

# Patterns of interaction

A study of relations between designers, engineers, marketers and top management in four companies

by

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## Abstract

This paper describes the interaction between designers, marketers, engineers, and top management. The empirical material comes from a case study made in four Swedish companies 2002-2005. The study was meant to search for, describe and reflect upon successful patterns of interaction between designers, marketers and engineers. However, the study turned out to be even more an exposure of the problems at hand in the interaction. In all four companies – chosen because they had a good reputation in design management – we learned more about “how *not* to do” than patterns of success. In our description of the interaction we focus on the designers’ relationships with other professional groups like marketers and engineers as well as top management. The aim is to understand how the different groups themselves make sense of their interaction and how these patterns of interaction facilitates or hinders the innovation process and adequate use of design competence.

## Introduction

Design as a strategic resource has been an important perspective for the design management discourse almost from the beginning (c.f. Svengren 1996, Jevnaker, 2000; Joziassé, 2000; Bruce and Bessant, 2002; Borja De Mozota, 2003). The importance of integrating design both in the innovation processes and in companies' overall strategic work has been stressed by researchers and practitioners alike. Though we do have this knowledge about the importance of a strategic integration of design and of the possibility to use design as a strategic resource at different levels, we do not have much articulated knowledge about how this integration process is carried through. We also do not have so much knowledge how designers and its close alliances in the company make sense of this process when design is introduced with a strategic intent. Rather, both practitioners and researchers indicate that despite the recognition of design as an important resource there are much of communication gaps as well as unexplored theoretical underpinnings.

In this paper we draw upon an empirical study made from 2002 throughout 2005 in four companies where we have looked at the relationships between three professional groups and the top management. We analyzed the relationships that occurred from a sense-making perspective (Weick 2001) in order to understand what actually happened when they interact and when designers tried to get integrated into the corporate strategic development. The three groups studied were industrial designers, marketers and engineers. We also looked at the designer's and the design's relation to top management and vice versa. The reasons we have chosen these groups are that engineers and marketers represent the main professional groups with whom designers need to cooperate. Support from top management is often mentioned as a necessity when integration of design is discussed. Marketers and engineers also have quite diverse sense-making – differing both from each other and from the designers.

Initially, we wanted to choose interesting companies, in order to find patterns from which other companies could learn – or at least get inspiration from. We looked for role models in our strategic selection of companies. However, as we did our empirical studies, we found that none of the companies could be labeled a role model. Instead, all of them had interesting features in their patterns of collaboration but many of them were the opposite of role models. Rather, what we noticed could be used as a ground for reflexive learning about difficulties as well as (unexplored) possibilities. However, both the successful and the not so successful patterns of interaction turned out to be a material for reflexive learning about the relations. .

The paper is structured as follows: First comes a short overview over our theoretical framework where problems as well as recognition of important notions are discussed. Then follows a presentation of the study, its methodological ground, and the companies studied. Thereafter we analyze and discuss our interpretations of what we found. Finally we summarize our reflections.

## **Theoretical framework – what we know about the relations beforehand**

Earlier studies in design management have indicated that the relations between designers and top management are very important for the designers' possibility to contribute to a strategic value creation (Svengren 1996; Olson, et al, 2000; Lockwood, 2004). Also the relations between designers and marketers and the relation between designers and engineer have been discussed by earlier researcher (Ulrich & Eppinger, 2000; Utterback et al, 2006, Veryzer, 2005)

For example, Bruce (2002) considers the relationship between design management and marketing as a symbiotic relation. The link between graphic design, advertising and marketing communication is self evident. Also, every element of the classic four P:s involves design and different design disciplines (Bruce, 2002). These relations have earlier been emphasized in design management as a fundamental issue for creating a corporate identity (Gorb, 1988). Whereas there is a long tradition of collaboration between marketing communication and graphic designers, the collaboration between marketing managers and industrial designers is of a more recent date. Researchers who have done studies on the relation between design and marketing have noticed there are difficulties in the collaboration (Bruce, 2002; Borja de Mozota, 2003; Svengren Holm & Johansson, 2005). Bruce finds that there is a lack of knowledge of the design process among marketers whereas Borja de Mozota discusses the lack of respect from the marketing side towards design, especially industrial and product design.

There are certainly different relations and approaches to the product as such between industrial designers and marketers. For industrial and product designers in general the physical product is their delivery, the solution of their task. Already in 1960 Levitt in a classical article in Harvard Business Review discussed the problem of having "the marketing myopia". Levitt's phrase maybe should have been "the product myopia" as it was a critic towards companies' tendency to focus too strongly on the physical product instead of the function, the problem or the mission of the company. Designers are associated with physical products, but describe themselves as "problem solvers" where the physical product is just a tool to do that (Jones, 1981). Within the design management literature the issue of myopia, or near-sightedness is rarely discussed. The product, especially the physical product with its details of smart solutions, nice form, aesthetics,

style, etc, is discussed as the basis for success. In contrast, marketing literature is very much focusing on the conceptual issues of the product and its symbolic functions are emphasized. Communication and the value of the brand have become important as the basis for success, which is argued for by the marketing literature (Aaker, 1991; de Chernatony, 2001). Logically, the design management literature has integrated much of brand issues in their discussions (Borja de Mozota, 2003; Olins, 2001).

The relation between designers and engineers takes place within the discourse of innovation (Veryzer, 2005) Innovation is today a much debated field for business development. Innovation is something western companies need to focus on if they not only want to keep a front line position but survive on the global market. In the flood of innovation literature design, its creative methods and way of thinking has been emphasized by many researchers as resource for increasing a company's innovation capability (Ulrich & Eppinger, 2000; Veryzer and Borja de Mozota, 2005; Beverland & Farrell, 2007). Design is a discussed not only for creative solutions with a new way of thinking (Kelley, 2000; von Stamm, 2003) but also for the solutions having a clear customer and users focus. Kelley (2000) discusses the role of design for the development of an increased innovation organization in general.

Von Stamm (2003) claims that although design is considered an innovative force few organizations have succeeded in organizing design in a way that the potential of the design process is taken care of. The reason for this failure to utilize the design potential is, she argues, that other disciplines (for instance engineers and economists) have the largest impact on design decisions. In a pilot Feldman and Boulton (2005) studied if design consultancies could act as catalysts for an increased innovation culture in companies. Although it was a rather small study it showed that those customer companies who had a more conservative culture were negative to involve designers in the organizational development work whereas those companies who were more open to changes were also open for testing what design thinking and design methods could mean for their development works. There is a common understanding that design thinking is different than other professionals' way of thinking.

Many researchers (for instance Lawson, 1998; Rieple, 2004; Stolterman, 2007) discuss in what way designers' way of thinking actually is different from other disciplines. According to Rieple designers have a creative visionary thinking, fantasy about how it could become. Designers have the visual tools and talent to create concrete pictures of a world-to-be. Stolterman (2007) claims that designers think differently based on a combination of thoughts and hand. Design thinking is of course associated with creativity and creativity with abstract thinking. However, within design, the abstract thinking is parallel to the concrete thinking and in close relation to the concrete material; material in a broad sense. The intimate relation to the material and a good knowledge of the material

is the basis for good design thinking. Ideas are formulated in relation to the work with the material, with sketches and models. Hence there is an instant hovering between the abstract and the concrete thinking. Stolterman refers to this as “thinking with material”. This could be compared to for instance marketing where thinking probably could be considered as abstract thinking and the tools are more verbal than visual.

### **Studying the relations from a sense-making perspective**

As stated above, the relationships between designers, marketers and engineers have been discussed in earlier research. However, it is either done from a more deductive reasoning about the different areas and their common interests, or from a more general experience. In this study we wanted to find out more particular about the relations and how they were constructed from the different parts in the communication and cooperation.

In order to do so we took a sense-making perspective as our theoretical frame of reference. We did so because we were interested in how designers versus marketers and engineers looked upon their relation, if it was reciprocal and if the problems and positive relations were constructed in similar or different ways. And sense-making is about this – how people make sense of the world and what is happening.

People’s way of creating meaning is the focus and basis for symbolic interactionism (SI) (Mead, 1934, Blumer, 1969) and for the “sense-making” perspective (Weick, 1995; Johansson, 1998) as it is referred to when SI is applied within organizational theory. A sense-making perspective means, among other things, to catch different groups’ way of the thinking and arguing; about what happens in the daily work and their views upon how things should happen. Hence, it is about the actors own images of conflicts, problems and opportunities. Symbolic interactionism as a research perspective is a study of how people shape and change their views in communication and interaction with other people, how they shape meaning of those things that happen in their surroundings. The interaction between designers, marketers and engineers in the companies we have studied can be understood as different logics for creating meaning.

The concept of roles is central for symbolic interactionism, but in contrast to the dominating role concepts within sociology SI emphasize that roles are not constant but an active creating process. Roles are shaped and re-shaped in relation to its surrounding (Goffman, 1959). The role concept is also related to the concept of “sense making” in terms of that “role making” can be considered as a way to understand and view relations between one own and others. To understand the encounter between designers, marketers and engineers is an act of shaping and re-shaping the roles according to the SI perspective.

To discuss design, marketing and technology as different logics is nothing new, on the contrary. Design is often described as the creative link between art, technology and

function. This view upon design and its distinction to the other professionals is quite firm and taken for granted. In our study we wanted to see how designers', marketers' and engineers' different forms of sense making are active role shaping in terms of symbolic interactionism. Role shaping should be seen in a dynamic perspective; it is about shaping and re-shaping the roles that change through interaction.

## **Methodological approach**

Our overall methodological approach is ethnographic. We use a number of different qualitative techniques in order to be able to interpret the study within an organizational context (Alvesson and Sköldbberg 2007):

1. We have made participant observations at different meetings, workshops, conferences etc. between designers and other groups.
2. We have made interviews with designers, engineers, marketers and top management in all the companies. Mostly, we have interviewed them together and tape recorded the interviews. After transcription, we have analysed them according to a modified Grounded theory thematizing earlier used by Johansson (1998).
3. Our contact with the four companies varied in length from five months to about seven years. Most of them we have, however, followed over about a year.
4. We have also studied the companies' web pages, display room etc. The annual reports have been studied for a number of years.

In our analysis of the material at hand in this way, we have used at thematic analysis, inspired by, but not strictly following, grounded theory (Glaser and Strauss 1967). Our aim has been to find patterns within the material that we found interesting due to our earlier knowledge about the research area. In this way we distance ourselves from grounded theory, where earlier theories should not be taken into account.

As stated before, the approach towards the field material changed during the study. From an initial focus on generating patterns of success we rather turned towards analyzing and reflecting upon the rather complex and problematic relationships we found at hand.

The groups we chose to study were industrial designers, marketers and engineers and the design's relation to them and to top management and vice versa. We chose these groups because they represent the main professional groups with whom designers need to collaborate. Support from top management is often mentioned as a necessity when integration of design is discussed. Marketers and engineers also have quite diverse sense-making – differing both from each other and from the designers.

## **The four companies and the role of design**

In this part we present the four companies, the context in which the role and position of design was developed.

### **Babybjörn**

Babybjörn is a success story that started in the beginning of the 1960s. The company has a range of products divided into Mobility, Kitchen and Bathroom. The baby carrier is the largest product. The business idea is to support the parents with products that make everyday life with the baby (up to the age of three years) an easy and pleasant one.

It is no coincidence that the founder got interested in baby products. Children have always meant a great deal to the founder and his wife. They have four children and now a great number of grandchildren. The company is still quite a small family owned company with sales worldwide through sales representative. At the head office there are product development, design, engineering, and marketing departments. Manufacturing is outsourced to different countries in Asia and Europe. An assembly line and storage is based in south of Sweden.

Being a family company a lot of the family competence has contributed to the development of the company and its products. The founder is an entrepreneur, highly engaged in product development, generating new ideas as well as developing the business. The founder's wife has a background as textile designer and has also studied marketing. She used to design all textile parts and decide upon colours ranges also for the plastic products. Besides this, Babybjörn has always worked with external design consultancies. For the last 20 years it has been the same designer at one of the largest Swedish industrial design consultancy, Ergonomidesign. When the founder and his wife reached the age of retirement they hired a textile designer as an internal design manager but continued to work with the external designer as well. The founder and his wife are still very active in the company.

### **Pergo**

Pergo is a leading company in the laminate flooring industry, with strong brand recognition, and commitment to product development. Markets include the end consumer market, interior designers and the retail industry. The company sells products in Europe and the US. Products range from high volume low price products through to high performance premium products. The company is an off spring of the corporation Perstorp, a chemical technical process industry. Laminate for flooring was developed in the end of the 1970s and the first laminate floor was sold in Sweden in 1980. It was set up as a division, named Perstorp Flooring, within the Perstorp Corporation and became a business unit of its own in the mid 1990 and renamed Pergo after its largest brand. It was

also at this time the top management started to work on a design policy. A design manager was hired by the managing director.

The flooring business grew, especially in the US. Management decided to invest in the US and to build a factory in North Carolina to serve the American market more efficiently. The managing director of Pergo took the position as head of the American operations. This decision had implications for the newly hired design manager. First of all she lost her most influential support and the investment in a design center was postponed as the money was needed for the American enterprise.

A long period of hesitation regarding design followed. The design manager struggled with the objective to make design a strategic issue, integrating the technical development with the brand strategies in new design concepts. She found few alliances in the company. In 1998 however, a new managing director entered the stage and together with a new head of product development, investment in design took off. The design department was enlarged by six people, four of them being designers and model maker, and one administrator. The design manager became Director of future concepts and a new design manager was hired.

The managing directors, three different persons during our study, were recruited from the corporation and had an engineering background. In general they supported design, but it was only one of them who made a larger investment. When Pergo was separated from the corporation as a public company in 2001 this managing director quit and a more brand oriented managing director took over. The person head of product development became the managing director and continued to support the design investment. After our study the company has gone through some turmoil with new board of directors, managing directors and economic crises. The design department in Sweden was closed down and moved to the US.

## **SKF**

SKF is a world leading company in roller bearings, founded in 1907. The company has sales in 130 and factories in 100 countries. The business idea has been developed into complete solutions based on the roller bearings. Services and maintenance has become increasingly important. These services requires more tools and testing equipment that are faster, more precise, and more accessible than before to make the maintenance more efficient. The company has a strong technical orientation and advanced technical research and development, hence a large crew of highly qualified engineers. The managing director has always been a person with a technical background. Sales are business-to-business and the sales people also have technical backgrounds. The customers are hence

also knowledgeable in technology . Neither marketing nor design has any leading position in the company.

Despite this there has been a certain interest for design in the company. The head of Group Communication has for a long time tried to create a design policy as a guideline for both communication and product design. In 2000 he was supported by the managing director who decided that a design policy for the whole corporation should be developed. An industrial designer was commissioned to be part of this development in order to demonstrate how product design should be integrated with the corporate identity.

It is a strong decentralized company with head office in Gothenburg. There are five divisions: industrial, automation, electrical, service and Aero & Steel. The divisions have a strong position and work quite independently. It is therefore up to the head of the division whether a design policy will have an impact or not. Only few of the subsidiaries have supported the vision to create a strong design profile for the products. One subsidiary within the industrial division has been very active. They have commissioned industrial designers for their product development and actively supported the work with the design policy.

### **Swepac**

Swepac International AB is a small company that was founded in 1993 as an offspring from a large international company. It is a market leader in Sweden as supplier of in soil compactors. The company has focused on smaller compactors that are used on pavements, around lampposts, and on drives. There are several different models with different capacity and sizes. Swepac is considered a manufacturing company. In reality it is more of an assembly company as most components are purchased from all over the world. Special designed components and chassis are designed by Swepac and manufactured by subcontractors in the neighborhood. The compactors are leased to other companies or to private persons.

Quality and design was always important but it was not until the company got involved in a project by Swedish Industrial Design Foundation where companies were supposed to design their products according to ecological requirements. An industrial designer was commissioned to this project and he has continued to work with the company ever since.

The industrial designer is invited to the company's weekly meetings, together with the managing director and the engineer. From the perspective of the designer Swepac is an ideal customer. He gets involved early in the discussion of new products or when products need to be changed. He also has had the opportunity to bring in issues of branding and identity of the product.

## **Patterns of interaction**

### **Positive reconfiguration of the emotional values emerged as the interaction proceeded**

The engineers' view upon what a "designer" does and what the "design process" consists of changed in most companies as the design project and the interaction went on. This change was not so much concerned with the design process as such but rather a change in how they valued the process. Incidents, initially viewed as "negative fuzz", became after a time of collaboration revalued and regarded as "positive fuzz" or "a creative way of working". What in the beginning was considered as "chaotic brainstorming without any guidance" was after a while regarded as something both systematic and relevant. The role of design hence got some new emotional values. An insight many engineers got after a while was that it was worthwhile to let the ideas go into "blue sky" without any technical or economical restriction in the beginning. Letting this happen, turned out to be a prerequisite for completely new concepts that nobody could have imagined; concepts that later on were realized with considerations to possible technology and economy. This way of working was nothing new for the designers, but it took some time and emotional re-evaluation before the engineers could overcome their skepticism and see the value in the designers' way of working.

This kind of working processes and their values have been discussed by several researchers (i.e Walker, 1990; Dumas 1994; Press & Cooper, 2004). Their discussions, however, have been with a pure design perspective. We find it relevant to also bring forward the impact on the engineers. Not only did the engineers' values and notions of design change; their own work also changed when they started to work with the designers. The engineers entered a world of creativity that they enjoyed.

### **A positive adoption of some design approaches among engineers**

Another pattern we saw was engineers changing their view upon themselves and their way of working. The engineers reconstructed their own work in a number of ways and became more creative. They told us it was valuable to participate in brainstorming exercises and that the designers challenged them to become more creative. Within one company the engineers were so inspired by the designers that they changed their way of testing and defining the quality of the products. The technical terminology and procedures were complemented by user tests and users' view on what was important from a qualitative perspective. These changes were not mutual. In all companies we studied the designers did not change through the interaction with the engineers. On the contrary, they were rather confirmed in their role as the creative partners.

### **Engineers and designers met in their fascination for the product**

When the engineers became more creative they also took on the opposite role, namely the ones who defines limits and constraints for the designers. The engineers experienced that the designers were striving for the “perfect” aesthetics which sometimes was seen as strenuous. This led to an interesting role division that made sense for the engineers, who started to see their role as giving the limits and saying “good enough”. This was seen as necessary if the product was supposed to be ready on time. Certain design decisions just had to be made in time. In this sense the engineers became both more creative and more rigid, but in the words of the engineers they saw it as being responsible. The relation between the designers and the engineers was seen as positive by the designers who could share their fascination of the products with the engineers. The role of the designers could be described as catalysts, i.e something that changes the surrounding but not changes itself.

### **A gap with non-existing cooperation common between marketers and designers**

The role creation between marketers and designers differed to a great extent among the companies we studied. In one of the company with an internal design department there was no actual collaboration between the designers and the marketers in the same way as between the designers and the engineers. No workshops, no brainstorming sessions to develop new concepts. The designers were not invited to work with the marketing issues. This company has a consumer product but a technological background and culture, which might be a reason for this. In another company with a technology dominating culture the marketing (communication) sought support for their work through the involvement of an industrial designer. In a consumer driven company with both an internal and external designer the relation between design and marketing could be seen as symbiotic. This had historical roots as the founding family had both disciplines within the family. In the two smaller technical based companies with no internal design department there was neither relation nor any collaboration between the industrial designers and the marketers. The managing director in one of the company had the regular collaboration with the designer, whereas the marketing person had his office outside in another place. In the other company the marketers were not involved in the concept development although it was a project aimed at communicating a new identity.

There are several studies on the gap between marketing and technology, a gap that has been quite obvious and easy to identify. The gap between industrial design and marketing has not been noticed in the same way. Certain industrial designers have the same rhetoric and terminology as the marketers and have incorporated these in the design role. In at least one company this did not create a bridge but was rather seen as a rivalry act by the marketers. The sense making of the industrial designers was therefore “them” and not “us”. Industrial design was seen as part of product development and the technological

development, not as aligned to the customers and distributors, the ones that the marketers worked closely with.

The responsibility for the brand and identity creation for the company is an interesting subject in this process of sense making. Marketers see themselves as responsible for brand management and the marketing activities around the brand. At the same time we have seen also internal designers act as if they were responsible for the brand and its marketing through the product, which sometimes led to conflicts. In companies where marketing and design were integrated the company had developed a marketing approach that to a great extent resembled the design methods, for instance ethnographical inspired methods, observations etc. In this case the designers and marketers worked together in a dynamic way.

### **Easier to create a strategic role for design in the small companies**

We could see a large difference in the way design could create a strategic role between small and large companies. In small companies it is of course easier to create a close relation between the designer and the managing director, who often participates in product development. This is especially the case if the managing director is still the founder of the company. The character of the relationship is of course dependent on the personality of the involved persons. In large companies the situation is different and also the roles and the symbolic integration have to be different. The designer will probably not get a close relation, sometimes not even meet, the managing director but have to build a relation with other functions in the company. The role the designer will get in the company, however, will still be dependent on the view on design hold by the managing director. The view on how important design is for the competitiveness will decide whether there will be enough resources to invest in design.

It is of course no surprise that the different companies had different stories and different characters when it comes to how design was interacting with other disciplines and how they made sense of each other. When we tried to identify how designers could use a sense making perspective we could focus on

### **The designer as a token**

The pattern of interaction we could see in the case studies were of different kinds. One pattern in the relation had the character that resembles role creating between women and men in top management. Feminists, like for instance Moss Kanter (1977), have described the following phenomenon: When there is only one woman (compare this with only one designer) the role as “woman” (or “designer”) in general form becomes equal to the character of this one person’s way of behaving. Moss Kanter (1977) calls this phenomenon as a woman becoming a *token*. This means that specific designers with their individual personality represent a whole professional group – professional characteristics

and personal characteristics are mixed. This is rarely the case with marketers or engineers as they seldom are that kind of minority.

### **Non- reciprocal relations between designers and other professions**

Another pattern we could find was that the re-shaping of roles was not mutual. The different disciplines did not change; neither in the same way nor to the same extent. There was a great difference in how the designer had an impact in the sense making of the engineer and the marketers and how the designers themselves were influence (or were not influenced) by the interaction.

## **Summary and conclusions**

A study of the kind we have presented above is open for multiple interpretations and reflections. We do, however, find the following points most interesting:

### **1. The low level of design integration and exploitation of design competencies**

We did not have any average sample of companies. Rather, we decided among what we considered to be successful companies in Sweden. Also, we did not regard the selected four companies much different from the other dozen that we did *not* choose. Considering this, we were astonished over how much of problems with design integration we were confronted with. We got more examples of “how *not* to do” than examples of “how to do a good design integration”. We could easily, in all the companies, see a number of possibilities for improvement, if we with improvement define how to use the design competence in a better way in order to improve company performance.

### **2. Top management’s understanding of design important for the design integration**

This is nothing new. Rather, Borja de Mozota (2003) and other researchers (Cooper & Press, 1995; Jevnaker, 2000) have earlier stated what we once again found: the relationship between designers and top management in all four companies had a large impact on the position and role of design. Regardless of company top management’s agenda and view on design had a large influence on designer’s position, and how design was established in the corporate processes. This in turn had an impact on how the other disciplines related to and made sense of the design. We had no case where the managing directors changed their view on design during interaction. Rather, those management directors who supported design in a forceful way had a positive view and experience of design, often from experience outside the industry. However, we could see that some of the managing directors learned that design needed some extra support if the designers’ were the ones who made the design decisions.

### **3. The relationship between designers and marketers almost non-existing in the four companies**

The relation between designers and marketers were in three out of the four companies unexpectedly a non-existing one; or a rather complex one. In some cases the relationship was characterized neither by conflicts nor by creative cooperation. Only in one company we did find an interesting and creative relationship. In this special case the head of marketing and design department were in the start-up period of the company the same person (and a person married to the founder of the company as well). When this changed into separate functions the intimate relationship continued. In other companies the relation between designers and marketers changed slowly into a positive one. In one case the marketing communication turned out not to be the best strategic alliance.

### **4. The relationship between designers and engineers was better – after an initial skepticism.**

The relationship between the engineers and the designers initially seemed to be characterized by some skepticism in all companies. However, we could also see that this skepticism was dissolved and turned into a good collaboration, if or when they started to work in practical settings with design methods like workshops and visual concept development. The shared interest for the physical products brought the two professions together and especially the engineers saw how they gained from their cooperation. Whereas the engineers to some degree changed their way of making sense of both their own discipline and design, designers continued with what they considered as their normal proceedings.

The overall conclusions of the study could be summarized in two ways. First, no good role model seems to exist concerning how to handle the design integration. This could also be phrased in the following way: There seemed to be a lot of possible developments that could be done in all the four companies. In all of them we saw unexplored possibilities of integration for better use of the design potentials. From an academic perspective we would welcome more detailed studies of both experimental character and closer ethnographic studies. Experimental studies where researchers and companies collaborate could give practical advances in design integration at the same time as it gives material for reflections about these complicated relationships. Closer ethnographic studies could give a better understanding for the problematic relationships – that turned out to be even more problematic than we had expected.

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