Challenges of Doing Empathic Design: *Experiences from Industry*

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Empathic design aims to build creative understanding of users' experiences for new product development (NPD). In this paper, we review the literature of empathic design, and we discuss our own experiences with introducing and practicing empathic design in several NPD projects at Philips Research over the past years. Having experimented with empathic design in an industrial context, we experienced success but also encountered eight challenges that relate to discrepancies between the theory of empathic design as described in literature on the one hand, and the application of empathic design in an industrial context on the other. Three cultural and methodological changes are proposed for addressing these challenges in the future. These include changing focus (a) from rational approaches to including empathic approaches, (b) from users as informers to users as partners in NPD practice, and (c) from being informed of user research to being engaged in user research. The first two changes strongly resonate with Sanders' (2006) dimensions of change. The third dimension is new, and highlights an area of empathic design that is largely unaddressed in the literature.

Keywords **–** Empathic Design, Engagement, New Product Development (NPD) Practice.

Relevance to Design Practice **–** Design practitioners may experience several challenges when implementing user-centered design approaches, such as empathic design, in an industrial context. This paper intends to raise awareness of these challenges, and open up discussion of possible cultural and methodological changes needed to overcome these challenges.

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Introduction

Empathic design is part of a relatively new branch of user-centered design approaches that support design teams in building creative understanding of users and their everyday lives (e.g., Fulton Suri, 2003a; Koskinen & Battarbee, 2003; Sanders & Dandavate, 1999). A review of design research literature shows that the founders of empathic design, including leading academics and design consultancies such as IDEO and SonicRim, have successfully explored empathic design in projects for and with clients in the industry (Black, 1998; Sanders, 2001). Much less has been published about how others can successfully introduce and practice empathic design within an industrial organization, and the difficulties they may encounter when trying to do so.

In this paper we share and reflect on our experiences with doing empathic design at Philips Research, a corporate research organization of Royal Philips Electronics. We focus on the challenges that were encountered when introducing and practicing empathic design in this organization, and also propose three cultural and methodological changes that we think are necessary to overcome these challenges. The paper proceeds in three parts. First, we give a brief introduction to empathic design, its four principles, and its position in the industry. Then we explain how empathic design fits within the context of Philips and introduce a project illustrating this about baby care at Philips Research. Finally, we discuss the challenges encountered over the past years, as well as the three changes that we identified that need to be made for the future, with examples from the *Baby Care* project where appropriate.

Principles of Empathic Design

Empathic design is a design research approach that is directed towards building creative understanding of users and their everyday lives for new product development (NPD). Creative understanding is the combination of a rich, cognitive and affective understanding, and the ability to translate this understanding into user-centered products and services (Wright & McCarthy, 2005). It draws on information about the user and his/her everyday life, and it includes inspiration for design and empathy, or 'a feel' for the user (Postma, Lauche, & Stappers, 2009). The empathic design approach is considered most valuable in the early stages of NPD, when product opportunities need to be identified and product concepts developed (Koskinen & Battarbee, 2003).

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Over the past few years, empathic design has rapidly evolved in response to the popular notion of *design for user experience*. Design for experience means design guided by broad and thorough understanding of users and their experiences. It is a design attitude that emerged in the 1990s when the design community was increasingly faced with the design of complex integrated systems that affect users' behaviors and experiences beyond the individual product or service, and started to realize that a broader approach to user-centered design would be necessary to develop products that are pleasurable and easy to use. At the same time, the business community came to see design for experience as a way to build stronger emotional connections with their customers (Brazen, 2009; Dandavate, Sanders, & Stuart, 1996; Fulton Suri, 2003b; Pine & Gilmore, 1998). The attitude involves respecting users, being committed to understanding users' needs and desires, building holistic understanding of users' activities, and relying on personal insight and creativity (Mattelmäki, 2006). The design for user experience attitude is reflected in four principles that, we think, lie at the heart of the empathic design approach.

The first principle is balancing rationality and emotions in building understanding of users' experiences. In 1996, Dandavate, Sanders and Stuart noticed that the human factors discipline has mainly focused on the scientific study of the rational domain, i.e., how people understand and use products. Understanding people's experiences of owning and using products, they argued, requires a more holistic approach that includes the emotional domain, i.e., their feelings and experiences. Addressing emotions and rationality in a balanced way will help researchers and designers "to understand those uniquely human traits that are responsible for people's liking, using, and wanting to live with the products [they] design" (Dandavate et al., 1996, p.415). In empathic design this balance is found by combining observations of what people do with interpretations of what people think, feel and dream (Dandavate et al., 1996; Fulton Suri, 2003a).

The second principle that we identified is the need to make empathic inferences about users and their possible futures. In empathic design, people's feelings and experiences are thought to be best understood through empathy (e.g., Dandavate et al., 1996; Segal & Fulton Suri, 1997). Empathy can be described as the ability to understand what it feels like to be another person – what that person's situation is like from his/her own perspective (Wright & McCarthy, 2008). Empathic design calls upon designers' and researchers' empathic abilities in making interpretations of what people think, feel and dream, and in envisioning possible future situations of product use (Black, 1998; Fulton Suri, 2003a; Steen, 2008).

The third principle is one of involving users as partners in NPD. In empathic design, designers and researchers continually develop and check their creative understanding of users' experiences in dialogues with users over time (Fulton Suri, 2003a; Postma et al., 2009). Users are seen as the experts of their experiences and crucial partners in building creative understanding of these experiences (McDonagh, 2008; Sanders & Dandavate, 1999; Wright & McCarthy, 2008).

The fourth and last principle that we identified is the engagement of design team members as multi-disciplinary experts in performing user research. In the article "*Design for experiencing: New tools*," Sanders and Dandavate (1999) notice that the roles of designer and researcher are becoming mutually interdependent. Social scientists bring in research skills and frameworks that are necessary for gathering user experience data and for understanding users' experiences, while designers bring in design skills necessary for transforming understanding of users' experiences into opportunities and ideas. Empathic design suggests that researchers and designers join forces in designing and conducting user research to make sure that the user perspective is included in NPD (Black, 1998; Leonard & Rayport, 1997).

The four principles are not exclusively related to empathic design. There are several design research approaches, such as participatory design and critical design, that share one or more of these principles. The (sometimes subtle) differences between these approaches often lie in emphasis of principles, and in the ways in which the principles are practiced. Sanders' (2006, 2008) topography of user research in design is useful in explaining how we see empathic design fit within the design research discipline. The map has two dimensions along which different design research approaches are positioned (Figure 1).

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Elly Zwartkruis-Pelgrim holds a Masters degree in Economic Psychology (Tilburg University) and a Professional Doctorate in Engineering in Human-Computer Interaction (Technical University of Eindhoven). She has been working for Philips Research since 2005. Her work has focused on identifying user needs for specific target groups, such as the elderly and parents with babies. She is currently working on methods to enhance sleep in infants and translating them into product propositions.

Elke Daemen is a research scientist with the Human Interaction and Experiences group in Philips Research since 2007. She has a background in user centered design and user interaction design research. During her work at Philips, she has developed expertise in the area of domestic appliances, specifically in doing people research, analyzing & identifying User needs, translating user needs to product concept creation, UI Design and Interaction Design. After working several years in the domain of consumer products, she moved her focus to the research and design of healthcare applications and solutions, specifically in the domain of Healing Environments.

Du Jia is a research scientist working at the human interaction and experiences group in Philips Research. She has a background in user centered design and user interaction design research. During her work at Philips, she has developed her expertise in the area of relaxation and sleep enhancement, specifically in translating user needs to product concept creation, as well as conducting psycho-physiological experiments. After several years working in the domain of consumer products, she moved her focus to the research and design of healthcare applications and solutions. She has a particular interest in hospital workflow, communication and collaboration in hospitals and culture influences on user interface design.

The vertical dimension of Sanders' topography distinguishes between research-led approaches and design-led approaches. Research-led approaches have been introduced into practice from a research perspective, and mainly focus on building understanding of users and their present and past situations. Examples are human factors approaches and applied ethnography. Empathic design best fits with the design-led approaches. Design-led approaches have been introduced into practice from a design perspective, and typically focus on transforming and understanding users' experiences; the idea is not so much to develop an ultimate truth about relationships between people and their environment, but to build actionable understanding for design (Kurvinen, 2007; Steen, 2008). In this group of approaches, designing is part of doing research, and often design methods and techniques, such as making collages and future scenarios, are used in the research method.

The horizontal dimension of Sanders' topography describes the mindsets of the people who practice and teach the design research approaches. It distinguishes between approaches that involve an expert mindset on the one hand, and approaches that require a participatory mindset on the other. In approaches that involve an expert mindset, the researcher is seen as the expert and the user as subject. This group of approaches focuses on designing for users. An example is critical design, in which design experts challenge people's social values through speculative design proposals (Dunne & Raby, 2001). In approaches that require a participatory mindset, the user is seen as a partner who actively participates in the NPD process. This group of approaches focuses on designing with users. An example is participatory design, which strives for democratization of decision-making and design, and attempts to actively involve users throughout the design process. Empathic design, which also tries to involve users as partners in NPD (principle 3), equally relies on designers' personal insight and creativity in envisioning possible future situations of product use (principle 2), and therefore may be positioned in between the two groups of approaches, where it largely overlaps the area that Sanders refers to as "design and emotion." The approach draws methods and techniques from all the other areas of design research in Sanders' topography. Fulton Suri (2003a) distinguishes three categories. The first category is about looking at what people do in their own context, and it mainly involves observational techniques (Black, 1998; Leonard & Rayport, 1997). The second category involves asking people to participate by reflecting on their personal experiences and by expressing their thoughts, feelings and dreams. This class includes methods and techniques such as context-mapping (Sleeswijk Visser, Stappers, Van der Lugt, & Sanders, 2005), design probes (Mattelmäki, 2005), and generative techniques (Sanders, 2000). The third category involves trying things ourselves and learning about other people's experiences by approximating their experiences. This class of methods and techniques includes experience prototyping (Buchenau & Fulton Suri, 2000) and role-play (Boess, Saakes, & Hummels, 2007).

As these four principles and the comparison with other approaches illustrate, the empathic design approach has been developed to build creative understanding of users and to aid user-centered design. The question remains, however, whether the approach as developed by the academic design research community fits within the realities of NPD in industrial organizations.

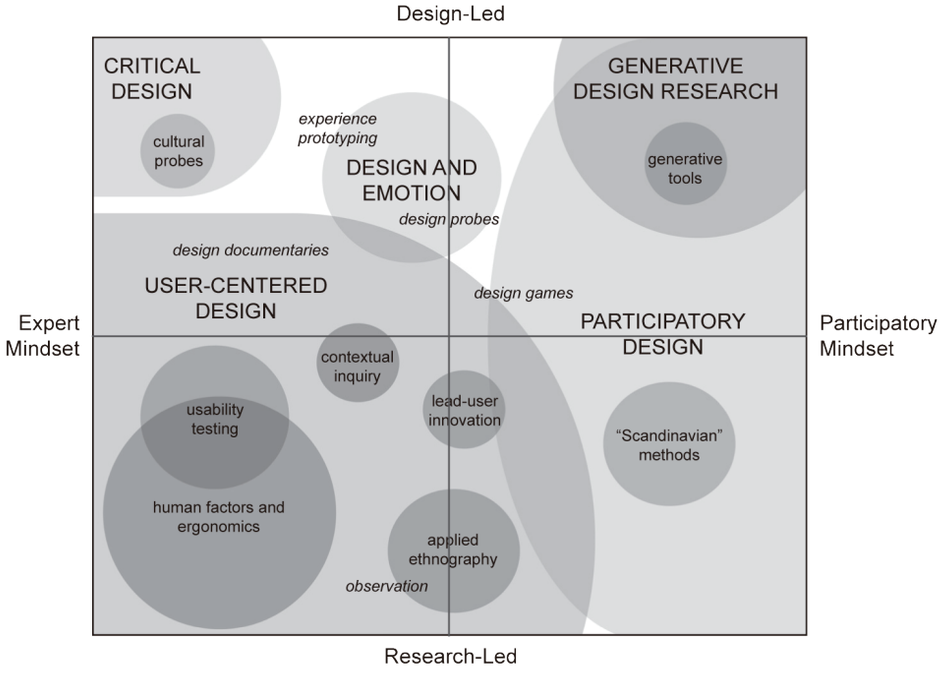


Figure 1. Topography of design research, adapted from (Sanders, 2008).

Empathic Design in an Industrial Context

This section briefly explains empathic design's position in an industrial context before we turn to the discussion of a specific situation at Philips Research.

Reviewing literature and websites about empathic design reveals that many organizations turn to design academia and design consultancy to facilitate and organize empathic design processes for them. Several examples are presented in Table 1. In our experience, success of such empathic design efforts largely depends on the degree to which the client and his/her organization are receptive to empathic design, i.e., how user-focused the organization is, how people within the organization think and communicate about users (Pruitt & Adlin, 2006), and to what extent they already practice the four principles of empathic design.

This observation fits Sanders' (2009) idea that design research approaches, such as empathic design, need to be embedded on five levels within an organization to become successfully practiced. She uses the diagram shown in Figure 2 to explain that practicing design research involves more than just practicing its tools and techniques. She explains, "It's not just about tools and techniques, because these need to be practiced through methods which are organized, clustered and approached through methodologies." Most critical, she argues, is the mindset, "the established set of attitudes held by someone, one's frame of reference" through which the tools and techniques are used. "If we are working with people who don't think it makes sense to design with the client and design with people, it stops there" (Sanders, 2009, p.24). Thus empathic design needs to be embedded on all levels within an industrial organization to be successfully practiced. If the people within the organization do not share the attitude or mindset that is needed for doing empathic design, then the effort is likely to strand.

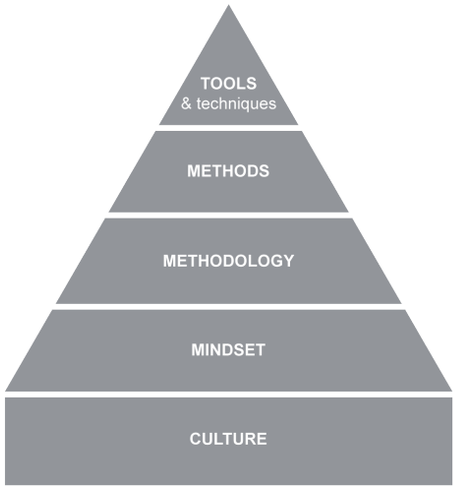


Figure 2. Embedding empathic design on different levels within the organization, adapted from (Sanders, 2009). Empathic design needs to be adopted on all levels to become practiced within the organization.

Empirical Study: The Philips Case

For Philips, empathic design is a possible next step that fits the corporate ambition to become a truly customer- and user-centric organization that delivers on Sense and Simplicity, Philips' brand promise that was launched in 2004. Sense and Simplicity implies a break with the company's past in which innovation was mainly driven by technology development. Sense and Simplicity encapsulates the company's commitment to understand the needs and aspirations of users and customers in order to deliver innovative solutions that are "advanced" and "easy to experience"."It is the combination of two unique capabilities that enables us to deliver on our sense and simplicity promise," Philips website states (http://www.usa.philips.com/about/company/brand/brandpromise/index.page). "These capabilities are firstly,

Table 1. Examples of empathic design in an industrial context.

Continuum for Chicco (ICSID, 2006).	A design team of Continuum, an international design consultancy, used empathic design methods in developing a new baby bottle line for Chicco.
Sleeswijk Visser and Stappers (2007) in collaboration with Sara Lee.	Sleeswijk Visser and Stappers, affiliated with Delft University of Technology, facilitated an empathic design study about footwear for Sara Lee.
Jump Associates with Mercedez-Benz (Patnaik & Mortensen, 2009, p.105).	A team from Jump Associates, an innovation strategy firm, organized an afternoon session in which they facilitated contact between senior executives of Mercedes-Benz and prospective car drivers using empathic design techniques.
Sanders (2009) with NBBJ Architects.	Sanders (founder of MakeTools, a design research consultancy) and her team are working on a project with NBBJ, an architecture firm, in which they build understanding of hospital staff's and patients' experiences of working and staying, respectively, in hospital.
Mattelmäki and Battarbee (2002) with Polar Electro Oy.	Mattelmäki and Battarbee, at that time both affiliated with Aalto University in Helsinki, facilitated an empathic design study about the experience of wellbeing and exercising for Polar Electro Oy, a heart rate monitor manufacturer.
Multiple design consultancies with small and medium enterprises (Van der Lugt et al., 2009).	In a Pressure Cooker project, design researchers from different consultancies facilitated empathic design studies for ten small and medium enterprises in the Netherlands.
IDEO for/and with various organizations (e.g., Fulton Suri, 2008; Samalionis, 2009; South, 2004).	IDEO is well known for employing empathic design approaches in projects for and with organizations.

by understanding people and secondly, technology integration and product design." It continues: "Philips products improve people's lives through technology that makes sense. Technology designed around the way people live and work. Technology that's easy to use. In other words, technology that's pure simplicity."

To bring this customer- and user-centric culture to life within Philips, a framework for developing product propositions, called Value Proposition House (VPH), was developed and introduced company wide. The framework provides an overall structure and format for including the customer's and the user's perspective in the early stages of NPD. It points out when customer and user research should be conducted and provides steps for how findings from customer and user research should be processed and fed into the NPD process. For example, part of the VPH framework proposes a structure for generating so-called "platforms" and "end-user insights", which are themes or need areas captured by keywords and/or mood boards, and brief textual descriptions of customers' and/or users in order to deliver on sense and simplicity. We have experimented with empathic design as an approach to fill this gap at Philips Research.

The Case of Philips Research: From Evaluative User Research to Generative User Research

Philips Research is a research organization within Philips that provides technology options for innovations in the area of health and well-being, targeted at both developed and emerging markets. It serves the three Philips operating sectors (i.e., Lighting, Healthcare and Consumer Lifestyle) in introducing meaningful innovations that improve people's lives. Positioned at the front-end of the innovation process, Philips Research works on everything from spotting trends and ideation to proof of concept and, where needed, first-of-a-kind product development. Customer and user research play an important role in this regard.

When *Sense and Simplicity* was rolled out a few years ago, we (authors and colleagues) started to experiment with empathic design in a number of projects at Philips Research, because we expected that the approach would help us in exploring new growth areas and domains that are relatively open and unexplored. The empathic design efforts were often successful in that the project teams became more user- and customer-focused. But introducing and practicing empathic design within the organization was not always easy. Philips Research's focus on evaluative user research had indeed expanded to include more generative, or rather "pre-design" (Dandavate et al., 1996; Hanington, 2003) user research, and the people within the organization were generally open to the idea of trying empathic design. But with a rich history of almost 100 years of science-based technological innovation, the people within the organization did not necessarily share the mindset needed for doing empathic design as described in the literature, nor did the theoretical principles of empathic design seamlessly fit into their culture of doing research.

In addition, we experienced several challenges that relate to discrepancies between the theory of empathic design as described in literature with the application of empathic design in an industrial context in practice. We found that these challenges are largely unaddressed in the design research literature. The literature provides explanations of the theory of empathic design, but offers very limited guidance as to how practitioners can successfully introduce and practice empathic design within an industrial organization.

In this paper we try to raise awareness of these challenges, and open up discussion of possible cultural and methodological changes needed to overcome them. The challenges discussed in this paper reflect our own experiences and findings from doing empathic design in a variety of projects at Philips Research. In explaining the challenges, we draw examples from the *Baby Care* project, a NPD project at Philips Research.

The Baby Care Project

The *Baby Care* project (2008) is an example of an NPD project at Philips Research in which empathic design was explored. The aim of the project was to identify and develop new technologies and product concepts for baby care, based on rich understanding of the lives of parents with babies. When the project started, the project team consisted of a project manager and five team members with backgrounds in electrical engineering, computer science, psychology, and industrial design. The stakeholders of the project were the members of the program board of Philips Research. The first two authors participated in the *Baby Care* project in the role of people researcher.

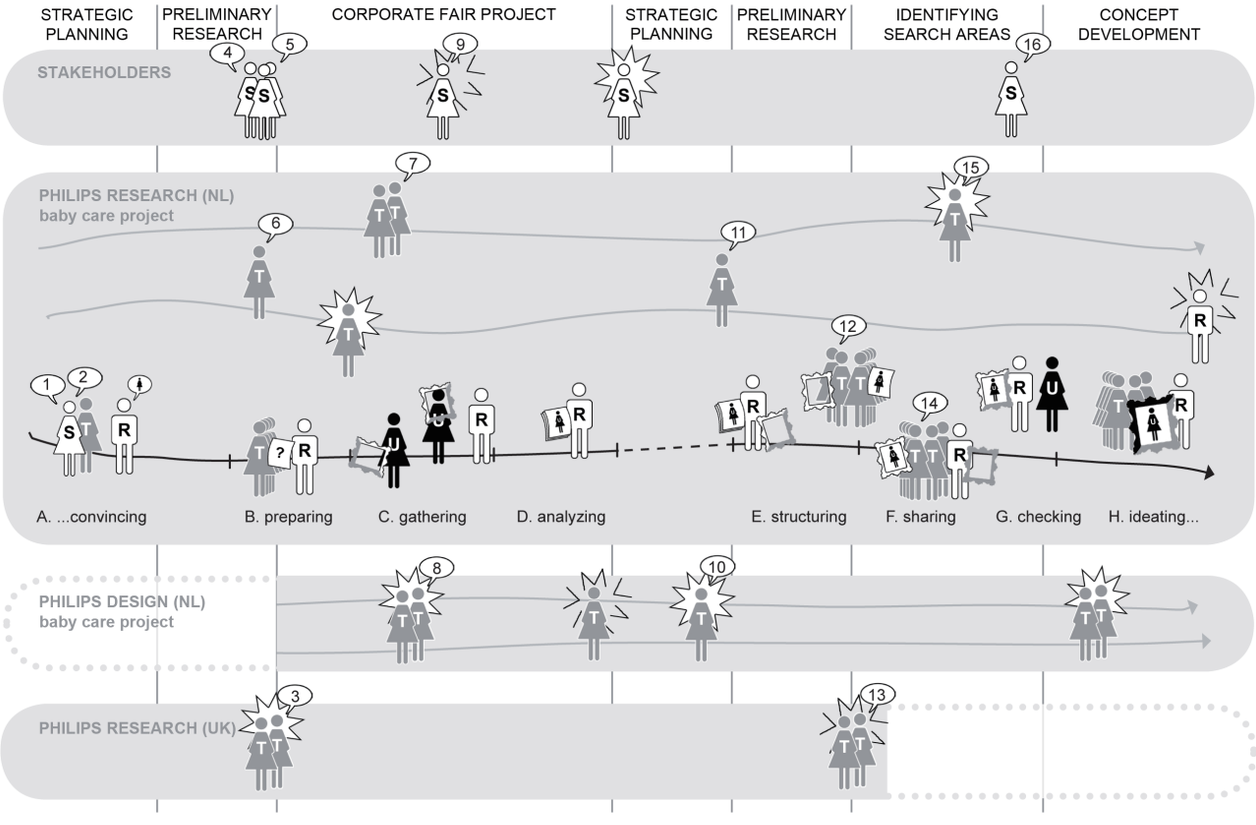
The project manager initiated the empathic design effort. She had received findings from earlier user research as input for generating platforms and end-user insights within the VPH framework, but because these findings were very abstract, she was looking for ways to enrich them. Having witnessed our approach in other projects, she believed empathic design could be valuable in this regard. The stakeholders of the project supported her initiative, as it fitted with the corporate ambition to become a truly customer- and user-centric organization. The members of the project team only had a vague idea of what doing empathic design actually means, but they were interested to learn about empathic design and wanted to give it a try.

Figure 3 presents an outline of the project's dynamics and the empathic design process that we followed during the first half-year of the project. The figure illustrates how (1) different parties (grey fields) are involved in different phases of the project (indicated on top), (2) the project planning changes over time, (3) different activities within the project (arrows), such as business planning, user research, and technology development, need to be time-aligned, and (4) how the NPD team changes over time: new members join the team (stars) and others leave the team (broken stars). An empathic design process was followed (black arrow) as part of the project. The people researchers (puppet marked by 'R') gathered user experience data in dialogues with users (U),

and representations (frames) were used in conveying the data to the NPD team (T), the project manager and the stakeholders (S). The project involved several user studies, of which an exploratory user study that we conducted in The Netherlands will serve as an example in this paper. The aim of this study was to develop rich understanding of the lives of parents with babies. The results of the study were not intended to be representative of a population, either national or global, but were meant to inspire technology and concept ideation.

The Empathic Design Process

After having convinced the project manager, the team and the stakeholders of the value of empathic design for the Baby Care project (A. ...convincing, in Figure 3), the team went through seven steps, following the contextmapping procedure as explained by Sleeswijk Visser et al. (2005) and illustrated in Figure 3. First, the team members and the people researchers jointly prepared the exploratory people study (B. preparing). Being actively engaged in preparing the people study prompted the team members to



U: User R: People researcher T: Team member S: Project manager and stakeholders

1 'We need user insights.'

2 'I like the idea of empathic design! Let's do it!'

3 'We are interested in learning about this target group too.'

4 'We want you to present your vision on this domain at the corporate fair by showing product concepts.'

5 'You should work closely together on this project with the design department.'

6 'I need to focus on the fair now, so I cannot help you with the user research.'

7 'We need your user insights for developing our vision for the fair.'

8 'We would like to focus on a slightly different target group.'

9 Project manager and advocate of empathic design leaves the project team.

10 'I like your approach, but isn't this something we should be doing?'

11 'Are you finished yet? We need your user insights!'

12 'Is your data representative of our target group?'

13 'Our project has been paused, but we still like to be involved.'

14 'We can really use this information! This was a great session!'

15 'I need to trust that you did it in the right way...'

16 'How can we implement this approach in other projects?'

Figure 3. The empathic design process followed within the *Baby Care* project.

already consider parents' possible needs and aspirations. Also, the people researchers developed a better understanding of the project team's needs in working together with the project team.

The team members and the people researchers mapped their preconceptions about baby care, identified research questions, selected focal areas of the user research, recruited parents, and developed probes. Probes are packages of tools and playful exercises that invite participants to reflect on their routines and daily experiences (Mattelmäki, 2005). Six couples with babies aged between three and ten months old participated in the study. The parents worked on the probes individually during five days. Then (C. gathering) the couples participated in a generative session in their homes (Sanders, 2000). The sessions were facilitated either by the people researchers, or one people researcher and a team member. During a session, parents explained what they had created in their probes, they then jointly mapped their baby's bedtime ritual on a poster and showed us around their baby's bedroom. The dialogues with the parents resulted in rich user experience data in the form of video recordings, completed probes, posters and photos. From this, some data fragments and preliminary findings were presented to the team and the stakeholders in interim presentations to create involvement, as well as to inform design and research activities that were run in parallel.

When all generative sessions had taken place, the people researchers pre-structured and pre-analyzed the data (D. analyzing and E. structuring), and developed three different preparation kits, each kit reflecting one parenting style, for sharing the user experience data with the project team. The kits contained small chunks of raw data, including quotes, photos, audio fragments, the researchers' initial findings, and five small exercises, which the team members asked to reflect on and compare their own situation to the parents' situations. For example, in one exercise the team members were asked to compare the things that used to help them fall asleep to the things that helped the baby fall asleep. The team members and the project manager worked on the preparation kits individually over five days (F. sharing). Then they participated in a joint insights session.

The aim of the session was to build shared understanding of baby care as a starting point for developing product propositions within the VPH framework. During the insights session, the team members first discussed their observations and findings from working on the preparation kits. Then they created maps of the parents' current situations by structuring raw data and observations and findings on posters. Clusters of findings were labeled with themes. Later in the NPD process, these themes would function as "platforms" within the VPH framework. Lastly, the team members envisioned parents' aspirations and dilemmas, and added a final layer to the posters with ideas about possible futures of baby care (Figure 4). By the end of the session, the team had made three posters, one for each parenting style. Each poster connected raw user data with the team members' interpretations of the data and ideas about the future. After the session, the team used these posters (and findings from other user studies) in formulating end-user insights for proposition development within the VPH framework. An external market research agency confronted the end-user insights with parents in focus group sessions (G. checking). The team members processed the parents' feedback, and edited the end-user insights in between sessions. In the end, four end-user insights were selected for concept ideation. The selection of end-user insights was based on parents' responses as well as insights from business and technology perspectives (H. ideating...).

The Project Dynamics

The *Baby Care* project exemplifies the complexity of NPD in large organizations. The project started as a relatively small-sized and straightforward project that involved only six team members and few stakeholders from Philips Research in Eindhoven. But soon the project team grew larger and the project became more complex; multiple design and research activities were run in parallel. Different parties and stakeholders from different parts of Philips were involved in different phases of the project. Sometimes new parties introduced new ideas and concerns that changed the project's

Figure 4. Sharing (phase F): The insights session.

The project team members worked on preparation kits during five days (left). Then they participated in an insights session in which they shared their observations and findings (center), and created maps of parents' currents situations and possible futures on posters (right).

strategic course of action. These project dynamics, which are quite common in an industrial context, challenged the empathic design effort in several ways (as is indicated in Figure 3):

- *Redistribution of resources* (B. preparing) – During preparation, activities regarding a corporate fair were prioritized, and manpower of other project activities, including empathic design, was cut down. But the empathic design work group still needed to deliver input for the fair in time.
- *Redefinition of stakeholder roles* (C. gathering and D. analyzing) – When user experience data had been gathered and analyzed, strategic decisions, including target group and ways of working and collaborating, were reconsidered as part of a new collaboration set-up with Philips Design, the global, corporate design organization of Philips.
- *Out of sync schedules* (D. analyzing and E. structuring) – Due to these and other developments within the larger organization, business planning and empathic design activities were temporarily suspended. Technology development, however, continued and waited for the other work groups to share their results.
- *Changing project team* (H. ideating...) – Finally, in ideation, two new team members and eight guest members joined the team. These people had not been part of the earlier empathic design process, and did not share the creative understanding that had shaped the project up to that point.

Sometimes relatively small changes of team composition affected the empathic design process significantly:

- *New project manager* (C. gathering) – Halfway through gathering user data, the project manager left the team and a new project manager was assigned to the project. This led to some uncertainty about the necessity and continuation of the empathic design activities, but eventually the decision was made to proceed as planned, with full support of the team members.
- *New team member* (F. sharing) – Halfway through sharing the data, the empathic design work group was reinforced by a new team member, who insisted to bring in user data that had been gathered in other studies.

Discussion: The Future of Empathic Design in Industry

In this section we discuss our experiences with introducing and practicing empathic design at Philips Research in terms of three cultural and methodological changes that we think are necessary for successfully practicing empathic design in a mainly technology-oriented industrial context:

- From focusing on rational approaches to include empathic approaches in NPD.
- From seeing users as informers of NPD to seeing users as partners in NPD.
- From being informed of user research to being engaged in user research.

The first two changes strongly resonate with the two dimensions that Sanders identified in her topography of design research, i.e., "research-led vs. design-led" and "expert mindset vs. participatory mindset" (Sanders, 2006, 2008). The third change is new, and slightly different from the first two in that it mainly requires further specification and development of the empathic design approach, rather than organizational or cultural changes within the organization. In this section, we briefly explain each change and its corresponding challenges, drawing examples from the *Baby Care* project where appropriate.

Change 1: From Rational Approaches to Including Empathic Approaches

The first change concerns the first two principles of empathic design, "balancing rationality and emotions in building understanding of users' experiences" and "making empathic inferences about users and their possible futures." These principles challenge the tradition of an industrial research lab that has been primarily reductionist and validation oriented (as opposed to exploration oriented). Doing empathic design, i.e., adopting an approach that has been introduced into practice from a design perspective as opposed to a research perspective (Sanders, 2006), requires people within the organization to take on a mindset towards (user) research and design that values holistic understanding of users and personal insight and creativity. At Philips Research, the new brand promise, *Sense and Simplicity*, opened the door to generative approaches to research, such as empathic design, but there are still few challenges on cultural and mindset levels.

Challenge 1 – Evaluating Empathic Design from a Traditional and Reductionist Research Perspective

In our projects, team members and stakeholders often expected user research to point out specific market directions of product concepts; they called for solid evidence, like proof points, facts and hard claims, based on inquiries with large numbers of people. Empathic design research does not provide this type of input, nor does it pretend to aim to. Its strength lies in raising awareness of what makes life rich, personal and meaningful. Stories about users and their experiences gathered in empathic design research cannot easily be up-scaled, quantified or generalized. Nor are they conclusive. Team members (and stakeholders) need to read, interpret and explain users' stories, and envision possible futures based on their own interpretations and explanations.

In the *Baby Care* project, the team members were interested to learn about empathic design, but they also questioned its scientific rigor and the representativeness of its results. "How much do you actually cover now?" one team member asked, for example. New team members, who had not been part of the empathic design process, did not always understand and/or trust

our approach, and were sometimes hesitant to use our data. In a group discussion, a new team member explained, "We had to believe you that you did it right, and I have no problem with that, I trust you, but there's still a bit of doubt that we could cover everything this way."

Challenge 2 – Using Rational Language for Emotional Understanding

Being inconclusive and unverified, creative understanding is not indiscriminately adopted as a deliverable as such within an industrial context like Philips Research. In our projects, creative understanding needed to be translated into deliverables that are approved by the organization, such as validated end-user insights, confronted product concepts, or voice of customer statements. The rich, personal and meaningful were often lost in the translation process, because the deliverables only capture abstracted findings from user research. They are valuable in discussing directions for product and technology development on a strategic level, but fall short in supporting NPD teams in building creative understanding of users and their experiences, since they do not show the real people and the idiosyncrasies of everyday life that make findings from user research meaningful, or, as a team member explained, they do not "Make it concrete." The need for capturing and sharing what a marketing manager called "that feel for the user" is recognized within Philips. However, ways of conveying "that feeling" have not been established yet, and the theory of empathic design leaves this area unspecified.

Challenge 3 – Looking for Straightforward Implications for Design

In empathic design, designers and researchers use their creative understanding of users' experiences in identifying product opportunities and in generating product concepts. This is not a logical process per se; individual team members may see opportunities and concepts that others do not see. In our projects, we noticed that teams and stakeholders generally tend to focus on themes and findings that steer ideation into a specific product direction, rather than to focus on more open-ended themes and findings. We also noticed that teams and stakeholders often choose to generate solutions to small-scale problems and issues that have been brought up most explicitly by the user. In only few of our projects, team members chose to identify product opportunities by envisioning possible alternative futures. The two foci are partly driven by teams' and stakeholders' need to rationalize and validate insights and solutions, and partly infused by the organization's established methodology. For example, end-user insights by definition address a dilemma or aspiration of the user, and established brainstorming techniques within Philips Research used to be mainly directed towards the generation of intellectual property, focusing on innovative technical solutions, rather than design for experience.

In the *Baby Care* project, the team initially selected quite open-ended themes for ideation. Reflecting on the selection process, a team member explained, "We selected the clusters partly on rational and partly on emotional grounds - what clusters felt important. Instead of selecting the more 'obvious' themes, we picked those that triggered us. For example, two clusters we found more interesting because they addressed issues that are important on the long term." In the ideation phase (phase H), however, the team decided to focus on themes that they had considered "obvious", or that they even had discarded during the insights session (phase F).

Change 2: Moving from Seeing Users as Informers to Seeing Users as Partners in NPD

The second change relates to the third principle of empathic design: "Involving users as partners in NPD". User research conducted within Philips Research used to be mostly evaluative, and often involved users as anonymous informers, who were asked to reflect on usability of concepts in experiments and focus group sessions.

Empathic design research, which involves users as partners in NPD over longer periods of time, requires a drastically different way of thinking about the role of users and user research in NPD. It implies developing a broader mindset in which users are also seen as experts, which translates into a "participatory mindset" (Sanders, 2006), with user research as a fundamental quality of NPD. While empathic design research is finding its way within the organization – we noticed that some designers and researchers regularly leave the office to observe and talk to users – both ideas are not fully grounded yet.

Challenge 4 – Empathic Design as a Checkbox

Empathic design proposes that designers and researchers build creative understanding of users' experiences in the context of continual informal encounters with users. In our projects, however, user research was often thought of as a discrete activity within the NPD process that involves few experienced people researchers and is rounded up once conclusions have been drawn. In the *Baby Care* project, for example, the empathic design effort more or less already ended once end-user insights had been generated. A follow-up user study was conducted by a market research agency, and did not involve the parents who had participated in the exploratory people study.

Also project management and organization did not always accommodate user involvement over time. In business-to-business projects, for example, frequent informal encounters with users were not always feasible, simply because user contacts needed to be aligned with other parties within the organization first. Often time constraints did not permit having multiple encounters with users over time.

Challenge 5 – Empathic Design as Subsidiary to Technology Development

In empathic design, creative understanding of users' experiences drives innovation. But in our projects, often emphasis was on technology development, and user research (including user research in empathic design) was generally considered as one of several activities that inform technology development. Consequently, the user research was expected to conform to project objectives and planning that had changed because new insights were obtained from design and research activities that were conducted in parallel. For example, in one project the target group was redefined as a result of new marketing insights. In another project, the project planning changed drastically as time to market was shortened. These kinds of changes, which are quite common in an industrial business context in which product development cycles are getting shorter and shorter, require great flexibility that empathic design is not always able to meet, being that it involves developing and checking creative understanding of users' experiences in dialogues with users over time. As a result, creative understanding of users' experiences was sometimes established too late, or turned out to be irrelevant for the project by the time product opportunities needed to be identified, or product concepts needed to be developed.

Change 3: From Being Informed to Being Engaged

The third change addresses the fourth principle of empathic design, "engaging the design team members as multi-disciplinary experts in user research." How to engage design teams in user research may be evident in academia and design consultancy, but raises several questions and challenges in large industrial organizations, such as Philips. In these organizations, people work in dynamic, multi-disciplinary and networked teams that involve different parties and stakeholders in different phases of the NPD process. Division of labor, the aligning of roles and responsibilities, is indispensable in such organizations.

Challenge 6 – Who Should be Engaged, and Who Should be Informed?

Empathic design advises people researchers to engage the design team and/or designers in user research. However, it leaves unspecified who is part of the design team and who is a designer. Sleeswijk Visser (2009) discusses "people who ask for user information." She recommends engaging many people in user research, including people who did not specifically ask for user information, for example secretaries and colleagues who are not part of the project. In our experience, it is often not feasible to engage *everyone*, i.e., people from different positions and with different concerns, because people may not be available, they may not want to be engaged, or their superiors may not allow them to be engaged for whatever reason. Moreover, we found that engaging *everyone* may interfere with group dynamics in building shared understanding of users and in identifying product opportunities.

Generally, in our projects, project team members enjoyed and appreciated being engaged; they highly valued hearing stories about users and their everyday lives. Stakeholders, on the other hand, usually preferred to be informed; they valued getting an "executive summary" in the form of a presentation in which the main conclusions are highlighted. But this distinction did not always hold true: In the *Baby Care* project, a project stakeholder actively participated in the insights session and was very enthusiastic, whereas a project team member questioned the necessity of being engaged saying, "I'm not part of the user insights group."

Challenge 7 – How to Engage a Team that Does Not Exist Yet?

Empathic design research suggests engaging design teams in designing and conducting user research to ensure the user perspective is included in design. But the NPD process covers several stages, and it involves different parties and people over time. People who join, or take over the project in a later stage of the process need to be able to include the user perspective as well, without starting the empathic design process all over again. This means that the project team's creative understanding of users' experiences needs to be continually captured and shared. As we explained previously, the need to capture and share creative understanding is recognized by design practitioners, but goes by unaddressed in the empathic design literature, which seems to assume that the same group of people is involved throughout the NPD process.

In the *Baby Care* project, the people researchers managed to convey the rich user experience data to the initial project team in ways that enabled the team to build creative understanding of parents and baby care. But the people researchers and the initial project team did not succeed in passing on their creative understanding to new team members, because their creative understanding of parents and baby care was captured in their experiences with being engaged in the user research, and therefore was difficult to pass on to new team members.

Challenge 8 – How to Engage People Who Are Not People Researchers or Designers?

Not every team member is a people researcher or a designer, but being engaged in empathic design research requires research skills as well as design skills. We found that less experienced (people) researchers may tend to overemphasize partial results, or focus on aspirations or dilemmas that are brought up by individual users, rather than patterns that underlie the user experience data. Less experienced designers, on the other hand, may have difficulties in translating their creative understanding of users into product ideas and concepts. In our projects, for example, we often witnessed that project team members "forgot" about the users and their everyday lives in ideation, because they struggled to join their understanding of the user perspective with their understanding of

the designer perspective. We found that empathic design offers various tools and techniques that enable users, or non-designers to actively participate in NPD. But the approach offers hardly any tools and techniques that enable multi-disciplinary teams, including non-designers and non-researchers, to participate in empathic design. The preparation kit and insights session that we developed in the *Baby Care* project could be examples of such tools and techniques.

Conclusions

This paper reports our experiences with introducing and practicing empathic design in an industrial context. We report the challenges encountered due to discrepancies between the theory of empathic design as described in the literature on the one hand, and the application of empathic design in an industrial context in practice on the other. Eight challenges were identified and discussed in light of four principles of empathic design, which we established from reviewing the design research literature. We then propose three cultural and methodological changes for addressing the challenges in the future: (1) from focusing on rational approaches to including empathic approaches, (2) from users as informers to users as partners in NPD, and (3) from being informed of user research to being engaged in user research.

The first two changes are consistent with the two dimensions of Sanders' (2006, 2008) topography of design research, which endorses our conviction that other industrial organizations face similar challenges when implementing empathic design. The third change is new, and slightly different from the first two in that it is primarily up to the design research community, not industrial organizations, to make this change happen. It highlights an area of empathic design that we think is largely unaddressed in the design research literature, but may be key in successfully embedding empathic design within an industrial organization. Future research addressing this area may find inspiration from the *Baby Care* project presented in this paper. This project already demonstrates a challenging, but successful way of dealing with empathic design's principle of engagement in an industrial organization.

Having shared our experiences with introducing and practicing empathic design within the specific situation of Philips Research, we hope that others will feel invited to critically reflect on the use of empathic design in their contexts, and share their experiences and findings with the design research community. Only in this way can we dissolve the gap between the theory of empathic design as described in the literature and the application of empathic design in practice, and develop an approach that is effective and acceptable.

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