Industrial Design Strategy –
Innovating Markets and Technology

Assignment 3: Research Planning Course 2010-05-25
Introduction

Preface
My wonder of the use of design started when I had the great opportunity to work with methods for product development at Designstudio Värmland, a local office to SVID, the Swedish Industrial Design Foundation. I had the chance to meet large companies as well as small entrepreneurs who wanted to work in a more innovative way. The thing that hit me was that when contacting companies to discuss product development, there was almost never a design responsible. My colleagues and me were directed to the marketing manager or the product manager, at times, to the top executives.

Within SVID the ambition was to show the advantage of industrial design and to explain what it could actually mean to work with design. I had the advantage to work with the inspiration of an industrial designer, but in my team we also had an excellent graphical designer and a great pedagogic and behavior scientist and project manager. We collaborated closely with the Karlstad University, both with the engineering students and with teachers in the field of innovation and design. But also with researchers within service development, customer involvement and paper/pulp technology.

This multifunctional working environment has been the foundation for my vision of how a product development project should function. And it is also inline with the working process of a designer. A wide and open approach, considering many different sources of information is fundamental for a well-planned and finished product development project. The companies we had the chance to work with shared with us the ideas of starting off in a very broad approach. But despite good and promising results, the majority of our projects, mainly in packaging, never came to be realized.

Trained as a marketer I often asked myself what happened when the projects left our studio in Karlstad. There seemed to be a difficulty to anchor the ideas in the organizations. The persons involved had problems to “sell” the concepts to their colleagues and managers. My experience was that there seemed to be a gap between the active and “towards innovation” minded people in the project and the other parts of the company. Rarely, people from product development/design AND marketing cooperated. To me this felt odd. Marketing and industrial design have a lot in common. Both want to sell the product, create a value, and deliver a message. They should benefit from cooperating. But, their cooperation was always out of sight.

My wonder found its way to the research community. I wanted to understand the product development units in an organization and how they relate to the competence of industrial design. I wanted to look at the situation of large companies as these have complex organizations to handle and a challenge to meet with increased competition on a worldwide basis. How do a large and divisionalized company with plants and facilities all around the world work with the flow between different competences? How can they be innovative and stay competitive? How do they set up a strategy for this? Could the competence of industrial design be useful? In what way?

This paper explains the background, the purpose and the research questions of the research project. It describes the methods considered, the time plan and the participating companies. It also examines the theories of departure and the research community.

Background
Swedish industry has a long engineering tradition. In the field of design, the large companies have kept a strong focus on design as “engineering design” rather than industrial design. The latter is a user-centered and open-ended activity whereas the former is focused on problem solving and strongly goal-oriented. Industrial design often looks beyond the current resources in the company and find solutions outside the...
product development scope, where as engineering design adapts and uses the available production systems and knowledge.

In recent years, Swedish companies like Volvo and Electrolux, have extended their industrial design departments[1]. There seem to be a growing interest for design within the product development process but at the same time a gap exists between understanding the value of design and implementing it successfully. Good product design demands a holistic approach. It is a combination of user functionality, engineering aspects, marketing knowledge and the competence of the research and development department, (R&D). Collaboration between the user centered industrial designers and engineering can often be fruitful as these two competences find the creation of the product as a common ground for understanding. But, the collaboration between marketing and design often runs into difficulties[2, 3]. Marketing tends to look at a product as a concept, designers focus on the product features. Marketing trust objective sources as marketing polls, industrial design uses the intuitive design process in the search for solutions. Traditionally connected to technology or marketing, the transfer of new, external insights from the R&D departments to industrial design seems to be a weak link in many companies.

Several companies believe that a more dynamic collaboration, including industrial design, would be a reinforcement of their innovation capacity. But there is a lack of tools for managers and designers to develop and assess design thinking and design methods to organizational problems[4]. The management of design could be seen as a competitive advantage, as it bridges the two fundamental competences of engineering and marketing. Yet, design plays “a minor role, if any” in technology-intensive companies[5].

In the following text, the terms “industrial design” and “design” will be used interchangeably. The definition of design stems from the Latin designare, meaning to make something, distinguishing it by a sign, giving it significance, designating its relation to other things, owners or goods[6]. This was stated by Krippendorff who also describes design as “making sense of things”. The research study shares Krippendorff’s definition of design.

**Purpose of the study**
The purpose of this study is to understand how large technology intense companies use design as a strategy for innovation.

**Research Objective**
The study will result in an increased understanding of the connection between design and the strategy for innovation. It aims at the creation of a support model for innovation, valuable for researchers and industry.

**Research questions**
The research will deepen the knowledge of how industrial design is perceived and integrated into the product development strategies in technology intense companies.

Therefore, the main question of the research is:

> How do large technology intense companies use design as a strategy for innovation?

Complementing questions are:

1) How do companies perceive the competence of industrial design?

2) How is industrial design integrated in the product development process? What are:
a) the connections between the internal network (the different competences within a company) in relation to the role of industrial design?
b) the connections between internal resources and external networks?

The research questions are summarized in the figure below.

![Figure 1, the research questions]

**The research method used**

**Concentrating on the interpretation of empirical data**
Design is by nature, a competence that combines a lot of different aspects. The designer is focused on the user, trying to understand her context, her needs. The fundamental way of working, starting with a focus on the human, makes it a subject for interpretation. The designer use his or her reflections to understand the actions of a user, looks at the intentions of the actions and must find a way of categorize his or her observations. The designer, indeed, works with qualitative methods. To observe a designer in his or her working situation will not be efficiently done by using objective methods, as measuring and calculating. It is obvious that it involves an interpretation of the collected observations. But, what methodological approach would be suitable to this potentially subjective approach?

The methods when collecting data are several. The *hermeneutic* approach is built on understanding and interpretation, consisting of a constant movement between an observation of the parts and an observation of “the whole”[7]. In this context, the
researcher observes phenomena, classifies and categories them. The observations contain data, building on actions that are meaningful and intentional. In the field of hermeneutics, the requirement for objectivity is built on the fact that there is a common intention, or attitude, things that a lot of people do and understand. The guarantee for objectivity lies in the commonly agreed on actions in the context observed. But also on the commonly agreed on theoretical frames of the research society. This commonly agreed on actions, is independent of the researcher. If research is placed in the hermeneutic tradition, the researcher stands free and “relies” on the opinions and frames of others. Her or she focuses on the observations and how to interpret them, leaving to others the validation of them.

Another approach is the methods of *grounded theory*. The researcher observes a situation and classifies the data. Without the help from existing theories, new knowledge is created. But in this context, the researcher still has to codify and interpret the observations, assuming the risk of bias. Without the reference of existing theories, this approach can be very hard to validate.

The chosen approach, the hermeneutic, will be dependent upon the researchers interpretations. It is therefore mandatory to clearly explain his or her theories of departure, views and values. The researcher will have to be aware of the problems of being biased and also very clear and explicit about the conditions for field-research, findings and interpretations.

Accordingly, the hermeneutic way of doing research is influenced by the theoretical frames of the researcher, but this does not mean that there must be clearly outspoken hypotheses. Instead, research is focused on the creation of hypotheses. As a result, the observations and how they are interpreted is a very important domain that needs to be deeply understood before starting out the research project.

**Fieldwork**
The project research plan is based on the methodologies described in Design Research Methodology (DRM), by Blessing & Chakrabarti[8] and consists of four phases.
The first phase within the DRM methodology, the research clarification, gives the information needed and explores challenges. A close cooperation with the participating companies will ensure a focus on relevant issues.

The second phase, the descriptive study, becomes a reference model that highlights the problems in the investigated area, shows the relevance of the research topic, clarifies and illustrates the main line of argumentation, and points at the factors that are most suitable to address in order to improve the situation. In this phase, the companies will contribute by allowing participating observations, interviews and as objects for analysis.

The third phase, the prescriptive study, will produce an impact model with a description of support addressing the key factors.

Finally, the fourth phase, the second descriptive study, evaluates criteria for success and implications of the findings for the developed support.

**Current status**

The research project, so far, has included the main part of the first phase in the DRM approach, the Research Clarification phase (see figure below). Topics of interest have been investigated by mapping of the researchers previous experiences, by meetings, conferences and seminars with companies and researchers in the field and by examining literature. The goal has been to establish a common picture of the interest area and the creation of a reference and impact model trying to detect the main problems/obstacles, key factors and measurable success factors.
The study is currently investigating what research methods could be appropriate. The approach will be qualitative, including semi-structured interviews, observations and dialog-seminars. The research aims at explaining a situation, showing problems and paradoxes. It will not follow a normative tradition, stating how things “ought to be”, but rather try to explain and show the complexity of design strategy in large technology intense companies. As design involves many different disciplines with fundamentally different backgrounds, educations and traditions (as engineering, marketing and strategy among others), this research will try to avoid to “speak the language” of one of this disciplines. Instead, the study takes a narrative approach, focusing on a thorough and rich description of the situation. The researcher believes that this approach opens up for several disciplines to understand and interpret the findings.

Together with the investigations of suitable methods, a focused literature search and the finishing of a research proposal is ongoing.

**Time plan**

The research project is part of a larger project, called Design- and Visualization Methods (DeViP) and belongs to the research focus area Innovation and Design Inspired Product Realization within the environment IPR (Innovation and Product Realization) at the Mälardalen University. This environment, IPR, consists of different research groups within engineering as Product- and Process Development, Innovation Science & Management and Information- and Interaction design. The IPR milieu has an interdisciplinary approach where different disciplines can merge to create better products, processes, services and changed mindsets.

The DeViP project aims to cooperate and gain knowledge from the participating Ph D students and senior researchers. Therefore, a common time plan has been created, focusing on activities and deliverables for the coming three years. The project consists of three Ph D students with one work package (WP) each, a core team of researchers and
an advisory board with members from international universities. The research described in this paper is the WP 2 (see below).

**Figure 4 Project plan DeVip 2010-2012, deliverables and activities**

### Theories of departure / Current Research

**From Design to Design Management**

**The sixties and seventies**

The work of the designers in the sixties focused on form and the possibilities of new materials like polymers. Designing was product oriented by one or a few designers, often working as consultants to a company (like Sigvard Bernadotte for the Danish silversmith Georg Jensen or Arne Jacobsen for Novo Pharmaceutical, SAS etc).

The seventies were the decade of democracy, the people movement, the fight for the individual. Designers considered themselves as helping the people to understand the value of design. To interpret and propose solutions to the public. To help business leaders to understand the power of design. The focus turned into new technology like computer analyzes. Edgar Kaufmann, who was then Professor of Architecture at the Colombia University, thought that the “greatest task of industrial design was to understand and interpret the data collected and systematized by the computers[9].

**The eighties**

But the era of designers as “stars”, dictating the direction of product development changed. In the eighties, the faith in the individual, in business-terms expressed as the
consumer, was still present. But not only through the lenses of designers. Management and strategy was on the agenda, focusing on rational ways of satisfying the customer. Michael Porter’s normative theories of “formulating a plan and then implementing it” came to be a dominant view within the strategy discourse[10].

Design was no longer seen as a “finishing touch” but to be a more integrated part in the development process. It became more multi-functional oriented. Designers were described as a competence that ”sees associations”, ”makes relationships”, ”works as an executor”, and ”is an interface”, to quote David Bernstein, at that time an advertising man of The Creative Business, an specialist agency within communication and design skills[11]. He explained that the design-aware companies in the eighties experimented with structure - creating a tension between the self-disciplined cadre of management and the anarchy of designers, intentionally trying to brake down barriers. The aim was to give design a more central role, including an earlier involvement in the product development process and strive for a mix of competences within the company.

**Design in the organization**

**The idea: from isolated to integrated**

Despite the aim to integrate design in a larger context, the increased focus of management and efficiency in the eighties placed the design competence in a weaker position. Instead of bridging the different competences in an organization, design gained a role in the growing interest of corporate identity, intended to ensure a common and consequent message from the company towards its customers. Design became a part of branding in the nineties with close links to the field of marketing.

Simultaneously, the community of designers strived for the legitimacy of design on a top management level. Assessing design as a competitive advantage raised the discussion of design as a strategic tool. Lisbeth Svengren at Lund University, Sweden, showed that design-oriented companies proved successful by a collective and well-established attitude towards design. This included an comprehensive vision on how the physical objects of an organization make life better, easier, funnier etc, an empathy towards the users, an aesthetical feeling and finally, the courage to emphasize and implement these elements[12].

**Brand Management verses Design Management**

The strategic use of design is still not common in the vast majority of companies. Still, design, as in brand management is dominant. Branding, according to Johansson and Svengren Holm[13] is about communicating the core values of the company. It is associated with abstract associations, focused on the product concept rather than the product features and keeps a market focus with offers to the customer. Brand management is to be coherent within the organization and it is often about consumer goods. It is understood as an activity that pays back. But brand management, despite its holistic approach, does not take into account the production process.

Design management, on the other hand, deals with concrete associations as it is focusing on the product and its features. It deals with the organization as such, including different departments, it puts value through design, it deals with manufacturing and costs. Design also has a tradition to take a social responsibility, putting the user in front where as brand management and marketing traditionally have put more emphasizes on the surface and on sales.
It seems as the fundamental differences between brand management and design management create difficulties to understand each other. When these different activities are not cooperating there is a risk of a gap between the identity that the company communicates and the identity of what it consists.

The reality: clear understanding but less action
The creation of a collective attitude towards design was, and still is, a challenge to many companies. An important factor is the level of integration between the different competences and a mutual understanding among them, another major factor is the skills of leadership in the organization. Many scholars have therefore investigated the links between engineering and business departments, between design, product innovation marketing[14-17]. The result is evident, investing in design is a success factor but integrating it is key. Today research still try to understand the remaining question, namely why a lot of companies still do not include design to a greater extent.

Promoting design on a strategic level has resulted in several models for the understanding and use of design, as The Danish Design Ladder[18] and the Design Management Staircase[19]. Both are focusing on design as a problem solver but leave out the organizational context of the company. None of them do fully apply to large divisionalized organizations, splitting design departments on several units, in several countries, on different hierarchical levels and far away from the top executives. In these companies, Sabine Junginger argues, design efforts remains “disconnected rather than working unison towards a common purpose or vision” [4].

Consequently, a major problem for companies today is not to understand the potential of design, but to implement it. In Sweden, the development of an integrated innovation and design strategy has so far not been common[20]. The result is that these large companies are entering problems to stay innovative - despite the knowledge of the potential of design.

Design Management – the integrating capability
As an answer to the question about how to implement design, Brigitte Borga de Mozota, in 2003, presented her theories on design management. She describes design as differentiating, coordinating and transforming. Design can be found on an operational level, a functional level and a strategic level. On the operational level design can change the activities in the value chain (as in brand marketing, production and communication). On a functional level, design takes a wider stance, changing the support activities (as in technology and innovation management). Finally, on the strategic level, design can change the value chain of the entire industry (when working with strategy, knowledge and networking management).

Integrating
The value of design is its holistic approach. It puts “human values over technological ones”. Mozota argues that design adds a customer perspective to the process of new product development and that design management has to combine product integrity and organizational structure, it must bring market info and technological context, create close links between marketing and R&D, build “liaisons” between communication, technology management, information management, marketing and
human resources. To summarize, Mozota sees design in as an integrator, understanding the customer and the society, creating competitive advantage and innovation space.

The integrating role of design must then be combined with an understanding of what the top management wants. It is a well-known fact that the attitude towards design from top management is crucial for successfully implement design. But design must also understand other parameters. Kotler and Rath ([3]s 60) adds arguments like the lack of knowledge, budgets and resistance to change. Mutual suspicion between managers and creative teams are other factors. The tasks of a design manager are clearly multi faceted.

Strategy
Mozotas answer to overcome the difficulties is to adapt to different design management strategies. Strategy and design have a lot in common. Both are problem solvers, work with creativity and innovation. They are systematic and coordinating and focus on culture and customers. To have a competitive strategy is to think different. The way of thinking connects strategy thinking to design, which is a way of thinking divergent.

But before creating a strategy, the company must clearly define their identity and core values. The place of design in the organization must be concluded. Should design belong to R&D and production, or to marketing or even be an independent department? Design then has to "educate" the organization about the core values, the design strategy and the way to think of design, according to Mozota. This is necessary to secure the design activity in the company and to promote prospective design projects.

Further on, design must create networks both internally and externally. The main goal is to create trust in design to guarantee future investment in this activity. This can be done by finding the key-factors where design can contribute and criterias for measuring.

Strategy, innovation, engineering and design

A merger of competences
From the product oriented perspective and focus on visualization, design came to be viewed as an integrator and as a part of the organizational context. Over time design has turned into a strategic means and further more, to play a role in the innovation discourse and as a part of the product realization process. The domains of strategy, innovation, engineering and design have slowly come closer to one another, with common and overlapping fields of interest. They are all used for growth-intended strategic work, for organizational change and as competitive tools[10].

Clearly, similarities exist. But what are the different characteristics of these different domains of knowledge? The strategy discourse is an executive discipline with focus on resource planning, long-term goals and decision making[10] whereas innovations combines technology and market focus. Engineering is targeted to a defined goal and associated with the analyses and solutions of problems. Design, on the other hand, stems from architecture and art and is characterized by an open-ended approach focusing on “sense making”.

Innovation and engineering
Innovations are traditionally related to technological development but exist in varying fields as processes, services and management practices. The field is based on entrepreneurship and economics and aims at “making something new” on the market. A classical definition is the one of Schumpeter, who in the 1930’s stated that innovation
drive economic development forward. It is an invention in use, an invention that has reached the market.

In the field of engineering, innovation relates to the product development process. It could be considered as a process of transforming different stakeholder’s needs into output information, corresponding to the manufacturing of good design. It includes scenario planning, idea and technology management, product planning, product development and production development including logistics, maintenance and recycling[21]. To be efficient, the product development process demands the collaboration of many different competences and phases. Horizontal integration (often used for complementary technology knowledge) and vertical integration (for cost reduction) as well as a large amount of information must be coordinated. The process must be flexible to adjust to new demands.

The complexity of the production system and its process is challenging and complex task for all organizations. Engineering, based on problem solving, has developed analytical structured design methods, for example by Pahl and Beitz[22, 23], Ulrich and Eppinger[23] or the Toyota Production System[24] to manage the activity. These models derive from an engineering perspective and tend to be descriptive and normative, demanding a subjective and specific method or processes.

If the company strives for innovation, these models tend to leave out important but constantly present factors as the level of uncertainty, of flexibility and of creativity. There is a need for new models where traditional production factors are complemented with the important resources of knowledge and creativity[25]. When incorporating these values in the traditional engineering field the company creates a bridge to the competences of innovation and design. The combination of engineering science and technology with the market focus in the innovation field and the open-ended design practice is a given competitive advantage. It is a key challenge for companies today, it is an imperative[26]!

Open innovation
In the search for innovative ways of improving products as well as for new product development, the stream of open innovation is a growing field of interest for several companies. Open innovation is the idea to turn to external communities for modifying and improving the products or service of a company[27]. Von Hippel [28]stretches the concept, focusing on “lead-users” as co-producers in the innovation process. By including the consumer in the product development process these theories show similarities to the methods traditionally used by designers. The involvement of users is a popular approach in many companies but parallel to the praise of the consumer, the question about the use and reliability of the user is always present. Is it profitable and wise to let the customer decide the direction for new products? Do the customer always know what the most urgent need will be in the future?

Design thinking

Designers – an elite?
Innovation and design are clearly related competences focusing open ended solutions, useful to the consumer and to the market. The combination of design and business has resulted in the discourse of design thinking, a popular subject among executives and in the field of management. In the academy however, the concept of design thinking is not new. Schöön[29] described almost three decades ago “how designers think”, stressing the
intuitive process which some practitioners bring to situations of uncertainty, instability, uniqueness and value conflict[30]. Cross stated that design must avoid swamping its competence with different cultures as science and art, building a strong and intellectual culture[30]. This uniqueness of design was further described by Buchanan[31] explaining that designers must work on the creative re-definition of ill-defined design problems.

Non-designers

Design thinking derives from the view of the designer possessing certain unique skills. But, in recent years the discussion of design thinking has come to emphasize, not the individual designer, but the collective process of how to solve a problem, including several competences. The focus has turned to how business can use design without being designers, an idea that is associated with the design and innovation firm IDEO[32]. The starting point is multifunctional, and turned into the intuition of “people who may have never thought of themselves as designers” to quote Tim Brown, the CEO of IDEO[33].

But, the idea of a collective design process is not new. In Sweden, the process of including the user has a long tradition in ergonomics[6], and the Swedish way of working is built on the consensus-approach, a strong reference in the Swedish culture. Swedish firms are not used to the more hierarchical models previously used abroad. The design thinking debate is maybe a new phenomenon in the business world outside of Sweden? It might not be new to countries where design has a long tradition among top executives, like in Italy where design driven leaders are more present.

A new outlook

Interpretation or intuition?

In an era of increased competition, design finds itself in a more complex arena than ever before. The mobility of people, the convergence of sciences and the increasing power of micro processors, described by Frans Johansson in the Medici Effect[34], create new intersections between people and businesses, leading to potential innovations. This new and ever changing climate demands an increased focus on the world outside the company. The opportunities within the organization must be combined with the ideas of external sources.

Focusing on insights from the society and gaining knowledge from outside of the company is not a new thought. But a burning question, more important than ever before. Thirty years ago, Mischa Black, Professor in Industrial Design at the Royal College of Art, London[9] stressed that designers, instead of creating one universal style, referred to as “good taste”, should focus on the importance of studying behaviors and social symbols. David Bernstein[11] put the designer in an even more wide position when expressing that "He must be part social scientist” and Edgar Kaufmann followed this logic, explaining that the most important tool for designers is not the raw material as wood and metal, but the people, which should be the source of inspiration. Further on he says, intuition cannot be the staring point as it is “too risky”.

An opposite view to the listening and interpreting role of design has always been present. Terence Conran, the textile designer of retailer chain Habitat, suggested that there might be doubt about the role of the consumer[11]. Maybe he or she “should be surprised” instead of dictating the attributes of a product. This was also the opinion of Günther Zempelin, a German industrialist connected to the Dutch chemical company Akzo, saying “to be successful - constant fine tuning is required to meet the mood of the consumer, or better still, to tell him what mood will be before he has realized it!"
Whether designers should act on intuition or interpret the moves of people is an ever-ongoing discussion. It is clear that companies must pay more attention to the activity outside their own business but simultaneously develop tools to handle the complex processes of their organizations. As the competences of design, strategy, engineering and innovation are merging there is a need for a holistic approach. The demands on the design function are increasing with a wider and more all-embracing scope than ever before.

**Design as a combination of internal and external competencies**

But are the designers the right persons to take the lead and manage the design and innovation process? Peter F Druckner pointed out 1985 already, that innovation is the responsible of every executive, and it begins with a conscious search for opportunities. He stresses the importance of context, to “go out and look, ask, and listen”[35].

Innovation, as stated by Druckner, requires hard, focused, purposeful work and it aims at leadership from the beginning, otherwise it is unlikely to be innovative enough.

Similar to Druckner’s view of leadership and the need to search outside the domains of the company are the approach developed by Roberto Verganti. He explains how to combine design and innovation in the process of listening-interpreting and addressing[5]. Focusing on the link between meaning and technology, Verganti suggests that a company should identify key interpreters outside the organization to gain knowledge about the fundamental needs of people. Instead of the traditional sources of marketing and beyond the classical trust of user-opinions, the company should cultivate its relational assets with the community, with cultural institutions, with schools, partners and sub-contractors.

Companies must learn to combine their core competence of technology with the external knowledge of the meaning of things. This means breeding the personal relations, keeping an open door to new socio cultural phenomena, new meanings and - in the end - to the proposal of new solutions. Verganti’s approach suggests that this “design driven” innovation is to be led by the top executives, aiming at the development of a continuous dialogue – resulting in a unique and “hard-to-copy” asset. This fundamental meaning of things will then be delivered to the people through the proposal of new, innovative products.

**Relation to own research**

The majority of theories of Verganti relate to consumer products and his findings are to a certain extent based on the Italian manufacturing industry. But the core message about combining the internal knowledge of technology with the external influences is universal and applicable to all business. Could his theories be applied to large, divisionalized companies in Sweden?

Some questions related to these theories are: to
- How can large organizations find and develop relations to key interpreters?
- How can they make use of the networks of their employees?
- What are the driving forces for Swedish companies when it comes to innovation strategies?
- How does technical dominance relate to design driven innovation?
- What are the plans when “technology is not enough”?

These questions could be the subject for the empirical study. The research questions would be answered by conducting interviews, observations and dialog-meetings with
employees and top executives in the companies and with external partners like customers and design agencies.

The Empirical study

Participating companies
The research project will investigate the design- and strategy activities in two technology intense companies, ABB Robotics and Bombardier Transportation. They are both situated in Västerås, in the Mälardalen region in Sweden and presented below.

ABB Robotics
Automation and robotics is becoming more and more important in order for small and medium sized companies to stay competitive. In the area of industrial robotics, ABB Robotics is a world leader. The company provides industrial robots, software for robots as well as system integration of robots.

ABB Robotics has a long tradition of involving industrial design in the product development process. The research interest of the company lies in the development of new and improved methods for integrating industrial design in the product development process – and - to clarify how efficient industrial design can support the future strategies of business development and sales.

Bombardier
High-capacity urban transport networks as well as high-speed trains are becoming a more and more attractive solution to major cities, regions and airports. Bombardier is a global transportation company with two industry-leading businesses, aerospace and rail transportation. This includes commercial and business jets, as well as rail transportation equipment, systems and services. In Västerås, Sweden, Bombardier has a core centre for design and product- and service development.

The company views the proposed research as a step towards a more dynamic and adaptive integration of industrial design within the product development process. The goal is the development of new, innovative methods and a more efficient, internal product development, giving strength and support to business and sales, towards the realization of new products on the market.

Both ABB Robotics and Bombardier will provide resources for discussions, observations, interviews, case studies and serve as a dialogue partner in the development of support for improved design activities. The research will be conducted within the sites of the respective companies. A project plan with prioritized activities and time schedule will be set up late spring 2010 and the case studies will start in fall 2010.

Other sources
The research is also connected to the newly established Nordic Design Management Network consisting of design managers from the four Nordic Countries Sweden, Norway, Denmark and Finland. This network meets two times a year and contributes with a critical and up to date view of the challenges within the area of design management. This network is an initiative from the Danish Design Centre and SVID and is a valuable way to gain knowledge of relevant issues as well as the establishment of
contacts. Members in the network are Volvo, IKEA, Sony Ericson, Stokke, Novo Pharamceutical, Sandvik, among others.

The Research Community

One of the leading actors within the field of design management is The Design management Institute (DMI), an international nonprofit organization that “seeks to heighten awareness of design as an essential part of business strategy”. It was founded in US in 1975 and arranges conferences, seminars and publishes research reports. It provides a monthly newsletter, the DMI News, the Design Management Review (four times a year) and the Design Management Journal (once a year).

Another important actor is The British Design Council, concentrating on how design “can help build a stronger economy and improve everyday life”. The council is a government agency with a Royal Charter, funded 1944 by the Department of Business Innovation and Skills. Interesting publications include surveys on the UK industry, the Business Innovation newsletter and Pinged, a newsletter for designers.

More research oriented is the Design Research Society, “a multi-disciplinary learned society for the design research community worldwide”. Publications range from the free monthly newsletter Design Research News, the journal Design Studies, and a public digital archive of peer reviewed conference proceedings. The DRS organizes and promotes design research events around the world. Some events are major peer reviewed conferences, others may be one-day symposia and non peer reviewed conferences.

In Sweden, the Swedish Design & Research Network was founded in 2004 to support design research through the offer of doctoral courses for Ph D students. It is headed by professor Peter Ullmark at KTH in Stockholm. As the Ph D students in design management at the different universities around Sweden are few, the National Swedish Research School was created in 2007. This school arranges Ph D courses and activities.

Central to the design research in Sweden are also the SVID, the Swedish Industrial Design Foundation. SVID aims 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 was founded in 1989 by the Royal Swedish Academy of Engineering Sciences (IVA), the Swedish National Board for Industrial and Technical Development, (NUTEK), and the Swedish Society of Crafts and Design (Svensk Form). SVID publish the Design Research journal a few times a year.

Influential groups

In Sweden the research is focused to Business & Design Lab, at Gothenburg University in Gothenburg, headed by professor Ulla Johansson. The focus is on the design process, design as a strategic resource and design thinking. The ambition is to build an internationally recognized research group within the field of design as a strategic tool for innovation and business development.
There is also the **Nordic Design Research network, Nordes**, for people interested in design research. This network arrange conferences and summer schools.

Interesting research is also represented by **Helsinki School of Economics** (contact person Tony-Matti Karjala, at IDBM) and **Copenhagen Business School**. **University of Dundee** in Scotland and **Brunel University** in London are recommended by Naomi Gormick, one of the founders of the design management field as well as **North Umbria University** in Newcastle, said to be one of the best design management educations worldwide. Other interesting schools include the **Imperial College of Art** in London (contact: Bruce Tether), **Politecnico di Milano** in Italy (contact Roberto Verganti) and the ESADE Business School in Barcelona, Spain. Outside of Europe American universities like D-school at Stanford University (contact: Robert Sutton) and Rotman School of Management in Toronto would be interesting to investigate further.

**Important conferences**
The DMI arranges three professional education conferences each year for senior management. One of them takes place in Europe, the European International Conference, in early spring. The two others are the Brand Design Conference in late spring and the International Design Management Conference in October, both in US. The first, the European conference, is interesting as it focuses on international design management issues. The third, the International Design Management Conference could also be inspiring. The focus here is leadership, design issues and trends across the disciplines.

One important conference is the \textit{“M5 + D = nV” - October 25-27, 2010, in Providence, Rhode Island, USA} This is the annual DMI conference, focusing on the five major macro shifts (M5) we are facing, and “how Design, with a capital D, can help in new value creation (nV)”. In addition, DMI sponsors the biennial International Forum on Design Management Research and Education.

Eiasm, The European Institute for Advanced Studies in Management, is an international network for management research and teaching in different established disciplines as marketing, accounting, product development and technology management. The institute also arranges conferences, seminars and summer schools on design.

One important event is the \textit{20th European Doctoral Summer School on Technology Management – September 6-10, 2010, in Volterra, Italy}. It focuses on the complex and multifaceted challenges in technology management and the economic social and environmental trends that are extending this. Students will learn from comparing experience and analyses across different situations. This could be a valuable opportunity to discuss the research project, design management in technology intense companies.

**Important Journals**

**Design Management Review** – published four times a year by the DMI, focuses on design strategy, methods, and leadership, supported by case studies and research.

**Design Management Journal** – published once a year by the DMI. It is a refereed journal devoted to articles and academic research “exploring how design—in products, communication, and environments—is an essential resource, a component of every organization that can be effectively managed to make important contributions to the bottom line and to long-term success”.

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**Design Issues** – published four times a year, a quarterly academic journal in design history, theory, and criticism.

**The Journal of Product Innovation Management** – published six times a year, an academic journal devoted to the latest research, theory, and practice in new product and service development.

**Design studies** – focuses on the understanding of design from comparisons across all domains of application, including engineering and product design, architectural design and planning, computer artifacts and systems design.

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