might face, such as business strategy (Holloway, 2009), organizational renewal (Sato et al., 2010) or even "all areas of life" (Stanford d.School, 2013). Despite being marketed as a superior approach to innovation, it is less clear what the promise of DT is other than "increased innovativeness", "breakthrough ideas" (Brown 2008; 2009) or a "better balance between creative and rational thinking" (Martin, 2009). Some scholars argued that DT as a concept is in fact unlikely to yield radical concepts, criticizing the practice of involving users to obtain

feedback to support idea and concept selection as it may move solutions in the direction of current user needs, thus leading to incremental innovations only (Verganti, 2008*)*.

When DT is described in relation to NPD or innovation work, it is often linked to concept creation in the front end of innovation (e.g. Martin, 2009; Stanford.dSchool, 2013). According to the Stanford d.School (2013) *"Design thinking can be used for diverse work, but it is most easily adopted for the discovery phase of a project: when you are still seeking the meaningful problem to work on, or the right solution to pursue"*. Accordingly, innovation scholars studying the use of design methods or DT in an innovation context typically focus on the front end (e.g. Seidel and Fixson, 2013; Bessant and Maher, 2009). Some process descriptions of DT include 'implementation' or 'delivery' as a final stage resulting in an 'action plan' (e.g. Kelley, 2001; Brown, 2009; IDEO, 2009) or a learning launch (Liedtka and Ogilvie, 2011) signaling its use also in later stages of innovation work. It is however unclear what is implied by such an action plan or learning launch. In a study of 15 companies having integrated DT into their operations, Carlgren and colleagues (2014a) found that while many firms perceived DT as an overall problem solving approach, a common understanding of DT was also as an approach to use in the front end of NPD and innovation; especially in initial stages of implementation.

Since many companies already today have difficulties organizing for innovation (Govindarajan and Trimble, 2010), they may see DT as a shortcut to innovation and oversee other aspects that may be crucial to be able to make an innovative idea finally reach the market. In a study of perceived challenges with using DT in large firms, Carlgren et al (2016b, forthcoming), identified seven clusters of problems: misfit with existing processes and structures, resulting ideas and concepts are difficult to implement, value of DT is difficult to prove, DT principles/mindsets clash with organizational culture, existing power dynamics are threatened, skills are hard to acquire and communication style is different. They argue that several of these issues can also be found in the mainstream literature on barriers to innovation, although some seem unique to DT. Further, Rauth et al (2014) argue that any organization wishing to incorporate DT in their operations face challenges related to legitimizing the concept, and it is argued that this might be linked to it bringing in elements of subjectivity which makes the value of DT difficult to quantify.

Discovery – Incubation - Acceleration

According to O'Connor and Ayers (2005) many organizations think of innovation only as discovery-related activities and processes, aiming at coming up with innovative ideas; for example, through the use of new ideation methods, idea jams, involving users in ideation or web-based crowd-sourcing (ibid). In order to address this problem, they put forward the Discovery, Incubation and Acceleration (DIA) framework as a more complete description of innovation work; taking into account other aspects necessary for realizing an innovation and the appropriate competencies needed. With this framework O'Connor and Ayers (2005) propose a set of necessary competences needed for a company to be innovative: discovery, incubation, and acceleration. They argue that by describing them as competencies rather than process steps, their framework takes into account that DIA does not have to be a linear chain of events. The activities and skills linked to each competency are described in table 2 and will be used for analysis of the empirical findings.

Table 2: Discovery, Incubation and Acceleration competencies (DIA), adapted from O'Connor and Ayers, 2005 and O'Connor and deMartino, 2006.

Competency	Description
Discovery	*Identification of opportunities - exploration.* Activities that create, recognize, elaborate and articulate innovation opportunities. Skills needed: exploratory, conceptualization, open innovation, external hunting for ideas.
Incubation	*Turning mature opportunities into proposals - experimentation* Activities that mature radical opportunities into business proposals. Reducing market and technical uncertainty through experimentation and learning. Experiments from both a technology and market point of view. Testing many proposals (letting many fail), and testing a working prototype in the market. Skills needed: experimentation, competency to coach projects through the phase.
Acceleration	*Ramping up the fledgling business - exploitation* Activities that build a business to a level of some predictability. Grow projects until they can compete with ongoing businesses in terms of resources and attention. Invest to build business and necessary infrastructure. Respond to market leads and opportunities. Institute repeatable processes for e.g. manufacturing, order delivery, customer contact and support. Turning early customer leads into a set of qualified first customers, make predictable sales forecasts. Skills needed: those required for managing high-growth businesses.

Method

Research design and case company description

This paper builds on exploratory, qualitative case study research studying the single case of Kaiser Permanente (Kaiser). It is argued that case study research is suitable for exploring a field, and when context is important (Leonard-Barton, 1990; Voss et al., 2002). The use of a single case can be seen as a strength due to the possibility of gaining in-depth information about the phenomenon in context, and the opportunity to study several contexts within the case (Voss et al., 2002). Kaiser was found a suitable candidate since it has long experience of using DT (ten years), and has integrated DT in structured innovation work. Since the company has been held forward anecdotally as a success case in the business press (McCreary, 2010) and in books (Brown, 2009; Kelley, 2001; Liedtka and Ogilvie, 2011), gaining an in-depth understanding of such a case was also a motive for case selection. The company is a California-based, non-profit healthcare organization providing care to approximately nine million members. Focus in the study is on the Innovation Consultancy (IC) that was the first internal group to explicitly work with innovation at Kaiser.

Data collection and analysis

Data was collected using a mixed approach of interviews, observations and internal documentation . During a period of two weeks in August 2012, the author spent eight days, seven to ten hours per day with the IC, attending project meetings at their Oakland headquarter and observing their fieldwork at a hospital unit in Sacramento. Observations were made in the back-end of two innovation projects, as well as in two meetings where the IC facilitated the work of another team. Video-recorded material

made by the IC of ideation and prototyping sessions gave additional insights about the front end of projects. Aside informal and impromptu conversations, formal interviews were conducted with well-informed individuals (Åhlström and Karlsson, 2009): all members of the IC, their manager, frontline staff who had participated in innovation projects and an executive manager not linked to the IC in order to gain an outsider perspective. One of the early members of the IC was designated as a contact person, and he came to act as a key informant (Voss et al., 2002), as he would often comment upon events that took place during fieldwork in the hospital unit, adding explanations or providing background information. In total 18 semi-structured interviews (30-90 minutes; all together 16 hours recorded), and a number of open interviews of varying length (all together 10 hours recorded and 8 hours non-recorded) were held. The open interviews typically touched upon one or a few topics of interest, and often building on insights gathered during previous interviews and observations.

Immediately after each point of data collection, the author wrote a summary of 'facts' and 'reflections' in a field diary, as suggested by Eisenhardt (1989). These notes were expanded every night narrating what happened in detail while memories were still fresh (Emerson et al., 1995). Every night reflections were also made in relation to the entire data collection thus far, guiding and adjusting the topics for data collection the next day (Eisenhardt, 1989). In total, this produced 189 double-spaced pages of field notes. The recorded interviews were listened to and critical parts were transcribed, yielding together 401 double-spaced pages. In addition, observation notes yielded 129 double-spaced pages.

Directly after the study, a detailed narrative was written delineating the story of DT at Kaiser to create a rich picture (Voss et al., 2002; Åhlström and Karlsson, 2009). In a second level of analysis, parts that were relevant for describing the use of DT in innovation work were moved to an analysis document, adding information from interview transcripts and observation notes. In order to identify where DT was used, texts and statements related to the use of design methods and a design process were identified both on an overall process-level, as well as on a working level. Inclusion criteria were linked to the model proposed by Carlgren et al., 2016a) as well as interviewee reflections of how and when they were using design methods or DT. In a third step, the results were mapped against the DIA framework (O'Connor and Ayers, 2005), leaning on the overall descriptions of each step explained by the authors (ibid). The use of their framework as a tool for analysis was found suitable due to its systemic view on innovation work that goes beyond discovery-related activities.

The case described in this paper belongs to a health care context and is linked to service and process innovation; as such, we do not know whether the analysis can be transferable to for example a product setting. The IC themselves explicitly state that they do not focus on any specific type of innovation. Instead they focus on the complexity of the problem, and building on the understanding they gain, the final innovation may be for example technical, service or process. The facilitation example (2) was however linked to a technology development project.

Research quality

A limitation of a single case study is the risk of misjudging singular events or exaggerating easily accessible data (Leonard-Barton, 1990). In order to limit this risk, and to add depth, data was triangulated when possible and multiple informed respondents were interviewed (Voss et al., 2002). Further, the scope of the data collection was decided in discussions with Kaiser in order not to

compromise the work of the IC. An extended data collection could have further strengthened the results, or produced data pointing in a different direction. However, despite attempts to find opposite views and contradictions (Eisenhardt, 1989), comparing data from different interviewees and between interviews and informal discussions yielded quite aligned results. To increase the trustworthiness of the study (Guba and Lincoln, 1994), each step of the research was carefully documented and feedback was solicited from the company. One important issue is the inclusion criteria when coding the use of DT, and whether to base it on the practitioners' local definition of DT in the empirical setting, or whether it should be based on the literature. The approach in this paper is the latter, which has implications for the analysis – if DT were to be defined by Kaiser employees, it is likely that example 2 would not have been included here.

Empirical description

After an introduction of how DT was integrated and adapted to the Kaiser context, this chapter will present two examples of the use of DT at Kaiser. The first example is on a macro-level and gives an overview of their structured innovation process. The second example is on a micro-level and is an account of the detailed use of DT in facilitation of another innovation function's technical innovation work during two meetings. These examples will be followed by a section on challenges encountered in starting to use DT in innovation.

Integration and adaptation of Design Thinking at Kaiser Permanente

In 2003 Kaiser first came in contact with the design agency IDEO and decided to investigate whether their playful and user-centered approach to innovation would fit Kaiser. A small group, the Innovation Consultancy (IC), was formed with three non-designer Kaiser employees and one union representative. This group worked full time with IDEO to learn and transfer the skillset to Kaiser through a series of projects carried out in collaboration.

Early on a strategic choice was made not to spread the use of DT throughout the organization, but instead let the small IDEO-trained group form an innovation team that would become specialist in the methodology and build an innovation process that would suit Kaiser's needs. The early IDEO approach was at the time essentially product-focused, and at Kaiser it was adapted to the healthcare context through iterations, and blended with influences and methods from for example service design and behavior design. They soon discovered a need to adapt the methods and language to a prevailing number-driven culture, as the solutions of their innovation efforts ultimately had to appeal to health care professionals accustomed to evidence-based facts. By the end of 2005, three members of the original team had studied improvement science at the Institute for Health Care Improvement (IHI) in order to get a thorough understanding of how to test and measure ideas. They learnt how to plan and perform tests, how to collect feedback and evaluate data in PDSA (plan-do-study-act) cycles. By incorporating this new knowledge, an innovation process that merged the IDEO approach with IHI's improvement science methods was created, resulting in what they today call Human Centered Design (HCD), a "human-centered, design-oriented evidence-based practice" to use in large-scale innovation projects.

Interviewees described how design occupies a central position in innovation work at Kaiser today: first and foremost through a human-centered perspective. All innovation efforts are driven by the

needs of patients and front line care providers, and the interviewees often talked about empathy as an important tenet: understanding users deeply to design for their real need and with maximum consideration for everyone involved. The approach was described as collaborative and integrative, involving a large number of stakeholders, and including multiple points of view. Several interviewees pointed at how these aspects contributed to creating a strong engagement in the organization. The IC is now institutionalized as the main innovation function responsible for innovation in care delivery at Kaiser[5]. There are also some accounts of how the use of design methods have started to spread on a grass-root level, and how newly formed innovation groups are also trying these practices.

Example 1: A structured human-centered innovation process

The interviews revealed that the main use of DT is in large-scale innovation projects targeting complex problems related to care delivery on a corporate level. At the outset it is often not determined what type of innovation the project will yield, but the outcome is typically a combination of new processes, tools and behaviors. In these projects that typically last for half a year or longer, they use a highly structured process for innovation that takes a project through different phases; from the very front end to the back, resulting in an innovation that should be ready to implement across the organization. The innovation projects are staffed and led by 3-4 member of the IC but in some phases involve a large number of frontline staff (nurses, doctors) and other stakeholders who are educated in and using the methods of the IC. Depending on the challenge, projects often span several areas, such as IT, administration and patient care services. The interviewees stated that the process generally includes the following phases that can be iterated:

- *Understand and gaining empathy* - user research performed by the IC and project participants from frontline staff.
- *Making meaning* - synthesis performed within the IC team in order to seek patterns and articulate initial problem formulations.
- *Ideation and prototyping* - ideation, prototyping in iterations in a focused 'Deep Dive' session with the IC team and a large number of frontline staff and other stakeholders.
- *Selection and field-testing* – selection and testing of the most promising ideas which are first tested on a small scale, then piloted and carefully measured in medical units in an iterative process. Tests carried out by frontline staff and monitored by the IC.
- *Scaling up* - testing in a wider range of units in order to get sustainability across the system. Tests carried out by frontline staff and monitored by the IC.

Understand and make meaning

In the first step that typically last 2-3 months, extensive ethnographic and participatory research is carried out by the IC and some frontline staff participating in the project. The methods used include

[5] Other innovation functions have been established as well, targeting IT/technology innovation (the Innovation and Advanced Technology Group, IAT), and innovation in facility management (the National Facility Services, NFS). Until recently, these groups have not had an outspoken design approach.

ethnography and video-ethnography, interviews, journey-mapping, analogies (studying similar problems but in different contexts), digital journaling where people can submit videos and texts, letting patients wear cameras to document their experiences through a day, and letting users draw their experiences[6]. Interviewees found that conversations facilitated by the use of visual tools typically gave rise to deeper insights than direct questions. The second step of 'making meaning' is a synthesis performed within the IC team in order to understand the collected data and uncover underlying needs, seek patterns and articulate initial problem formulations. During this phase members of the IC would cover the walls of a big room with transcripts, photos, drawings, post-its and "live in it" in trying to uncover the crucial stories for better framing the problem. This phase could take up until one month.

Ideation and prototyping

Interviewees described the "Deep Dive" as a central part of the process: a two to three daylong session where participants engage collectively in brainstorming and prototyping. This phase often involves as much as 50-70 participants to obtain diversity and to create ownership for the solutions. The event typically starts with storytelling and sharing observations to frame the challenge, and then onto analogous observations in different environments (e.g. supermarkets, motorcycle producers, wedding planners) in order to push the participants as far out of their frames of reference as possible. This is followed by brainstorming in small mixed teams, and the creation of rough prototypes of the most popular ideas.

Prototyping was described as central and often done through skits (acting and role-playing and sometimes filming a scenario) as a way of prototyping an insight or a service. Physical artifacts could be made of paper, foam, glue, or whatever objects found useful. The prototypes are shared between the teams, then iterated again, combining and building on the ideas of each other. These design sessions may take place in a hospital or clinic/hotel conference room, but are often held in the Sidney Garfield Center, a large design center built a couple of years after DT was introduced, containing a prototyping space and mock environments of a hospital, clinic and patient home. Here new concepts, workflows, roles and technology are modeled and tested before being tried in real settings.

According to the IC members, the deep dive typically provides the innovation team with hundreds of ideas, ranging from incremental to very radical. From the experience of several interviewees, often the most eccentric ideas that would be impossible to implement give rise to important insights that could be used in less spectacular ways. They pointed out that the collective ideation during the Deep Dive helps with the change management process, as participants are primarily users and more prone to accept the final solutions if they have had a hand in creating them. After the event, the IC members start to distill ideas, picking out a sub-set to test in real life settings.

Field-testing – merging design with improvement science

After two to three weeks of building stories and selecting ideas, the IC team members go back into the field with a few rough ideas that are tested iteratively with nurses or other clinicians and patients to get some basic feedback. If an idea still holds they will continue field-testing with more users to

[6] For further details, the observation phase of a project is thoroughly described by McCreary (2010) and by members of the IC in Lin et al. (2010).

see what works and not. One of the original team members described that this was as far as the original IDEO process (taught as of 2003) would go. In IDEO's phase of 'field-testing', ideas would be prototyped and iterated mainly using quick qualitative feedback from users. At this point at Kaiser, the project would instead *"move into the world of improvement through using the PDSA (plan, do, study, act) model"*. In this phase, observations are mainly done by staff at the chosen unit, different metrics are recorded, and feedback is collected from everyone involved; physicians, nurses, facility workers. Based on the feedback and measures, prototypes will be abandoned, adopted or adapted in an iterative process. One interviewee described how DT and PDSA are essentially overlapping (iterations of brainstorming, prototyping, testing, evaluating with users), but they found that improvement methods add more rigor to their projects, especially in terms of how measurements are set up and monitored. Some of the design methods used came from their initial collaboration with IDEO and the IHI, while others have been introduced by newly hired designers in the team; for example the use of storyboards for getting user feedback.

In total, the phase of field-testing usually takes about 6 months, and for all measures they start measuring a few months before testing in order to get baseline facts. Based on actual data, a final iteration of the idea is tested in a second "spread" unit to evaluate if a different setting will yield similar results. If the results are mirrored, an implementation package is created, as well as a spread plan for implementing the new process or way of working across all units of the hospital. Several IC interviewees pointed at the importance of creating compelling implementation packages. Here storytelling was used to convey the message in a way that creates recognition and an awareness of the need for change.

Example 2: Use of DT in facilitating technical innovation work

With a growing awareness about the work of the IC in the organization, interviewees from the IC gave evidence of an increasing amount of requests for using their human-centered approach to facilitate other projects; both within the other innovation groups and in the organization as a whole. While the previous example looked at the overall innovation process used by the IC, focus in this second example is on the role of the IC in facilitating technical innovation, as well as the detailed use of design methods on a working level.

In this case the IC was asked to plan and host a workshop for frontline staff in an innovation project at the Innovation and Advanced Technology group (IAT). The project in question was an example of "technology push", an on-going technology innovation project investigating the possibilities of innovating around a technology previously used outside of health care. According to the interviewees, several areas of use related to care delivery and nursing operations had been foreseen, and it was hoped that the technology would in turn lead to a better use of available resources, increased work safety, patient safety and process efficiency. However, the technology innovation work was still in its infancy, but in order to develop concepts and build the necessary infrastructure the IAT was dependent on user feedback, something that they anticipated might be hindered by a lack of knowledge about the new technology. Yet the IAT feared that merely presenting the technology to front line staff and ask for input would not evoke interest and yield the necessary feedback. The IC was contracted to design and facilitate two workshop sessions for selected frontline staff (mainly nurses), aiming at creating an understanding of the usefulness of the technique and the problems it might solve; as such it would open up for taking the innovation project in new directions. The IC's

idea was to appeal to their emotions through telling stories, and letting them experience the technology through role-play. Inviting the users to interact and come up with ideas would create ownership and provide the project team with the initial feedback needed.

Apart from accounts of the planned workshop where elements of DT were to be used, observations of two meetings where members of the IC met with the project group in order to plan the workshop, also revealed an "implicit" or embodied use of DT, as a natural way of interacting with their client, the IAT.

Prior to the planning meetings the IC members had done ample preparations in order to get the most out of the meeting with their contractors (the IAT project team), and to understand the needs of the workshop participants as well as the frontline staff who were to participate in the sessions. They had done some basic user research, and identified and prepared analogous examples. In synthesizing the data, journey-mapping was used to map the typical day of a nurse, focusing on his/her tasks in detail and the problems he/she might run into. Based on these insights a persona, "nurse Tiffany", was created, and "how-might-we questions" were used to come up with ideas for how the new technology could help her. They had also prototyped insights from ethnography by videotaping skits where the IC members enacted different scenarios. In addition, they created small cards that illustrated the day of nurse Tiffany in nine steps to be used for explaining the as-is, and future possible benefits of the technology. The idea was to use this type of cards during the workshop in order to allow participants to experience "what was cool and what was weird" about the new technology, and in a setting that was known to them; thereby creating a sense of identification.

During the first planning meeting the IC presented their insights to the project team through the films and set of cards, and the project leader (a nurse herself) was thrilled: *"you have totally captured how the new technique might help her get through her duties in a more efficient and safe way […] I have nothing to add".* Since asking questions did not yield any more detailed feedback from the clients, the IC members engaged the meeting participants in a spontaneous prototyping and brainstorming exercise in order to push them further. They started by attaching the cards on a white board, picking one of them and asking specific questions around the situation depicted on the card. This resulted in a lively discussion and yielded some additional information that led to altering the prototypes by adding post-its with texts and images to the cards or gluing the cards together. They then invited the participants to role-play one of the situations as a nurse and a patient; experiencing how Tiffany would waste time waiting for medications without being able to do other duties in the meantime, and how this would change once the technology solution was in place. This lead to a new level of engagement: *"yes this is how it happens", "no, you have forgotten this"*, and *"oh, this also made me think of…*" resulting in further modifications of the cards.

This way of prototyping and iterating something intangible – a process or a service – through skits, cards and role-play raised the activity in the meeting and lead to a constructive dialogue. The meeting was energetic with laughter and hand clapping, and the participant responsible for technical development stated that already at this stage he had gotten more input to his work than he could have dreamt of. When acting through the schedule of the planned session it was discovered that the IAT actually did not have to develop any IT solutions before the session, something that was initially planned for. He was thrilled since conveying the main ideas through the interactive exercises, while still being able to collect user feedback, would reduce development costs and time at this stage.

Perceived challenges

A few things that proved difficult at Kaiser Permanente deserves mentioning. One challenge was to gain acceptance of the approach and securing further funding; this was achieved by carefully balancing the nature of the challenge to the competencies of the team; with time and experience gained the team took on increasingly complex challenges. As mentioned above, the IC also found it necessary to adapt the method and the internal rhetoric to the evidence-driven culture in which they were immersed, and they did so by incorporating elements of improvement science. Although reducing friction substantially, there were still some views that the improvement practices embraced by the IC were not solid enough: early cycles were perceived as too "rough" and lacking in rigor, and the complexity of the resulting solutions did not fit the practice of continuous reduction of variation since they often contained too many (human) parameters. While reduction of parameters was key to improvement science, the complexity in both solution and problem was embraced by the IC.

There was also a paradox in the often "soft" nature of the concepts that resulted from user research and reframing the problem with the user in mind. Costly technical innovations that were pushed on frontline staff were mandatory to use, even though they were disliked. The often behavioral or process innovations resulting from DT work could not be forced on staff, and even though there were substantial proven benefits, change was slow; something that risked decreasing the perceived value of DT as an approach to innovation.

Another problem was in building the skills necessary for performing DT work. Interpreting insights and articulating problem statements was described as one of the most difficult parts to execute; and one where the skills needed takes a long time to build. It was described as the part that IDEO had the most difficulties to explain and were even reluctant to teach, since they could not point to any concrete tools. The team protested and wanted to learn the approach, something even if it was perceived as a chaotic process. Although today they are using some tools, they refer to intuition and experience when it comes to getting to the core of the problem and reframing it. Just as the synthesis step was found difficult, so was going through the insights, ideas and lessons learned from the Deep Dive. Some aspects of visualization are considered difficult to learn on a detailed level. On the other hand, in the cycles of rough prototyping, employees outside of the innovation team who were involved in the process gladly engaged in these visual practices with the attitude that there is no right and wrong. The IC members observed in example 2 were non-designers who had participated in the IC from the start about ten years earlier, and they referred to themselves as designers rather than nurses. The team later added a small number of new team members, the majority of whom are professional designers. One interviewee held forward that the reason for hiring designers was that they can use the methods "naturally", and that using DT takes a lot of time to master.

Analysis of findings

The two examples given in the chapter above show the use of DT in activities linked to innovation at Kaiser. O'Connor and Ayers (2005) suggest that an organization needs three distinct innovation competencies, each consisting of a set of activities and skills: discovery, incubation and acceleration (DIA). Since the DIA framework covers innovation from the front end to the back, the use of DIA as

an analytical tool will clarify the role of DT in innovation at Kaiser. The analysis will be made in two steps, comparing DIA activities and ways of using DT in Kaiser as described in the two examples described above. Table 3 compares the use of DT in various steps of large innovation projects (example 1) to the different activities linked to discovery, incubation and acceleration. The first row gives a summary of the DIA framework, while the second row describes the use of DT. As described in example 1, the interviewees stated that in the front end of innovation projects, DT is used explicitly as a formalized part of the innovation process, with a large number of design-related methods such as ethnographic research, deep dives and prototyping exercises. In the back-end of projects ('field-testing' and 'scaling up'), the dominant way of working is linked to improvement science (learnt from the IHI), although coupled with design methods. However, observations of IC work in this phase revealed that several design methods were used in what seemed to be a naturalized part of every-day work. As an example, tools such as personas and storyboards were used as visual aids for communication in user feedback sessions, and also as a way of prototyping new insights gained from these settings. Several interviewees also described how the DT and IHI approaches were overlapping; both focusing on testing, measuring, learning and involving users in repeated cycles; IHI however being more rigorous in terms of planning, collecting and analyzing data.

Table 3: Discovery, incubation and acceleration activities adapted from O'Connor and Ayers (2005) compared to the use of DT in large innovation projects at Kaiser (example 1).

	Discovery	**Incubation**	**Acceleration**
DIA	***Exploration:*** • Create, recognize, elaborate, articulate RI opportunities	***Experimentation*** • Maturing into a business proposal • Experimenting, • Testing a working prototype on the market • A large number of projects reduced to a few	***Exploitation*** • Preparing for growth • Build business and necessary infrastructure • Institutionalize repeatable processes for manufacture, order delivery, customer contacts.
Kaiser	***Understand, making meaning*** • Involving frontline staff early – priming staff for incubation, acceleration and implementation • User research, ethnography and creative tools, analogies • Making meaning – synthesis of insights, search for patterns • Problem reframing, articulation of initial idea	***Ideation and Prototyping*** • Deep dive; analogies, prototyping, idea generation and rapid testing of ideas in several iterations, done within a large cross-functional group • Synthesis – idea selection (reducing a large number of ideas) in a collaborative effort • Output: Numerous ideas reduced to a concept to test in a pilot unit ***Selection and Field-testing:*** • Pilot testing selected ideas in a first unit. Rapid iterations with users • Use of tools such as storyboards, personas, role-play • Measuring to evaluate the concept - Tweaking, abandoning, rethinking solutions iteratively	***Scaling-up*** • Replication – further testing in other units to see if the solution holds in more settings. • Finalizing process descriptions, designing change packages by creating aesthetically compelling material and engaging stories

Table 4 refers to the use of design methods in facilitation of IAT's technical innovation work as described in example 2. Here, IC members used design methods in what seemed to be a natural way for them to facilitate and support other groups. Again, for clarity the first row represents a summary of the DIA framework for comparison. The reason for the IAT to involve the IC was twofold: to help them get otherwise unavailable user feedback for further technology development, and to prepare future users to the new technology. The former could be seen as an incubation activity as it would facilitate experimenting and testing prototypes with users. The latter could be seen as an acceleration activity, as a way of preparing the market; building necessary knowledge among frontline staff who were later going to adopt the final solution. Mastering and using design methods could thus be seen as both incubation and acceleration competencies – in this case contributing with the different competencies simultaneously. Compared to the larger innovation projects that span over a year, the use of DT in this example could be seen as limited due to this seemingly small task. However, even using design methods such as storytelling, prototyping and role-play in a planning meeting had large implications in terms of what technology needed to be developed before user feedback iterations could be started. One of the IAT meeting participants described how he had initially planned to develop software prior to the workshop, and now it was no longer necessary as they could get feedback without having to show a technical solution.

Table 4: Discovery, incubation and acceleration competencies adapted from O'Connor and Ayers (2005), compared to the use of DT in example 2.

	Discovery	**Incubation**	**Acceleration**
DIA	*Exploration:* • Create, recognize, elaborate, articulate RI opportunities	*Experimentation:* • Maturing into a business proposal • Experimenting, • Testing a working prototype on the market • A large number of projects reduced to a few.	*Exploitation* • Preparing for growth • Build business and necessary infrastructure • Institutionalize repeatable processes for manufacture, order delivery, customer contacts.
Kaiser	In this project the innovation team were invited after the discovery phase	*Facilitation of user feedback, experimentation and prototype-testing:* • The IC supported IAT's technical innovation by helping them getting user feedback through a workshop based on principles of human-centeredness, empathy and using journey-mapping, prototyping techniques, story-telling, analogies and role-play, users would be familiarized with the new technology and be invited as co-developers. The team facilitated experimentation and prototype testing by making future users interested and willing to give feedback • The team facilitated the planning meetings held in the incubation phase: by using DT, making the meetings more productive, yielding ideas and discussions	*Market preparation:* • Making users ready for the new technology to facilitate adoption; a way of preparing the market or creating a readiness for spread. • Instead of pushing technical information on users, the team was using design methods (as story-telling, role-play and prototyping) and a human-centric approach to create an interactive workshop where users would experience the need for the technology, and potential benefits it may bring.

Discussion of results

The role of DT in innovation

This paper set out to describe and analyze the use of DT in innovation in Kaiser Permanente, in order to understand its potential role in innovation. With their Discovery-Incubation-Acceleration framework, O'Connor and Ayers (2005) took a competence perspective on innovation, stepping away from a process view and a narrow focus on creativity and ideation common among innovation scholars and practitioners. DT has been criticized for leading only to compelling ideas and concepts that have little chance of making it to the market place, but in the case of Kaiser, using DIA as an analytical framework revealed a more holistic use of DT in innovation. The analysis showed that apart from discovery, which is where DT is typically depicted, it could also be seen as an incubation and acceleration competency. Still, in the case of Kaiser Permanente, DT seems to work as a stand-alone process to come up with concepts, but in later stages it is used more as support. It could thus be argued that in an organizational setting, DT lacks the rigor to function as a stand-alone end-to-end innovation process.

Further, the DIA framework is based on O'Connor and Ayers' research on radical innovation in large firms making products with a high technical complexity. It can thus be argued that the discovery, incubation and acceleration competencies will look very different depending on the industry; that developing services in healthcare does not share the complexity involved in e.g. developing a new mode of transportation to replace cars, and DT might be found useful (or not) for very different purposes. The analysis builds on the interpretation of what certain activities mean in relation to DIA competencies. In example 2, while some activities were interpreted as contributing to incubation and acceleration, it could be argued that everything that took place during the observed meetings as well as in the planned workshop might just as well be characterized as discovery-related, since the IAT were still open to totally different concepts than the ones they had already started to develop. It has been argued that DT as a user-centered concept is less suited for technical innovation (tech push). However, from example 2 we see that even though technical innovation often departs from the invention of a radically new technology, DT seems useful in expanding the views on how this technology may crate value. DT can thus act as input to the creative process, even though user understanding is not the point of departure.

Merging logics

Some design researchers argue that by fitting design into a too analytical frame, the innovation power sought for is lost (Johansson-Sköldberg *et al*., 2013; Jahnke, 2013). Still, the results show that at Kaiser Permanente the IC was able to integrate DT in a way that has fundamentally changed how the company works with innovation, yielding several radical innovations that are being implemented across hospitals. This may partly be explained by design and health care being a particularly good match, as suggested by several scholars researching the use of design methods or design collaborations in health care (Pearson et al., 2008; Bessant and Maher, 2009; Duncan and Breslin, 2009). According to Duncan and Breslin (2009: p19), *"both disciplines rely heavily on the power of empathic understanding of the individual; both need keen observational skills to enable that understanding; and both are fundamentally hypothesis-oriented"*.

The process and the methods inherited from IDEO were described by interviewees as being adapted and complemented to fit a health care setting, but as shown in example 1, there is a great resemblance between Kaiser's process and common descriptions of DT; both in terms of overall process structure and methods used (Kelley, 2001; Brown, 2009; Stanford d.Schoool, 2013, Brown and Wyatt, 2009; IDEO, 2009). However, there is a difference in the strong focus on the measurements and field-testing in the back-end of projects, as well as the degree to which users are involved not only in the Deep Dive but throughout the whole process. The case of Kaiser gives an example of how DT practices and improvement science methods were overlapping. According to the team members, this marriage of approaches rendered the use of DT more powerful by providing new ways of testing results and proving value of new concepts.

It should be noted that in later stages of the innovation process (example 1) DT was not found sufficient, and several of the activities carried out in acceleration were competencies acquired from IHI's methods. Rylander (2009) argues that design may be difficult to fit in corporate settings due to a clash of logics, indicating that DT and improvement science would be difficult to merge. The case of Kaiser shows that a merger seems possible, but some questions remain open, such as the perception that innovations involving complexity are difficult to fit in a measurement culture.

DT, wicked problems and visualization

The context of innovation is often characterized by exploring the unknown, and problems are inherently wicked (Rittel & Webber (1973). DT with its convergent/divergent nature and its iterations between a problem space and a solution space (Efeoglu et al., 2013) resembles previous descriptions of the design process (e.g. Cross, 2011). However, at Kaiser it seems that while the IC has practices in place for diverging that seem unproblematic (ethnographic user research, the use of analogies, the deep dive event), the converging phases seem more problematic, with accounts of difficulties in synthesizing and making sense of data.

Design researchers have criticized DT for being mainly about creativity or cognitive aspects; design *thinking,* arguing that the material and visual practices of design are central if design is to contribute to innovation (Tonkinwise, 2012; Stigliani and Ravasi, 2012; Jahnke, 2013), and that the adoption of a specific way of thinking or a different perspective will only produce limited results (Stigliani & Ravasi, 2012). This critique seems linked to the very label, "design *thinking*". In this paper it is shown that at Kaiser Permanente focus is indeed on doing, and visual and material practices are at the core. The results of the study showed the importance of prototyping and visualizing: for example, the use of personas, storyboards, cards and role play as visual aids for communication in user feedback sessions, and as a way of prototyping new insights gained from these settings. This use of visualization methods is similar to what Jahnke (2013) refers to as aesthetic deliberation, and Stigliani and Ravasi (2012) refers to as prospective collaborative sense making. However, while these authors discuss visual and material practices in the front end of innovation, the results of this study have shown that these practices played a role also in the back-end. From example 1 we can see that visual practices were also an aid to dealing with wicked problems, and it offered some a support in the converging phases (visualization on walls to support 'making meaning'). From example 2 we can see that role-play and various visualizations were used to frame and reframe insights together with the client.

Towards a competence perspective on the contribution of DT in innovation

DT has been criticized for reducing design to a toolbox of methods to pick and chose from, neglecting the embodied experience of the designer (Jahnke, 2013; Johansson-Sköldberg et al., 2013; Kimbell, 2011). With the increasing attention given to design in innovation, it has been called into question whether what are described as design methods and characteristics are unique to professional designers, or also shared by other professions (Kimbell, 2011). Kimbell (2012) questions whether design knowledge differs from other kinds of professional knowledge, and whether all designers exhibit it. Cross (2009) also states that "[the] abilities are highly developed in skilled designers, but are also possessed in some degree by everyone. A case is therefore made for design ability as a fundamental form of human intelligence".

Empirical examples such as the case of Kaiser Permanente may nuance this discussion. The design tools and workshop methods taken out of context may be of limited importance since the skills and experience held by individuals and teams are crucial. As can be seen from the examples, especially example 2, it is at times hard to distinguish the contribution of DT from the contribution of the individual or team using it. When for example the IC members were engaged for a facilitation task, they were not only contracted because of the methods they use, but because of their reputation as a team and what they had previously accomplished. As a parallel to the embodied experience of the designer that is held forward, it seems relevant to speak of *the embodied experience of the design thinker*. As suggested by Carlgren (2013) as well as Carlgren et al. (2016) it is impossible to talk about a general contribution of DT to innovation, rather it is the use of DT that might create value; putting a performative perspective at the center (e.g. Feldman and Pentland, 2003), as well as the individuals using it. What has been missing so far in discussions of DT is research on how the approach and related design methods are used in real settings. The contribution of this paper is that it moves from generic accounts of DT to a specific description of its use in a particular context. Taking it one step further, this type of description opens up for a competence perspective on DT; one that is focusing on the knowledge and activities of individuals and teams; not only what methods or processes they may be using.

Implications for research and practice

There are several implications for research. Future studies of DT, or the use of design methods, in innovation should not only focus on the front end, as has typically been the case before; also later stages may be of interest. Further studies are needed in other industrial contexts, such as manufacturing, software and services; for example, financial institutions or public to study how use of DT contributes to innovation also in other settings. Are design methods for example useful in the back-end of product innovation? The fit with a number-driven culture is noteworthy and partially contrasts previous research stating that it is problematic to fit design into an analytical logic prevailing in many organizations. This opens up for more research into different ways of integrating DT in innovation and combining DT with other management concepts typically used in organizations today. It is possible that differences and similarities between concepts may affect integration and implementation of DT. Further, the scope of this paper focused specifically on material practices linked to DT, neglecting the cognitive or cultural aspects often held forward. Several organizations claim to have integrated DT as a culture or a set of principles to guide employees, rather than a process

or set of methods. It would be of interest to compare different approaches of using DT, and also to study the implications it may have for innovation. With a focus on competencies, research is also needed on what enables particular competencies and how the necessary skills can be built within an organization. Therefore, studying the implementation of DT in relation to the previous role of design and designers in an organization are needed. The paper also has implications for practice. As the findings show that DT is used also in later stages of innovation and development work, it has implications for the integration of DT in an organization, opening up for a more holistic use. Contrary to generic descriptions of DT that often imply a mechanistic and straightforward implementation, this paper points at the importance of building the necessary skills for using and mastering DT in each organization's own particular context.

Conclusion

Responding to a call for empirical research on the use of DT in innovation, as well as a lack of holistic view on innovation in DT-related literature, this paper has investigated the use of DT in innovation in a large organization, in order to create a better understanding of its potential contribution to innovation. The paper is based on the case of Kaiser Permanente, and two examples of the use of DT in innovation have been presented and analyzed, one on a macro-scale (large human-centered innovation projects) and one on a micro-scale (workshop setting in supporting technical innovation).

It was found that today DT is being used as a naturalized part of innovation at Kaiser. Using the discovery, incubation and acceleration framework (O'Connor and Ayers, 2005), it was shown that DT is used not only in discovery, but also in incubation and acceleration; in other words from the front end and all the way to the back end. While in the front-end it was found working as a stand-alone process for concept generation, at Kaiser with their evidence-focused culture, in later stages of large innovation projects DT alone was not found sufficient, and the approach needed to be complemented with improvement science methods. DT was however found useful in supporting various aspects of the back-end, in particular the use of visualization methods and the focus on user needs.

Apart from providing a detailed example of the use of DT in innovation in a specific organizational context, three main contributions have been made. First it shows in detail how DT is used to various extent in in innovation, from the front end to the back, thus contradicting a commonly held view of DT as being something that is mostly linked to the front end of innovation, and only leading to compelling concepts (e.g. Stanford dSchool, 2013; Seidel & Fixson, 2013). Second, knowledge about the overlap between DT and improvement science is interesting per se since it has been argued that incorporating design in a managerial setting can be difficult due to a clash between different logics (Rylander, 2009, Edeholt, 2007). Third, the paper puts focus on the individuals and/or teams using DT, and thus opens up for a competence perspective on DT; one where methods and practices are not seen as isolated from context, but also includes skills and experience of the individuals using DT.

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