The role of Designers in competing with design

John K. Christiansen, Copenhagen Business School[a]

Marta Gasparin, Leicester University[Δ]

Paper submitted for

INTERNATIONAL COMPETITIVENESS MANAGEMENT CONFERENCE

Copenhagen Business School
January 19-20, 2015

[a]) Johnc@cbs.dk
[Δ]) marta.gaspa@gmail.com

Abstract

This paper is part of an ongoing research project on how companies can improve their management of design. This paper specifically addresses the role of Designers in the fabrication of design.

Several studies have agreed with the fact that companies, who actually consider design as an important driver can achieve higher profits than those who do not (Hertenstein et al., 2005; Chiva- Gomez and Alegre, 2009). Prior research on design and design management has considered design from multiple perspectives such as the product of the grand thoughts of a designer (Lam et al., 2006), something to add to products during the development phase or after (Cooper et al., 2003; Ulrich, 2006), an integrated part of industrial design (Veryzer, 2005), a part of the branding and design efforts for whole companies (Borja De Mozota, 2003), or proposals of new interpretations and meanings (Verganti, 2008). However, recent longitudinal studies on design intensive products have revealed that design can also be considered in a more dynamic and emerging perspective (Christiansen et al., 2010; Gasparin, 2014). Instead of considering design as an add-on and permanent feature inherent to a product, a design may be presented as a competitive tool to improve the companies' performance.

The paper starts with a literature review on different perspectives on design management.

This paper introduces four in-depth case studies of high intensive design products. We propose an analysis of the role of designers with the lenses of the five perspectives, and discuss how they can contribute to competitiveness. We propose some future avenues for further research and will present some ideas on the conference.

Introduction

Walsh et al (1988) entitled their article "competitive by design". The authors were affirming that firms, which compete successfully with design, can the best of their rivals. A renewed awareness in academia and practitioners' world has recognized design as one of the crucial factors in international competitiveness. Design is defined in many different ways. In the Oxford Dictionary, design is defined as:

> ... *the work of art and order and arrangement of these multiple entities coming together, and constructing a design product.*

According to this definition, design is an assembled product, a result of multiple interactions of variegated actors; therefore, the semiotic meaning of an object is a priori indeterminate and constructed. Heskett provided a definition of design that is understood to a certain extent as constructed:

> ... *the conception of a design is not simply a representation in visual form of predetermined values, but a creative, catalytic process in which external factors interact with the beliefs, talents and skills of individual designers or design-groups (Heskett, 1980, pg. 8).*

Walsh, V., Roy, R. & Bruce, M., 1988 reviewed prior research on design and competitiveness. They suggested that design could produce radical and incremental innovation:

> ... *improving the quality of a product by changing its design incrementally over time, can constitute a strategy for market success. So, too, can the design of an entirely new product embodying a technical advance in the state-of-the-art of a given field, and which more effectively meets market demand, or creates an entirely new demand (Walsh, V., Roy, R. & Bruce, M., 1988, pg. 207)*

In between these extremes is incremental innovation involving minor technological changes. There is a continuum of new designs enhancing product quality but involving no technological change, incremental innovations, and radical technological innovations. Radical innovation is more risky. Verganti (2001, 2008, 2009) has demonstrated how designers can foster radical innovation by proposing new meaning in the society, based on a hermeneutical approach. Therefore, in this paper, we are exploring the role of designers in fostering competitiveness through design.

Literature review
The literature review is divided into five perspectives: design as a rational decision making, based on the work of Simon, industrial design, initiated by the British professors in the 90s, concerned with how design can increase competitiveness of the firms, managing as designing, based on how managers can use designers as a source of inspiration to improve their organizations, design driven innovation, based on the work of Verganti on how designers can foster radical innovation by proposing new meanings, and finally design as a translation process based on recent socio-technical theories.

Design as a rational decision-making.

> *The engineer, and more generally the designer, is concerned with how things ought to be-how they ought to be in order to attain goals, and to function (Simon, 1969, pg. 4-5).*

The designers - in this view - have the role of communicating their understanding of the nature of complex things by reducing them to the interactions of their parts to simpler, more fundamental things. A complex system is nothing but the sum of its parts, and an account of it can be reduced to accounts of individual constituents. Simon wishes for a turn in design, since from the industrial revolution much, if not most, of what we knew about design and artificial sciences was considered intellectually soft, intuitive, and informal (Simon, 1969), while it should become a science. One of the main points of the analysis in the book is the difference between what natural scientists and people working with the artificial do. Scientists do "re-search", they repeat a search for patterns within available data that are past happenings by counting a population or designing a controlled experiment. The patterns of data analysis lead to understand the findings as existing a priori to their analysis. Based on these, the scientists construct theories that generalize what the data present, and the nature of the object studied is preserved. Designers are drawing, letting their ideas be represented as following the intuitive flow of thoughts arising during the delineation of the design process. Designers are also prototyping, making models of the artefacts to test form, fit and functionality. Simon highlights the limitation of a technical rationality growing out of engineering. Designers is not limited to a special training or profession:

> *Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artefacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state (Simon, 1969, pg. 111).*

This means that the role of designers is to plan determined courses of actions or artefacts, not necessarily to realize them. Designers should have broad vision and in designing the process, they should consider for each side the consequences, the solutions that would satisfy the conditions and attain the goals. They assemble problem solutions to problems from components, looking for appropriate aggregation. Designers are equated to biologists,

be- cause the organization is considered an adaptive system (inner) and they have to understand its characteristics. Simon describes designers as innovative people with different creative competences, working in a wide variety of professions. Designers are part of complex environments, they interact with other persons but also computers and other materials present in the company, they work with all these actors in organised cooperation to solve problems and achieve goals in an outer environment of great complexity. Therefore, they are people with the ability to combine empathy for the con- text of a problem, creativity in the generation of insights and solutions, and rationality to analyse and fit solutions to the context.

Industrial design

Industrial designers are among the several persons that participate in NPD. They are professionals that are able to work in multifunctional teams (composed by people from engineering, manufacturing, and marketing) (Perks et al., 2005).

> *More specifically, industrial designers focus on improving customer ease of product use and their graphic and aesthetic capabilities help to differentiate competitive product offerings and at- tract customers. These activities together with successful marketing campaigns enhance for customers the perceived product value, which in turn strengthens demand and/or justifies a relatively higher selling price, thus increasing sales revenue (sales) (Hertenstein et al., 2005, pg.5-6).*

The designer is a creative and artistic person that is working on developing a product or a service, acting as a coordinator (Borja de Mozota, 2003), harmonising the variegated components present in a project, and he/she acts as gatekeeper or integrator of the customers' needs (Bruce and Daly, 2007, Leonard-Barton, 1992). The designer usually has characteristics of project manager and conflict manager, but also
an innovator and a trend setter who tries to initiate change, to make a leap of imagination, and to produce an idea. He considers the world a reality to be interpreted (Borja de Mozota, 2003, pg. 4).

Designers are expected to meet the constraints that are given by managers, such as product costs, development process costs and time to develop (Hertenstein and Platt, 1997), to come out with a synthesis represented by the product or service (Cooper et al., 2003). Designers are frequently asked to become active in managing the innovation process, by applying new ideas in practice of the form of new or improved products, services or processes (Bruce and Bessant, 2002). In the projects, designers are expected to co- ordinate different roles and interpret the given instructions, including human values over the technological constraints (Bruce and Jevnaker, 1998, Jun, 2008). The designers are a source of different skills and knowledge, able to integrate with their expertise and relation networks the different actors, contributing to the competitive advantage of the firm (Twigg, 1998). The following list presents descriptions from literature in this perspective, which delineate the profile of the designer:

Possessing design skills; able to manage the design process; able to visualise products and services; risk taking; creative; able to use different materials; constantly researching for new solutions; original; possessing commercial skills; able to visualise the markets and understanding the needs; able to analyse and anticipate future trends; capable of building different scenarios; proactive in developing relationships; having a commercial vision; able to manage uncertainty; good at presenting and persuading through prototype and iteration; good at synthesizing; able to under- stand and balance stakeholders requirements; possessing intuitive thinking and action; striving for elegance;

These characteristics lead to delineate that the designers are catalyzers, creative persons able to lead to the generation of novel ideas, with the ability of combining ideas in new ways to solve problems and exploit opportunities, and to find modalities for changing patterns of consumption, taste and commercial imperatives. They purposively use design to increase creativity throughout the process of innovation, which entails combining function with materials to increase the efficiency of the production and combining style with appearance to increase the appeal of the products in the eyes of customers. Designers are expected to create something that has as an aesthetic output, functionality, reliability, and cost cutting, result of a process that translates ideas, opportunities or triggers something through the consistent deployment of creativity, extrapolating input from different parts of the organisation, from the market and from observing the customers (Bruce and Bessant, 2002, Bruce and Jevnaker, 1998). They are problem solvers, gen- erators of potential solutions and translators of ideas about new products into sketches or prototypes, moderating a dialogue and enabling others to visualise the product and start a discussion its possibilities. They are know- ledge brokers and, through their creativity and bridging knowledge from one field to another, they are able to create radically new products (Hargadon and Sutton, 1997, 2000). Designers are the initiators of a process that is bringing to the synthesis of the project by concretising and materialising the solution (Ulrich, 2011). By being attentive to the aesthetics of the product (Person et al., 2008) and by creating a form that produces an artefact eliciting unity between structural, functional and symbolic constraints (Lam et al., 2006, Ulrich, 2011, 2006), they work at a multifunctional level in a synoptic way, considering the project as a plurality of factors. The designers act also as craftspersons by applying a distinct skill set to the task to develop a brief (Platt, 1996, Ryd, 2004). The designers can drive a company towards a more sustainable policy, by using recyclable and compatible materials, avoiding toxic materials, maximising use of all materials through recycling and reuse, minimising the number of parts and the disassembly surface, considering the raw materials used and the impact then of the product after it has terminated its life cycle, and maximising the modularity of the product development (Borja de Mozota, 2003). Finally, designers are in the category of the *creative class* (Florida, 2004), people that engage in works whose functions are to create meaningful new forms, contributing to the economic growth.

Managing as designing
The idea behind the perspective of managing as designing is that what managers do actually is very closed to what designers do, which is designing things (design

organisations, design processes, design products, or services). Therefore, if managers become better designers, they can become better man- agers, because the world needs new kinds of organisation forms, new ways of collaborating, of forming teams in organisations, new ways of approach- ing new problems (Boland and Collopy, 2004b). Designers have to make managers realising that the world is changing, the decision making process has to adapt to the given changes and that the used are not enough evolved (Orlikowski, 2004).

Designers engage managers in the day to day activities in design. Designers help managers to better understand the situation and make more appropriate and better decisions (Lyytinen, 2004). Designers have to assist managers who are going to be judged according to the success or failure of their products, manufacturing practices, employment policies. They affect the environment, the community in which they participate, and in firms in which they have a have stake. Management is about connecting all the projects together, so there is a need for people and the assistance of designers to keep networks together a particular time span to operate with liquidity and crystallisation (Czarniawska, 2004b). For managers, serendipity, fluidity and opportunism are characteristics in the project that must be present. Designers are inspirational figures that managers analyse and try to apply their characteristics to their managerial processes. The designers are able to anticipate and predict what designs they can achieve, better ponder over past actions and future plans (Weick, 1993). Improvisation is part of the decision- making process, and design should help with the choosing and implementation of a good alternative (Boland and Collopy, 2004a). Designers are inspiring people that create artefacts that people care about and which exhibit and endure aesthetic quality. Therefore, designers inspire managers to develop a deeper awareness of, appreciation for, and ability to engage with the generative power of human enactment (Cook, 2004). De- signers transmit the concept of enactment, a critical concept indicating that other actors (a part from designers) have a role in realizing their design (papers with sketches, white boards and computers with models, graphics, texts, in software, hardware, all the tools and persons that make representations of different realities possible, and the creation of desirable futures), which outcome depends on actions, decisions, enactment of design, and for the laminal space of enactment there lies the opportunity for slippage, for resistance, for learning, for change, for people to choose to do otherwise with the designs handed to them (Cook, 2004). Designers also encourage man- agers to deal with emergences, with understanding the relations between the actors that enact them in practice by committing to co-create. The author also suggests that designers should engage people and managers in such a way that can lead to transformed meanings, identities and inter-subjective actions and relations, stimulating each other's knowledge, reflecting order to understand the cognitive, and social materials and structural consequences of their design. This process can result in a change in the managers and their actions as a consequence. Designers and managers would thus both benefit from explicit attention to the critical influence of reflectiveness and to the generative power of enactment in the ongoing production of social and material realities (Cook, 2004). Designers can also teach managers how to manage uncertainty, how to stimulate creativity, how to solve problems, since designers are mediators having interactions that are highly conceptual, cooperative and complex. On the other hand, designers should learn from managers how to displace the concepts and how to be persuasive with other people (Wagner, 2004). Designers are producing very diversified material, and with different degrees of abstraction, scale and materiality (text, diagrams,

comics, videos, sketches, models, 3D), and the diversity of design artefacts increases their possibility of evaluating the design, as each representation helps make particular aspects of a design visible, transforming and reprogramming, working with placeholders, developing persuasive artifacts that give great visibility (Wagner, 2004). The essential part of planning is the production of persuasive artifacts that convince people of the viability of the design solution, involving others in a dialogue and stimulating their imaginations. Designers are people who can reduce anything to its basic form, explain it to others, and lead to ask better questions (Chung, 2004, pg. 185). Designers, in order to produce innovation (whether incremental or radical) begin with the understanding the problems that need to be solved: first, designers formulate the problem, then look for the data they need, through observational research methodologies to reveal latent needs that can form the basis of change initiatives (Chung, 2004). Designers observe, take pictures, ask questions, mock journeys, make spatial observations, absorb the atmosphere of a location, and find behavioural patterns. After having done this, they create frameworks so that they can unify design opportunities in order to conceive possible futures and make sure that all the parts and pieces that compose these futures are coordinated (Chung, 2004).

Designers as proposers of new meanings

Designers are considered one of the few people with the capacity to get closer to users, understand their needs, and creatively generate countless ideas. De- signers are persons who foster creativity, defined as culturally neutral, a tool that enter for helping to solve problems and conducting research on intrinsic meanings that can be conveyed through the product. A design driven innovation, by definition, diers substantially from the dominant meaning in the industry, and a design, from a proposal, can become a fluke (Dell'Era and Verganti, 2009). The designers are specialists, key- players in the radical innovation process. They are able to identify the changes in the socio-cultural and busi- ness field and come out with new product meanings that represent customer's unexpressed values. Designers are in charge of producing new breakthrough products that anticipate needs, and, therefore, have to recognise and sense what is contemporary (Verganti, 2008) with their superior sensitivity, be- cause

> *the quality of goods, services and identities are not of a tangible thing. In designing goods, services, and various kinds of identities, designers are concerned with their marketability, that is, the ability to bring them to the attention of relevant populations, and with diverse symbolic qualities that encourage targeted consumer groups to acquire something, somehow, connect with a service, recognise a brand, or be committed to a seller, organisation or cultural practice (Krippendorff, 2006, pg.8).*

Design- driven innovation is based on the capability of designers to inquire into the changes of culture, society and technologies, and to make proposals to influence the emerging dynamics in the socio-cultural models (Utterback et al., 2006). A proposal is considered a vision about possible new product meanings that customers have not thought about but that they were waiting for (Verganti, 2006), meanings embedded in the design product and it conveying a message to consumers (Utterback et al., 2006).

Designers propose a vision, a product, an idea for the material suitable for the production, being careful about the client's identity, history, and geography. The company can also ask designers to act as knowledge brokers, bridging knowledge from one part to another of the organisation:

> *... industrial designers may serve as a bridge not only between different clients but also between different departments within one client organisation. The designers are seen as impartial, en- gaged at the corporate level, and more likely to understand the different language of marking, manufacturing, and research and development- their concern is for an all- encompassing approach to the entire system (Utterback et al., 2006, pg. 141).*

Designers, having graphic capabilities, help to visualise the ideas to speed up the processes and improve the new product development:

> *an avenue involves designers in refining a promising idea from an inventor through visualisation of the inventive idea. Most often, designers come up with important additions to the original idea put forth by the inventor (Utterback et al., 2006, pg. 141).*

Designers, therefore, stimulate an innovation strategy in the company, based on an approach that foster the deeper emotional and symbolic side of products, innovating what products mean for the customers (Dell'Era and Verganti, 2009). Designers are specialists with the capabilities of understanding, anticipating and influencing the emergence of new products' meanings (Utter- back et al., 2006), but also brokers, between otherwise disconnected pools of ideas. The best innovators systematically use, replace and combine old ideas in new places and contexts to create new products or services (Hargadon and Sutton, 2000), bridging knowledge and combining diverse ideas to solve the problems for different users. Designers can create breakthrough product meanings acting on the semantic dimension of a product by capturing, transferring, recombining and integrating knowledge about different socio-cultural contexts and proposing new aesthetic solutions to transfer product languages and meanings across them. Due to their ability to bridge information from different parts of the wider network they are part of (Dell'Era et al., 2010, Dell'Era and Verganti, 2009), they take advantage of discrepancies in the level of knowledge possessed by different groups, connecting unconnected expertise within a larger network. Designers are supposed to produce and present one or multiple radical design proposals from which the management can select what is considered an appropriate one, compatible with the management risk profile, understanding the target market and the relevant strategic orientations (Verganti, 2009).

Designers are proposing innovations that customers do not expect, but that they eventually appreciate (Verganti, 2009). Proposing design driven innovation means making sense of things (Dell'Era and Verganti, 2009, Verganti, 2009). The designer is aware of how to conduct a problem solving activity by applying creativity and reasoning, facilitating knowledge sharing and transferring within universities, other freelancers, companies and customers, to capture the latent and tacit information needed. After having realised the idea, the designer visualises through mock ups and prototypes, and this contributes to

speed up the process by contributing to the development (Utterback et al., 2006). Thus, the designer is a person that understands, anticipates, and influences the emergence of new products meanings. The

The idea that meanings reside in user's perceptions and senses, and that there are different possible ways to interpret it, derived from a set of imaginable uses. These could involve past experiences, the differences with others, the composition, the material, the possible users and stakeholders. The designers are the only persons with the sensibility to extrapolate them (Verganti, 2009), but also reflect on possible negative effects in case of misuse (Krippendor, 2006). The designers have to act and involve the stakeholders, and to negotiate their stay in the network. Stake- holders are political actors who pursue their own agendas and attempt to alter the manifestations they have access to. Acting within their own worlds, they emerge by communicating their actions. When designers propose a new idea for a new product, they have to work on realising and involving its stake- holders, because it creates a new history, which challenges the current network. Therefore, the stakeholders' networks need to be reinstitutionalised, energised into structures and be provided with instruments to understand the meaning (Krippendor, 2006). Relevant and competent stakeholders are invited to contribute, and this could establish and potentiate the product' s credibility. The managers are also bringing socio-cultural researchers in the network, as well as marketing experts to help with the construction of narratives to facilitate the designers' task. There are no causal relationships that could determine the meaning of an artefacts, but there are cultural constraints on alternative readings, due to social habits, social context, history, and language use (Dell'Era et al., 2010). Therefore, designers create a hermeneutic circle, in which the meanings of an artefact depend on the meaning of its arrangement, and the meanings of its arrangement depend on that of its parts. One way in which the designers align the interests of the different stakeholders in the initial phases is by following the idea, explaining the support he/ she needs in the network, explaining and negotiating conflicting perspectives, their stake in the technological development, bringing them in their expertise, and convincing them to act in support or opposition of that development, by mobilising the resources they have. Verganti (2003, 2009) and Krippendor (2006) describe the motivations of designers as them being motivated not by a quest for knowledge for the knowledge' s sake, but by the challenges, vexatious situations, problems, and conflicts that are hard to solve, inspiring them to look for opportunities to change something for the better, to contribute to the lives of human beings, for opportunities to introduce modifications to the world that others may not dare to, in the hope of creating something new and exciting with a scope and a use. Designers have the capacity of not being concerned with what already exists, but they are aiming instead at exploring possible futures that could be created in real time, evaluating the desirability of these futures (Dell'Era et al., 2008b). Designers act according to implicit and explicit motivation. Concerning the extrinsic motivations, they justify actions by defending the goals that have to be reached, tasks to be completed, while intrinsic motivations justify actions on their own terms, such as substantial amounts of user autonomy, multiple sensory- motor coordinations, and continuous learning (Utterback, 2006). The designers are equipped with intellectual tools allowing them to imagine what did not exist before, to introduce desirable changes to the world, and to work at having positive technological, social, and cultural consequences (Krippendor, 2006). Designers have also to ensure the validity (experimental, interpretative, and methodological) of a

product to the managers, explaining to them the possible feasibility of paths from the present to alternative futures (Krippendorff, 2006).

> *What is peculiar in design-driven innovation is that designers act as brokers of knowledge on languages and not just on technology. Language brokering is even easier as product languages are not industry specific: They move across industries more fluently than technology (Verganti, 2008, pg.451).*

Designers create feasible paths from the present towards desirable future and propose them to the managers and the stakeholders, who are able to realise and put it to a test (Krippendorff, 2006). Because design can travel between different sociocultural worlds, this is a complex process, as design is also culturally embedded.

Management of design as a translation process

The designer is one among the many actors who are working to construct the design. He is also one among multiple actors inscribing meaning in the design. A designer is an actor that not only can engage himself actively for framing the object, but also can act as a mediator. If the role of mediator is successful, he can become a macro-actor (the term is analysed in more detail in the Section 3.3, pg.146). ANT is a philosophy that is analysing how actors are interacting at the local level without appealing to any super-entity more powerful than other actors. However, the paper by Callon and Latour (1981) recognises the possibility of the existence of a macro-actor. A micro-actor becomes a macro-actor when he/she obtains a contract that is the translation of all the negotiations, intrigues, calculations, acts of persuasion (Callon and Latour, 1981, pg. 279). In ANT, actors are isomorphic, that is, all the actors have ontologically the same size and what they are it is a consequence of a long struggle (Callon and Latour, 1981, pg. 280). However, in the paper it is alluded to the possibility of having actors that are macro-actors because they ally themselves with the black boxes and other actors, altering their size. Because of the capability of designers of networking, explained in the previous chapter, the designer can be considered a macro-actor able to move the design process because of this aggregation of actors supporting him/her, and he/she is able to bend the space around by firmly associating with a large number of allies (Callon and Latour, 1981), and making the difference when he/she can dissociate as speedily as possible elements enrolled in the network (Callon and Latour, 1981).

Below is an overview of the perspectives.

Perspective	Role of the designers	Innovation process	Example authors
Design as decision making	Designers plan determined courses of actions or artifacts; not necessarily to realize them. Designers are creative persons, with creative competencies, working in a wide variety of professions	Happens in the modules- it is a modular approach	Simon 1969
Industrial design	Creativity, problem solving, observation, interpretation of data, aesthetic judgment, stretching, drawing models, ergonomic analysis, multidisciplinary thinking, working in multi-disciplinal and multi-factional teams, critical analysis and selection, designing for manufacture, visualisation, critical analysis and selection	User centered	Borja de Mozota 2004
Managing as designers	Designers are inspirational figures for managers, helping them to develop a design thinking mindset to solve problems and make decisions they share.	Organizational based	Weick 2002
Design driven innovation	Designers are the only people able to understand the unmet needs of society, so they have to understand them, to make them explicit in the idea development phase, and to present companies radically new products, which have semantic turn.	Design driven innovation	Utterback et al. (2006), Verganti(2008),
Management of design as a translation process	The designer is one among the many actors that are working to construct the design; he is a macro-actor	Collective effort	Christiansen et al, 2010 Callon & Latour (xxxx)

Method

The research process consisted of two activities: an initial explorative part and a historical ethnography conducted in a leading design company, Fritz Hansen located in Denmark.

Fritz Hansen´s official business strategy is twofold: to exploit the value created by the classic items, and to rejuvenate the brand by launching every year a new product in the market (at *Fuori Salone* design fair in Milano), with the hope it will be the new classic product in a near future. The design philosophy currently adopted by the company consists of design ambitions and core values, which are used as guidelines for developing new products: the design philosophy continuously seeks the "obvious" visual (original pure, long lasting), emotional (genuine, serene, Danish), rational (superior, quality refined, aging with beauty). The company considered the selected three cases presented here a radical innovation.

The data collection has covered a period of two years, first initially in 2009-2010 and then another year in 2011-2012. More than 20 interviews have been conducted supplemented with observations and participations in meetings and the collection of various written materials. For one year, the company has been visited in different occasions, and during some months with visits and stays 2-3 times a week.

The warehouse, where the company documents from the 50s, 60s and 70ties are located, was open for investigation. Newspapers, marketing material and brochures between 1955 and 1965 and 1999-2002 (the years of the respective launches) have been exanimated, photographed and stored in a database. A visual analysis has been carried out with special software. The data emerging from the ethnographic observations have been triangulated with 8 extra interviews: The Design manager twice, the PR manager, two interviews with a retired designer working in the company for 50 years, The external designer Kasper Salto, the former design manager, the CFO). The interviews latest between 1 hour and 2.5 hours, and all interviews have been recorded, transcribed, coded and analyzed with software for qualitative research (Dedoose). All the visits in the company have been extensively documented in a field note journal. Two workshops and two presentations of the preliminary results have been carried out to validate the results. The steering committee consists of the representatives of the company and of the university, and had meetings, on average, every 4- 6 month, to discuss the observations.

The three cases studies were selected in close consultation with the managers and approved during the first steer committee meeting. The cases were selected according to the Davila (2000) definition: a change in at least one of the areas including technology, organization, and customer interaction. After this analysis the cases identified were the Serie7, the Egg, and the Ice chair.

This study is exploratory (Drenth, Thierry, and Wolff, 1998, p. 15; Kotler, Adam, et al., 2006, p. 122), aimed to understand how a certain design has emerged, and which has been the product development process able to sustain it.

As methodology and theoretical framework, the ANT perspective was adopted. This perspective claims that organizational life is emergent, fragile and temporal, and to understand it, we have to look at how it is mobilized and how it makes a difference in organizing activities (Christiansen et al., 2011). The approach is in line with parts of the sociology of technology that consider technology as a network effect, and its understanding is related to the context of the network of which it is a part. In such a perspective, a phenomenon like innovation is co-produced by the heterogeneous network of elements that constitutes it, *"actors and organizations mobilize, juxtapose, and hold together the bits and pieces out of which they are composed"* (Law, 1992).

ANALYTICAL FRAMEWORK FOR THE EMPERICAL ANALYSIS
The cases are illustrated by analyzing them through the lenses of the perspectives presented in the literature review, analyzing the process, the role of designers, the effect, and how the role of designers have increased competitiveness for the firm by proposing a competitive product.

CASES

The cases chosen are four products manufactured by Fritz Hansen in different historical times (Serie7, Egg, Ice, Ro), and one from B&O. The following table presents the cases according to the analytical framework.

	Success of the product	*Aggregate sales (2013)*	*Significant technological innovation*	*Product development process*	*Positive design contribution*
Case 1	Most sold chair in the world. Launched in 1955	2.874.905.238	Introduction of the plywood in Europe	2 years	Yes
Case 2	Most innovative lounge chair when introduced. Launched in 1958	73.597	Use of the Styropore in Europe for furniture	2 years	Yes
Case 3	Suitable both indoor and outdoor. Launched in 2002	106.075	Plastic in the product portfolio	5 years	No
Case 4	New easy chair, affordable price. Launched in 2013	n.a	Innovation in bending the back of the chair	2 years	Yes

CASE 1

The Serie7 is a plywood chair designed by Arne Jacobsen, manufactured by Fritz Hansen Eft., introduced in the market in 1955 and it is the most sold chair in the world. From the analysis, it emerged that this was considered a special chair. It was the first plywood furniture for industrial production designed in Denmark, and the material was considered a radical innovation in terms of manufacturing: Søren Hansen, manager of the company, was trying to find new ways to manufacture the chairs. After the Second World- war, the firm Thonet, which was considered the most successful company in the furniture industry, went into bankruptcy, since the cost men-per-hour increased. Søren Hansen had the intention to develop an industrial design chair to be produced in large quantities, and not produced with the bent wood technique, and designed by architects and not cabinetmakers to increase the quality and the comfort through the new studies on ergonomics that were developing in the architectural schools. The company decided to hire Arne Jacobsen for designing the chairs. Søren Hansen showed him the chairs he brought from America: the chairs of Charles and

Ray Eames and Eero Saarinen, made of plywood. Plywood was a new material that was used for the first time by Alvar Aalto and made industrial by the chairs of the Eames and Saarinen, in USA. Søren Hansen was willing to finance the initiative, because he though it was necessary to bring some changes in the production of the chairs and being the first producer of plywood in Europe.

	Design process	*Role of designer*	*Impact on competitiveness*
Design as rational decision	Søren Hansen decided to design a new chair that was industrially made, with a lower production cost, made of plywood in order to solve the problem of increasing costs in the cabinetmaker market	Arne Jacobsen planned the design of the chair, with the different alternatives, use of materials.	By proposing an optimum solution, with a new material, difficult to copy
Industrial design	Søren Hansen has planned the process according to a linear model, in which the next step was happening if the previous one was completed: he started to work on the prototype after the drawings were completed, he accepted the prototype after the business case was agreed	Arne Jacobsen was hired to stimulate creativity, problem solving, observation, interpretation, aesthetic judgment	Higher price, lower production cost, better company image, emotional, symbolic value, new market possibilities
Managing as designers	Søren Hansen applied the design thinking process: everyone is a designer and he asked to his employees, including the manufacturing department, to be creative and propose liable solutions on how to use the plywood for furniture, and adapt the notions acquired in USA to the local timber	Arne Jacobsen was an inspirational figures for Søren Hansen and the all factory. Fritz Hansen, brother of Søren Hansen, as a machine engineer needed to find the appropriate way of working with the plywood made of beech, the native timber. The men in the manufacturing department were inspired by Arne to design the chair with the seat and the back made of single piece of molded plywood. They developed a machine that was able	The company can compete internationally by designing a valuable and sustainable workflow, attentive to the American and European competitors, recognizing the competitive advantage of creating a factory able to develop furniture in plywood, able to react to changing situations

		to press the double-curved seat in one piece, and was able to make the layers smaller around the transitional section between seat and back, by stabilising the transition by bending the wood in the third plain.	
Design driven innovation	Søren Hansen was embedded in a cultural network in Europe and USA, and he hired Arne Jacobsen as designer to propose a new chair, which had a radical new meaning, with new material and production techniques coming from a different industry.	Arne Jacobsen proposed a new chair, which was design push rather than technology push or market pull, he proposed a new meaning for the furniture, based on the industrial production process rather than cabinetmaker, cheap and affordable. The chair was proposed at the exhibition H55 to prepare the general public to the new meaning	Competitiveness was fostered because there was a new meaning and a radically new product presented in the market, that was able to satisfied needs that were still latent
Management of design as a translation process	The serie7 was the outcome of the process of constructing things by translating interests and goals, enrolling and mobilising actors, creating a stable network of human and non human actors in the network.	Arne Jacobsen was one among the many actors that are working to construct the design; he was a macro-actor, organizing the design process and speaking for his studio and the actors that were working for him.	Competitiveness was achieved by creating a strong network around the serie7. Søren Hansen, as spokesperson, worked for associating and disassociating features to the chair and he worked for enrolling actors and participates at the translation process

CASE 2

The Egg is a lounge chair designed by Arne Jacobsen and manufactured by Fritz Hansen, introduced in the market in 1958, made of Styropor.

The presentation of the Egg was in November 1958 at the Formes Scandinaves exhibition at Musee des Arts Decoratifs in Paris, where the Egg and the Swan were presented as part of the interior for the SAS Royal Hotel. In a 1958 article in the Danish newspaper, Politiken, a headline referring to the Formes Scandinaves exhibition reads: "The French press is astonished by Danish Design."

Arne Jacobsen won the competition for building the Radisson Hotel (SAS) and he decided to design everything in the hotel, including the chairs. SAS Airplane promoted the construction of the SAS hotel (Royal Hotel) in Copenhagen, since it opened a new route to New York and Los Angeles (first in Europe), and it was the first company to have a flight to USA through the Nordic Pole. The hotel position was decided to be close to the train station to create an international hub. Arne Jacobsen was the architect who won the competition for designing the hotel and its interiors. Søren Hansen agreed on supporting the production of the furniture for the hotel, if it could have been industrially manufactured.

	Design process	Role of designer	Impact on competitiveness
Design as rational decision	Søren Hansen decided to design a new lounge chair that was industrially made, with a lower production cost, made of styropor in order to solve the problem of increasing costs in the cabinetmaker market	Arne Jacobsen planned the design of the chair, with the different alternatives, use of materials, different solutions for complex functional problems (like the shape of the shell and how to mould it)	By proposing an optimum solution, with a new material that had a patent
Industrial design	Søren Hansen has planned the process according to a linear model, in which the next step was happening if the previous one was completed: he started to work on the prototype after the drawings were completed, he accepted the prototype after the business case was agreed	Arne Jacobsen was hired to stimulate creativity, problem solving, observation, interpretation, aesthetic judgment	Higher price, lower production cost, better company image, emotional, symbolic value, new market possibilities

Managing as designers	Søren Hansen applied the design thinking process: everyone is a designer and he asked to his employees, including the manufacturing department, to be creative and propose liable solutions on how to use the Styropor in creative was as Eames and Sarineen did in USA for furniture, and adapt the notions acquired during the second world war into manufacturing sector.	Arne Jacobsen was an inspirational figures for Søren Hansen and the all factory. Fritz Hansen, brother of Søren Hansen, as a machine engineer needed to find the appropriate way of working with Styropor, difficult to manager. The men in the manufacturing department were inspired by Arne to develop a machine that was able to mould the styropor	The company can compete internationally by designing a valuable and sustainable workflow, attentive to the American and European competitors, recognizing the competitive advantage of creating a piece of furniture that was rare able to develop furniture in plywood, able to react to changing situations
Design driven innovation	Søren Hansen was embedded in a cultural network in Europe and USA, and he hired Arne Jacobsen as designer to propose a new chair, which had a radical new meaning, with new material and production techniques coming from a different industry.	Arne Jacobsen proposed a new chair, which was design push rather than technology push or market pull, he proposed a new meaning for the furniture, based on the industrial production process rather than cabinetmaker, lightweight, and affordable. The Egg's meaning was complementary to the Womb chair by Saarineen. The chair was proposed at SAS hotel to prepare the general public to the new meaning	Competitiveness was fostered because there was a new meaning and a radically new product presented in the market, that was able to satisfied needs that were still latent
Management of design as a translation process	The Egg was the outcome of the process of constructing things by translating interests and goals, enrolling and mobilising actors, creating a stable network of human and	Arne Jacobsen was one among the many actors that are working to construct the design; he was a macro-actor, organizing the design process and speaking for his studio and the	Competitiveness was achieved by creating a strong network around the Egg. Søren Hansen, as spokesperson, worked for associating and disassociating features to the chair and he

	non human actors in the network.	actors that were working for him, also for the construction of the SAS hotel. Arne Jacobsen continued the design process by sketching the Egg and the Swan with quick sketches and he sent them to those involved (his collaborators and Søren Hansen). The process was a continuous back and forth between the designer, the manufacturer and his studio. After the sketches, Arne Jacobsen made a prototype, and the decisions were made based on the success of the modifications of the prototype.	worked for enrolling actors and participates at the translation process. The material used (aluminum, plastic, foam flake) framed the press that attached features of innovativeness and lightweight). The press described the egg as backed from a sculpture, and they are attaching the quality of innovation and novelty.

CASE 3

The Ice chair, designed by Kasper Salto, marks a milestone in the history of Fritz Hansen: Ice is the first chair marketed from Fritz Hansen that is equally suited for both indoor and outdoor use. The chair with its rib-like back incorporates the virtues of classic chairs of the past while the choice of materials points to the future. The base is natural anodized aluminum and the seat and backrest are made of ASA-plastic, a both sturdy and sustainable choice. The result is a lightweight, highly comfortable and hardwearing chair.

Kasper Salto worked on the development of the Ice Chair from August 1997 to October 2002.

	Design process	Role of designer	Impact on competitiveness
Design as rational decision	Jacob Holm decided to produce a new lounge chair that was industrially made, suitable for indoor and outdoor.	Kasper salto was one among different designers that proposed a prototype, and his was chosen	By proposing an optimum solution for a problem: developing a chair suitable for indoor and outdoor.
Industrial design	Jacob Holm and the design manager has	Kasper salto was hired as external consultant	Higher price, better company image,

	planned the process according to a linear model, in which the next step was happening if the previous one was completed, following a stage gate model.	to deliver a solution to a problem	symbolic value, new market possibilities
Managing as designers	-	-	-
Design driven innovation	This design process was market pull, no design driven innovation	-	-
Management of design as a translation process	The Ice was the outcome of the process of constructing things by translating interests and goals, enrolling and mobilising actors, creating a stable network of human and non human actors in the network. However, the network was very small and fragile. Not so many actors enrolled	Kasper Salto was one among the many actors that are working to construct the design; he was a macro-actor, organizing the design process and speaking for his studio and the actors that were working for him for the construction of the prototype of the ice.	This chair was not competitive, very limited market (only Scandinavian)

CASE 4

The design manager described that the development process of the RO was an innovation compared to the previous experiences, because they tried to apply a more interactive process rather than following the stage gate model developed in the past years. The RO is considered an innovation in terms of product portfolio, since the company did not have an actual easy chair since Arne Jacobsen's Egg.

The RO chair is a so-called easy chair, meant to be a comfortable and relaxing chair that was brought to market in 2013 with a lower price tag than the much older Egg.

	Design process	Role of designer	Impact on competitiveness
Design as rational decision	-	-	-
Industrial design	The design manager has planned the process according to a linear model, in which the next step was happening if the previous one was completed: he started to work on the prototype after the drawings were completed, he accepted the prototype after the business case was agreed	Jamie Hayon was hired to stimulate creativity, problem solving, observation, interpretation, aesthetic judgment	Higher price, lower production cost, better company image, emotional, symbolic value, new market possibilities
Managing as designers	The design manager applied the design thinking process: everyone is a designer and he asked to his employees, including the manufacturing department, to be creative and propose liable solutions on how to bend the back of the chair.	Jamie Hayon was an inspirational figure for the manger	The company can compete internationally by designing a valuable and sustainable workflow, attentive to the American and European competitors, recognizing the competitive advantage of creating a piece of furniture that was rare able to develop a cheaper easy chair
Design driven innovation	-	-	-
Management of design as a translation process	The Ro was the outcome of the process of constructing things by translating interests and goals, enrolling	Jamie Hayon was one among the many actors that are working to construct the design; he was a	-no data available for the competitiveness of the chair.

	and mobilising actors, creating a stable network of human and non human actors in the network.	macro-actor, organizing the design process and speaking for his studio and the actors that were working for him	

DISCUSSION

At the conference we will present preliminary conclusions and implications for companies and managers from these observations and suggestions for further analysis. Furthermore, we have here focused on the single actor, the Designer, leaving out the role of the design management context and the role of human and non-human actors in the production of design.

CONCLUSIONS AND IMPLICATIONS

Instead of considering design as an add-on and permanent feature inherent to a product, a design may be presented as a competitive tool to improve the companies' performance. This paper introduces four in-depth case studies of high intensive design products. We propose an analysis of the role of designers with the lenses of the five perspectives, and see how they can contribute to competitiveness.

INCOMPLETE LIST OF REFERENCES

Chiva, R. & Alegre, J., 2009, Investment in Design and Firm Performance: The Mediating Role of Design Management, *Journal of Product Innovation Management*, 26(4), pp. 424-4

Christiansen, J.K., Varnes, C.J., Storm-Nielsen, D. & Vinther, E.J., Gasparin, M., 2010, Living Twice: How a Product Goes through Multiple Life Cycles, *Journal of Product Innovation Management*, 27(6), pp. 797-827.

Cooper, R., Bruce, M., Wootton, A., Hands, D. & Daly, L., 2003, Managing design in the extended enterprise, *Building Research & Information*, 31(5), pp. 367-78

Gasparin, M, 2014. *Design as a translation process*. PhD thesis, Copenhagen Business School.

Hertenstein, J., Marjorie, P. & Veryzer, R., 2005, The impact of Industrial Design Effectiveness on Corporate Financial Performance, *Journal of Product Innovation Management*, 22, pp. 3-21

Lam, P.T., Wong, F.W., and Chan, A.P., 2006, Contributions of designers to improving buildability and constructability, *Design Studies*, 27(4), pp. 457-79

Ulrich, K.T., 2006, Aesthetics in design, Design: Creation of Artifacts in Society.

Verganti, R., 2008, Design, Meanings, and Radical Innovation: A Metamodel and a Research Agenda*, *Journal of Product Innovation Management*, 25(5), pp. 436-56.

Veryzer, R., 2005, The Roles of Marketing and Industrial Design in Discontinuous New Product Development, *Journal of Product innovation Management*, 22, pp. 22-41.