

# Design Methodology as a Foundation for Improved Innovation Capability

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## **Abstract**

The paper will describe the early findings of the research project “Design methodology as basis for a multidisciplinary innovation process”. The project is a collaborative action research project that draws on two different earlier research notions. First, the notion that there is an innovative power in the design methodology that quite often is potential but not realized. Design practitioners and researchers alike find that companies do not use the full potential of design. Second, that in order to use the strategic potential of design, top management has to be involved in the management of design. We add to these the notion that a designer can contribute to the enhancing of a companies innovation capability as a possible and explicit design service.

The practical purpose of the project is then to apply design methods and design thinking in product developing organisations with little or no prior experience from design in order to enhance innovation capability, and also to integrate design thinking into the corporate strategy of these companies. We will work with four companies and in three steps. The first step is an analysis of the situation at the starting-point of the project of the four companies regarding both design management as well as innovation management; an analysis of problems from a design perspective as well as possible future development paths. The next phase concerns the development and application of design thinking and design methodology by means of a hands-on innovation case in each company. After this phase comes a final study of their changing situation and in what ways design thinking and design methodology has possibly helped to develop the innovation capability as well as profitability.

In this paper we will describe the very first phase – the analysis of the initial situation and some suggested actions.

## **1. Introduction: Why design-based innovation processes are interesting**

The aim of SVID, the Swedish foundation for industrial design, is to “improve the awareness within the private and public sectors of the importance of design as a competitive tool and to encourage the integration of design methodology into their activities.”. SVID is financed by the commissions it receives, primarily from the Ministry of Enterprise, Energy and Communications. As part of SVIDs tasks regional and national projects are conducted in collaboration with partners in which design methodology and knowledge constitute the forces that drive developments. However, these projects and the knowledge production and experiences made within them has more seldom been related to or been part of any research project. When SVID received funding from the Swedish government for a bid program on design as a development force (“Design som utvecklingskraft”) the government required an independent evaluation of the results. The evaluator – Ulla Johansson – stated that the result as such was quite interesting, but criticized SVID for having too little collaboration with Academia.

This project is created in the backwater of this situation in two ways. First, it builds upon experiences made in this program. It also hopes to go further on into the tradition of working with companies when focusing how to assist them in developing their innovation capability with the help of design. This was not a specific area in any of the Design as development force projects. The project is a personal collaboration between Academia and SVID since it incorporates a regional officer from SVID who works together with the researcher in the practical/empirical part of the research. It also builds upon the recommendations from the evaluation in the way that it is an independent Academic project, funded by VINNOVA - The Swedish Governmental Agency for Innovation Systems.

The project builds upon two different theoretical statements from earlier research in design management. The first notion behind the research project is that designers and design methodology can contribute to an increase in competitiveness. This was clearly shown in the evaluation of the Swedish design program 2003-2005. However, through documentation and reflection it is possible to stretch the knowledge about the design process - requirements and possibilities- further.

The second theoretical notion behind this project concerns the link between leadership-design-innovation. Earlier studies have shown that design methodology, on condition that it has been firmly established in management, has caused “organisational surges” that affect the innovation climate positively (Johansson, 2006). The leadership dimension is therefore a second dimension to be taken into account in the empirical development work that the project builds upon.

To these two theoretical notions we add the notion that a designer can act as a consultant on how to enhance innovation capability by drawing on his/hers own design experience. This adds questions about the possibly additional competence and experience needed in areas such as change management and innovation strategy, as well as the characteristic of the process and collaboration between designer and company in such a project which differs from traditional design projects in many ways. Thus a practical aim of the project is also to pave the way for design and management consultancies that want to enter into this possible service area of combined design and innovation management. To explore these notions the project will work with four typical small and medium sized industrial companies that have little or no experience from working with design and/or little experience from actively working with innovation.

When doing this the following theoretical and practical observations are important for the project:

- Many companies, particularly smaller and medium-sized companies, lack an innovation process with the capacity to develop more radical ideas with business potential. This is expressed in a claim that “there is an obvious risk that the creative inputs and conditions for innovation are rationalised

away for the benefit of short-term savings and time gains”. International research has also, completely in line with these fears, illustrated the problems that companies usually have with supporting radical changes within the established project culture that is more usually dedicated to incremental rather than radical changes (Leifer, 2000, McDermott 2002).

- According to several researchers (Verganti 2003, 2006, Utterback et. al., 2007), a common feature of companies that succeed in their product development is that they pay attention to a wider perspective than that which is technical and product-related, for example cultural or social development, and that the innovative and creative capacity is allowed more scope. Another feature shown is that there ought to be active layout work where ideas and results are communicated in different format (diagrams, images, models) to facilitate the communication and nurture the innovation process (Utterback, 2006).

The rest of the paper is structured as follows: In the next section I will make a brief review of the literature on design and innovation. Thereafter I will describe the overall methodological design of the research project. After this follows a brief description of the four chosen companies, the preliminary results of the initial analysis and sketches about the next step in the transition/development of the innovation processes.

## **2. Theoretical framework**

As mentioned above, the project relies both on design and innovation as a theoretical framework and on leadership/management and design. These are related though quite different academic discourses. In the following we briefly sketch our theoretical framework:

### **2.1. Positioning the design concept**

The design concept has different meanings in Swedish and English and for different professional groups. According to Simon (1969/81), design is about conscious ideas that are realised later, i.e. one that by definition includes everything from engineering work to artistic work. In popular contexts, but also in what Julier (2000) calls high design, design is referred to as colour and shape are and the sensual experience from these. The Norwegian design researcher Michl (1995) represents a third perception, which talks about industrial design as a combination of 1) functional and useful properties and 2) appearance and 3) on products for mass production. This later perception to some extent describes our view on design. However we also need to look at what the designer actually do.

In recent years, the designer’s creative *work process* has been emphasised. Within SVID’s 2003-2005 project “Design as a development force” (Johansson, 2006), the emphasis was instead on the work methodology and the way in which it could be used in broad context from product to service development and innovation. Design in SVID’s definition is primarily a matter of a work process and methodology that “forms a part of the company’s whole development process and is used to achieve a successful and creative result with the help of design competence”. This is a perspective on design that we in this project are linking ourselves to.

To this we want to add Edeholts (Edeholt, 2005) research into the tradition of design and this tradition in relation to the different roles and methods of engineers, economists. Edeholt mean that “the design tradition has brought with it constancy, more intuitive methods and developed them so that they can function in an industrial and commercial environment that normally maintains more rational methods”. He also believes that the different approaches complement one another dynamically and innovatively. This is another perspective which is important for this project.

We also link the project to the growing use of the terminology “design thinking” as a way to frame what design is about in the context of change in company culture, especially when concerning business culture, referring to for example Boland (2004).

## **2.2. Research about design and innovation**

Design and innovation constitute a small research area. However, several interesting research and development efforts are ongoing. The consultancy company IDEO, and its founder Kelley, are working with a specific methodology for design and innovation (Kelly, 2001). Allowing a team of non-designers to work with the design methodology under the management of a designer brings about new thinking and more radical ideas. The team consists of employees within IDEO who contribute various backgrounds. There is a risk that there will be a “guest performance” in the companies. Our ambition is to contribute to the establishment and development of processes at the company itself, and to tailor the team on the basis of the company’s specific innovation needs together with the company. The aim of the project is that the company then can lead the future developments themselves. We are using the team methodology as a starting point, but also earlier research that emphasises the integration design into innovations and management processes (Svengren 1995, Bruce & Jevnaker 1998, Johansson 2006, Utterback et. al., 2007).

“Open Innovation” is a concept that was created by Chesbrough (2003) and is based on the companies’ need for access to distributed knowledge and expertise. He bases his work on an analysis of the properties of innovative environments and discusses the way in which the companies can open up to safeguard forces outside of their own company. User driven design is another concept that is based on the fact that it should be the clients and their situation that form the basis of innovative thinking and that cooperation with the client / the users is therefore important. Both these aspects of innovation are important to the companies we work with and will be taken into account when setting up the innovation cases to involve external experts, users etc.

Verganti (2003, 2006), who studied around 70 companies in Italy and their use of design as a strategic resource in the innovation work, emphasises Design-Driven Innovation. The majority of companies in the studies are furniture companies that develop products for the consumer market. Verganti believes that the designer for these companies is a “broker of languages”, and that it is a question of where the novelty of the design language is “significant and prevalent compared to novelty of functionality and technology”. The designer here is therefore more a traditional creator who focuses on aesthetics, expressions and messages. This differs from the role we see before us, which instead focus the internal processes and management of the company rather than objects in a more traditional sense. At the same time, we believe that there is much to be learned from the Italian project’s experiences of the way in which the companies include design as a strategic resource and the way in which company and designer form strong alliances. The concept of “Design-Inspired Innovation” (book Utterback et. al., 2007) further expands on the perspective of the design and the designer in a fruitful way, but still don’t address how designers can actively engage in development of processes within companies.

For us, it is important to freely link the ideas of the designer from the method and the process used by the designer to achieve innovative and new thinking solutions, irrespective of whether or not they concern form, function or technology. Von Stamm (2003) in “Managing Innovation, Design and Creativity” emphasises the similarities between innovation and design. The basis for innovation is a frame of mind, a way of thinking that is again found in the designer who is “educated and trained to deal with projects that involve unfamiliar concepts, are predominantly visual rather than verbal, involve fuzzy problems and high levels of ambiguity”. Von Stamm believes that it is crucial to change that “existing beliefs and mental frameworks need to be understood and shifted”. This cultural perspective will also form a crucial part of and platform for the project, and links directly to the concept of “design thinking”.

## **2.3. Research about design, strategy and leadership**

The link between leadership and design is touched on by several researchers. Svengren (1995) views design as a strategic resource and an integrative bridge-builder between the company’s business

concept and its products and services. Other researchers within design management (Borja de Mozota 2003, Bruce and Bessant, 2002) have to a large extent based themselves on Porter's strategic thinking (1985) and attempted to see what design can add to various parts of the value chain. Porter's thinking has, however, been criticised as lacking the dynamics of the strategy process from, among others, Mintzberg (1998) and Normann and Ramirez (1998), who criticise Porter's value chain thinking and introduce the concept of value star as a conceptual way of thinking about the companies' value creation. This comes considerably closer to the designer's method. It concerns constant structuring and restructuring and capacity to change between part and whole to gain new ideas.

In this project, we base ourselves on Svengren's view, but link to a sense-making input (Mead, 1934, Weick, 2001). We can then study the way in which various parties experience and conceptualise what happens in the company during the course of the project. A sense-making perspective makes it possible to link to the epistemological differences observed by Simon (1969) and discussed by Johansson (2006) in her description of the meeting between designer and other professional groups. It is thus not *necessary* (but possible) to link to a specific school of leadership theories, but a leadership and organisation perspective can still be accommodated. Since the design perspective and the innovation perspective are key, this limitation seems reasonable.

### **3. Methodological outline – collaborative research with four companies with different innovation context**

#### **3.1. The collaborative research approach**

We have chosen an action research strategy, and differ from more ethnographical and analytical studies where the researcher seeks to have as little effect as possible on the situation that he/she is researching. The researcher's role is the traditional one to observe, document, reflect and document the work and its result. In addition, action research involves playing an active part in structuring the innovation work.

The partners in the project are Business & Design Lab and SVID – Swedish foundation for industrial design. With collaborative we do mean that we exchange knowledge and plan actions together; collaborative (Adler, Shani & Styhre, 2004) indicates a broader view upon the collaboration than action research which mostly is associated with designed actions where the distinct outcome is looked upon in similar ways as the result with experiments in general within science. Collaboration also embraced exchange of sensemaking and interpretative perspectives and knowledges of different kinds that cannot easily be packed into the common paradigm of action research

The experimental structuring involves 1) observing the different companies' own viewpoints and needs, 2) building on theoretical knowledge of current research, and 3) using the creative capacity as designer and own experiences of industrial change work. The researcher will also in the practical part of the project work as a "senior consultant" in cooperation with the SVID representative who will share a similar role, these roles being divided between companies. We will also involve the necessary experts, designers and so on in the "service" conducted. The external professional designers, who are employed, are co-financed by the companies and the project.

Where methodological matters are concerned, the doctoral student himself needs to have a certain amount of scope. An actively explorative action research effort has been a common starting point. We also believe that the following efforts and methods will be relevant:

- An ethnologically inspired methodology is natural for collecting various types of data to interpret and describe: with participating observations, diaries, shadowing, interviews, etc.

- To give an account of the way in which the various players relate to one another and the way in which they (probably) change their views is (sic) a sense-making perspective a relatively simple theoretical reference framework that simultaneously affords possibilities of interpreting different events on the basis several different theoretical and practical perspectives.

### **3.2. Two kinds of collaborative partners: SVID and the four companies**

The project has two types of collaborative partners: SVID and the four industrial companies. The cooperation with SVID is a complex collaboration since we both build upon SVID:s earlier knowledge and experiences as well as develop new knowledge together with SVID in this project. As mentioned above the Swedish government program on Design as a development force showed that SVIDs cooperation with companies led to increase in profit. At the same time the SVID was criticized for having too little collaboration with Academia. This we hope to mend with this project and way of working together.

Initially we have searched for representative small or medium-sized industrial companies with a small amount of previous experience of in-depth design work that at the same time have a considerable desire to develop an innovation process and creative capacity. The reason is that we want to link design methodology with innovation processes without design being limited to concern form and function, but also for this to represent a large part of Swedish industry and thereby the potential for design. However with the initial analysis at the companies has come a realization that a slightly broader range of companies would be beneficial. With the aim of creating a more diverse spectrum of companies regarding innovation and design experience, one of the companies will be replaced. This was also practical since the company during the fall of 2007 both changed owners and moved to a new location which made starting up this project more difficult. We will now search for a company with preferably consumer products, a current established design process, but not with this connected to any formal innovation process.

**IDESTA Foodtech AB** develops and manufactures products for the catering and restaurant field such as stainless steel equipment and cabinets. The company has an in formal product development process, no innovation process and very little experience from working with design.

**Tranemo Workwear** manufacture and market protection and work clothes. Tranemo has more than 70 years' experience within the off the peg garments industry. The company has a formalized product development process, no innovation process and very little design experience. However som informal innovation is going on.

**Alfa Laval AB** is an international company that develops, manufactures and sells special products and technical solutions. The products include separators, heat exchangers, membrane filters and flow equipment. The project will work with the heat exchanger unit of Alfa Laval. The unit has a formal stage gate development system including idea generation and concept development. It works actively with innovation but to a very little extent with design, and then only through consultants.

### **3.3 The outline of the empirical research**

The project is divided into four main phases:

#### **1. Current status analysis and planning of the implementation phase (Aug 07 – Apr 08)**

Every company's special conditions and needs are investigated and documented in a current status report. In addition, in consultation with the companies and their management, proposals and plans are put forward for a developed innovation process through the introduction of design thinking. The process will include the setting up of a project group in each company. The group's work will be continuously reflecting and active, which will propel the processes forwards and contribute to the research process at the same time. The planning of the change process will include the creation of a

plan for the way in which the company will follow the innovation process and at a later stage transform the experiences into possible organisational, method and process changes.

The planning phase will be introduced and concluded with a leadership seminar with a broad participation of players involved. The seminars will be able to provide the exchange of experience and a response to planning, etc. It will also consolidate the various companies' participation in the project.

## **2. The implementation phase (Jan 08 – Aug 10)**

During the implementation phase change will develop around a hands-on innovation case. The case is established with a brief. A project group will be established including employees as well as external experts, customers, users etc.

The change process will then be gradually introduced as experiences can be drawn from the introductory innovation case. Of at least equal importance is to work actively with the cultural change that runs as a main thread through the project and this is where other inputs will be needed as exercises for inspiration and learning. In the studies of the change work, it will be equally important to study leadership and cultural issues and changes that arise.

## **3. Evaluation, reflection and documentation (Jan 08 – May 11)**

Evaluation and reflection will be ongoing throughout the project. It will also be important to continuously participate in international research conferences and present results in the form of individual articles. The evaluation and the documentation phase will therefore begin early on in the project and will be completed late. There are different types of documentation, however: from individual articles to a comprehensive public book that can be presented as a thesis.

The project on the financial measurement of effectiveness will be run as a separate parallel project that is documented by one or a few international articles and/or smaller Swedish reports. The work will be run within the framework of a special project group that studies the financial measurement of the effectiveness of designers and that exists in the same research corridor.

## **4. Utilisation (Jan 09 - May 11)**

We believe that utilisation will take place for *the participating companies* in that they themselves will change their way of working during the course of the project. At a concluding seminar together with all companies, experiences will be shared between the companies as motivation and good grounds for continued intracompany change work and utilisation for others.

Regarding the communication of the result to *other companies*, we believe that the cooperation with SVID will facilitate this. It is SVID's task to communicate knowledge on how design can be used to increase Swedish competitiveness. The result will be communicated continuously through regular meetings with SVID's regional representatives. A special conference focusing on the result from this project is planned. The intention is for the main project to result in an academic doctoral thesis in design methodology that can be presented in 2011.

## **4. Analysis of the situation at the companies at the starting-point of the project**

### **4.1 How the analysis was conducted**

At the time of writing three of the four companies have been analysed. The fourth company will be replaced as mentioned above. No management discussions about the results of the analysis have yet

been conducted. For these reasons the below are not the formal conclusions, but rather a sketchy first attempt to conclude some of the findings so far and suggest how they influence the continued project.

The purpose of the analysis is to map those characteristics of the respective company that affect how the process of integrating design methods and design thinking is to be designed. The result will serve as a point of departure when discussing with the management of each company about the work ahead. Added to the research texts I therefore need to write one text per company in the shape of an “executive summary”.

The SVID and the Business & Design Lab representatives spent one to two days in each company interviewing and discussing with representatives of the staff. The interviews had the character of informal discussions rather than formal interviews, even though there were a number of pre-determined questions which supported the discussions. The challenge was as much to understand the specifics of the current innovation and product development processes, whether formal or informal, as well as to get a feel of the culture of the company to understand the current attitude to design as well as innovation. The interviews were taped but a promise was made not to use quotes in the reports, this to ensure as open a discussion as possible. We are also aware that there is a tendency to "speak out" to external observers and we needed to treat such possible outspokenness cautiously. Added to these company visits were studies of homepages and other external communication to understand what kind of identity the company projects, and the possible gap between this external image of the company and the internal culture and identity. The results of the findings were discussed between the researcher and the SVID representative before the researcher wrote the “management summaries”.

The writing of the management reports posed a challenge. At the outset an attempt was made to use the same structure that SVID use when conducting and reporting on the level of design management in a company. However the very structured manner in which design management issues were broken down into different topics clashed with the more open questions of this analysis. Such issues as company culture, and attitudes towards design and innovation were non present. Already in this early stage we have felt that we are defining a culture within the service area which need to be inspired more by design thinking than the management discourse. When setting out to write about the findings of the initial analysis this becomes evident. The reports serve more a purpose of relaying feelings and intuitive reactions to the current situation regarding company culture and way of working, than the reporting of “facts”. Thus the reports need to be very open to invite management to a discussion about the present situation and way ahead. For this reason the approach is more narrative. How this will be accepted by the companies as a suitable format remains to be seen. This also emphasise other aspects of the process. We believe that the process of change should be grounded in design thinking in combination with change management. We hope that we can create a process which is open, playful and allows spontaneity. One example of this is an immediate result of the Tranemo Workwear analysis which after a discussion with the CEO resulted in an “on the spur of the moment” workshop with students at the Fashion Academy in neighbouring Borås.

There are a couple of more steps in this first stage before it is finished. The next step is discussions with management about the results of the analysis and after this workshops with employees to find a possible innovation case – and of course also to involve them more actively in the process. At the end of this stage we see a “brief” about the innovation case which also includes how the process of change will be conducted.

## **4.2 Typical findings and some early conclusions**

As mentioned earlier we have so far chosen companies with little or no integration of design in their product development processes and with a varying level of innovation work, from none to advanced.

We now search for a fourth company which we hope will complement this range by working actively with product design but with little innovation work, in order to broaden the range of the study.

### **Design experience**

While design is not part of the product development processes of the three studied companies, one important finding is that all of the companies in recent years have at least been involved in an external design project or have made their first attempts to purchase design services. For example Tranemo Workwear was involved in a SVID project which aimed to adapt workwear to the requirements of women working in heavy steel industry. IDESTA was involved in a similar project while Alfa Laval has initiated a couple of smaller design projects with external consultants. It seems like all these projects have been important eye-openers pointing to the possible advantage of working in a “designerly way” (Cross, 2006). In the IDESTA case employees told us that seeing the work of the industrial designer, how she went about to solve problems in a different way compared to them, was inspiring. Similar reactions were met in all companies and this seems to be vital experiences as a foundation for entering into this kind of project.

### **Understanding of design**

At the same time it is also evident that most companies have a rather sketchy idea of what design is on a deeper level than product appearance and function, and how design can also contribute to innovation. There certainly is a notion that design as a way of tackling a challenge might be different from how they currently work, but this notion is vague, only sensed rather than expressed. When explaining the possible advantages of design with their own words employees circle around how design can help bring more attractive and better working products etc. The management representatives on the other hand have a better understanding of, or at least feeling/inclination that design can also help improve innovation capability and help develop both the innovation process and innovation culture, even though they also find it difficult to grasp exactly how. So the need to exemplify and establish a better understanding of design methodology and design thinking is evident and needs to be focused on the next leadership seminar. In the end these observations are also important in terms of how services in this area need to be very well defined and pedagogically marketed.

### **Innovation work**

The companies differ in several ways. Alfa Laval is quite different in most respects. It is the larger company. Here we however work with a unit within the Alfa Laval group. This is interesting in several ways. First of all the unit is part of a larger culture which will have effects on what is possible to do within the one unit. Secondly the management of the unit are thus not fully independent to do as they wish. Added to this is the fact that the unit has a structured stage-gate system in place covering idea generation, concept development and product development. The innovation work is advanced and developed. The unit for example actively work with methods such as brain-storming and TRIZ. For us this posed a challenge. What could design contribute with? When taking into account that this innovation work takes place in the context of an engineering oriented company where these methods are used as tools rather than make up the culture we felt that design can help widen the approach. We see before us a possible process where the Alfa Laval unit meet and actively collaborate with another external unit or company with a strong design identity on a common development project. The aim will be to see if some of the design thinking of this “mirror organisation”, as well as their use of other tools and methods, may “rub off” on the Alfa Laval unit. With this we go back to Edeholts suggestion that the different approaches of engineering and design complement one another dynamically and innovatively.

In the cases of Tranemo and IDESTA there is a similarity in that product development in these companies focus improvements suggested by the market and production. New product development is very little focused and no formal processes or way of working support a more strategic new

product development programme. In other words in these companies we will also work with more basic areas such as working methods.

### **Company cultures and identity**

How company cultures today support or resist innovation and creativity has been important to try to grasp. Here we get clear statements from employees. In one company it was stated that creativity is frowned upon by some managers – this clearly pose a challenge for this kind of project. Other indications about how managers perceive aspects of innovation was if employees were allowed to cover business events and exhibitions, allowed magazines and other material for inspiration etc. This is not always the case and directly links back to management. Often the will and ambition of employees seem to surpass what management practice and signals. These are only a few examples that indicate the importance of not least working actively with such aspects during process of change, starting with management.

Another area which points to how management understands design is how well and actively the company work with image building and external communication of company identity. In the case of both Tranemo Workwear and IDESTA Foodtech this is an area in need of improvement. This is however more the rule than the exception with such small and medium enterprises. We hope some of this work can be integrated in the project and that a more developed identity can be one of the results of the project.

### **4.3 The next step – establishing the innovation case**

At the writing of this paper we have not yet met with management to deliver the findings our initial study. When this has been done we have set the stage for the project. Up until now there have been some differing views and ideas about the actual purpose of the project. It takes time to warm the organisations to the fundamental idea that design thinking can help enhance innovation capability and that this will have effect on working methods, management and culture in the company.

Some things also dawn on us in our roles as researcher and consultant - not least the importance to let the whole process of change also reflect design thinking in the way it is carried out. It is easy to fall into traditional management discourse, but we feel that this often clash with the purpose and soul of the project. This is a tricky situation to manoeuvre through and for sure the whole process is still to be designed – we still only have the brief in our hands.

The next step will be for the companies to close the first stage by setting up a project group as well as defining a brief for the innovation case which they will use as a vehicle for the project. During the spring of 2008 all companies will conduct workshops to generate ideas on possible areas of innovation. This will be the first time we start to employ design methods in the companies and hopefully the feeling will be of a request for more of the same. Change must come from within the organisations, this is our strong belief.

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