

## **The Beauty of Design Thinking**

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# The Beauty of Design Thinking – Is there a Small Beast in the Box

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**Abstract:** Previous research remains silent on the cognitive constraints for design thinking in SMEs making a living from customers on B2B markets. Through a cognitive lens, the article explores constraints for design thinking among SME top managers found in traditional trades as iron and metal workshops, plastic industry, machine makers, machine tool makers, and building and construction industry. These managers' cognition is shaped in conjunction with the organizational and inter-organizational spaces of the SMEs. Five SME cases are explored from applying inductive and qualitative research techniques. The article points at five themes reflecting significant cognitive barriers for design thinking in SMEs. Overall, it is concluded that design thinking faces barriers in SMEs, since managers have difficulties perceiving with fresh eyes the structures and dominant logics that determine them.

**Keywords:** SMEs, B2B markets, design thinking, cognitive barriers, opportunity creation

## 1. Introduction

“If one truly wants to succeed in taking a human being to another place, one must first and foremost take care to find him where he is and depart from there. This is the secret in the entire art of helping. Anyone who cannot do that, he is himself in a state of unreality, when he finds he is able to help another man. In order truly to help another, I must understand more than he – but indeed first and foremost understand what he understands. When I do not do so, my better understanding is of no use to him.”

Quote: Kierkegaard (1859)

Design Thinking is a beauty, not least as a cognitive image that can be helpful in reframing management practices within the business community. However, while design thinking is often referred to as a cognitive phenomenon that challenges mainstream business reasoning (Boland and Collopy, 2004; Martin, 2009), design thinking is also increasingly criticized for ignoring the cognitive and creative skills it takes to design (Cross, 2011). The criticism goes that design thinking is too assimilated to mainstream reasoning in the management community. Thus, the unique and deep cognitive practices and core of how designers think tend to get lost in the management-oriented design thinking literature (Verganti, 2017). Cognition is an underexplored approach to understand design thinking in the management discourse (Liedka, 2015). We therefore take the lead and study cognition in the cross-field of design thinking and management.

Almost as a hype, current design thinking literatures has a widespread focus on the appreciative aspects and positive results of design thinking (e.g. D'Ippolito, 2014) although one might call for concern in terms of the empirical evidence so far supporting the acclaimed effects. In contrast, the aim of our explorative research is to highlight weak spots of design thinking seen through the lens of cognition.

The empirical contextual setting addressed in this paper reflects that the beauty of design thinking somehow does not address the entire business community. Design thinking research and practice are mainly addressing large organizations over smaller enterprises (SMEs). When SMEs are studied, research tends to take a distinct focus on enterprises from or associated with the so-called 'creative communities' (e.g. Rodgers and Clarkson, 1998; Larsen and Lewis, 2007), excluding traditional smaller craft based and 'Fordist industrialists' from the sphere of interests. In this explorative contribution, we study cognition in design thinking from perspective of SMEs found in traditional trades as iron and metal workshops, plastic industry, machine makers, machine tool makers, and building and construction industry. It is important to examine the constrains of design thinking in these 'traditional' SMEs. Manufacturing SMEs remain a foundation in most western countries industrial structure (Baumol, 2004).

SME top managers/owners play a key role in the development processes of SMEs (Lubatkin et al., 2006). Therefore, the cognition and perceptions of the individual managers are the main level of analysis. Our basic assumption is that cognitive structures and bias embedded in the SME managers' past experiences represent psychological filters that influence managers' thinking and actions during design thinking (Laukkanan, 1990; Gaylen, Chandler, 1994). However, the filters are continuously shaped by the organizations the managers manage and the ecosystem they join. The exploration of constrains for design thinking in 'traditional' SMEs from a cognitive perspective is to us a matter of examining the cognitive spaces shaped in conjunction with the evolving organizational spaces of the SMEs.

We study design thinking processes aimed at creating new desirable, feasible and viable opportunities for SMEs (Martin, 2009). Design thinking becomes a matter of opportunity creation. Opportunity creation highly depends on how the managers perceive new opportunities. Perceptions can enhance and hinder new opportunity creation (Kruger, 2000). Barrier-related Issues regarding cognition and percepts in opportunity creation is therefore central focal points of our research.

The data are developed in a two-year-long EU-founded program, 'ReThink the Future', running in 2017-2018. We have for the sake of this article selected five SMEs that are making a living from customers on B2B markets, i.e. businesses serving other businesses. The firms all operate as sub suppliers, i.e. their products (and services) are components embedded in products sold by their customers. A comprehensive qualitative data-set of what divert the managers' opportunity creation during the five SMEs' consultancy-driven design thinking processes are inductively produced and analyzed.

Section 1 introduced the research aim and research question. In section 2, a brief outline of opportunity creation and design thinking is presented. Section 3 explores the cognitive tensions of SME managers, followed by section 4 on cognitive organizational and inter-organizational spaces of managers' cognition. Section 5 introduces our empirical case-material and related methodological issues. In section 6, five key themes on the constrains of design thinking are introduced. Discussion and conclusions are found in section 7 and 8.

## 2. Opportunity creation - a brief outline

The concept of opportunity originates from the entrepreneurship literature (Shane and Venkataraman, 2000). Entrepreneurship is a highly relevant lens through which to understand design thinking and SME managers. Theories on entrepreneurial opportunities hold strong parallels to the design literature (Nielsen et al., 2017), and SME managers are regarded to think and act entrepreneurially (Casson, 2003; Greiner, 1998).

Several views and assumptions co-exist on what constitute opportunities and how opportunities develop, ranging from objectivistic views on opportunities to subjectivist ones. (Davidson, 2015). In contrast to the view that opportunities are pre-existent entities that must be discovered (Shane and Venkataraman, 2000), design thinking implicitly commits itself to the idea that opportunities are created through subjective and inter-subjective processes (Kimbell and Bailey, 2017).

In design thinking new opportunities are created through applying some basic processes and tools, involving such things as hypothesis-driven exploration, abduction, learning from prototyping, experimentation, and frame creation (Liedka, 2015; Dorst, 2011). Variable, desirable and feasible opportunities only can be recognized retrospectively (Dimov, 2011). But design thinking processes might help SME managers pre-sensing opportunities (Scharmer, 2008).

Opportunity creation relies on the managers' ability to perceive an opportunity, which again relies on psychological and cognitive structures (e.g. mental models, schemas and scripts) of managers and related cognitive bias formed by the context (Gaglio and Kats, 2001). Zhang and Cueto (2017) gives an overview of biases associated with entrepreneurial opportunity creation and exploitation.

The cognitive setup frames individual managers' meaning making of actions, interactions and sense of the contextual setting of the SME, including how to sort out which signals from the context to be aware of or not to notice. Cognitive structures influence the way managers bring meaning to life, perceive opportunities, threats, etc., which influence managerial actions and decision-making (Laukkanen, 1990).

While some authors (e.g. Marcel, 1983; Krueger, 2000) assume that a percept must somehow be conscious and rational, design thinking processes also involves judgments and intuitive hunches of cognition (Martin, 2009). Cognitive biases, heuristics, cognitive schema, contextual stimuli, etc. act as psychological filters that make managers' opportunity perception differ even if they face the same situation (Renko et al., 2012).

## 3. Cognitive tensions of SME managers

The individual manager is found to be a key in explaining SMEs inability to develop and create new opportunities (Millward et al., 2006), and thus to utilize design thinking. A small business is not a little big business (Welsh et al., 1981). SMEs highly rely on the innovation attitude and skills of their manager/owner. Partly because the organizational culture is springing from the founder's ideas about truth and reality (Schein, 1995), and partly because SMEs have limited support facilities and few hierarchical layers (Lubatkin, et al., 2006).

At first sight, SMEs seem to be the perfect organizational setting to unfold opportunity creation and to utilize design thinking. SMEs are flexible, agile with few administrative systems, non-bureaucratic and characterized by quick decision-making (Millward et al., 2006). The organizations tend to use entrepreneurial effectual practices (Evald and Senderovitz, 2013; Roach et al., 2016) which aligns well with designers reasoning (Nielsen and Christensen, 2014).

Yet, tensions between the long-term and short-term tasks that the manager must perform is intrinsically making SMEs volatile. Operational deadlines and challenges in sales, marketing, workshop operations, and say accounting are prioritized at the expense of strategic planning and not least exploration of future opportunities (Woodcock et al., 2000).

The tensions are reinforced since SME managers tend to be 'doers' and their interests and professional skills are often closely related to the operational core of the SME. These managers might have a hard-time getting their mind and hands away from the operational core and move attention to a focus on strategy work and future opportunities of the firm. At the same time SMEs are typical restricted in opportunity creation by limited asses to new knowledge beyond the core business of the SME.

While cognitive perspectives hold a weak position in design thinking, cognitive aspects are increasingly seen as significant in understanding managerial behaviour (Woodcock et al., 2000; Sadler-Smith, 2004).

## 4. Organizational spaces of cognition

According social cognitive theory, managers are neither masters nor slaves of their environment according (Bandura, 1989, Sennett, 2008). The shaping forces of the environment on cognition, they exist and can be very powerful. Nelson and Winter (1982) characterize organizational routines as the genes of the organization. The routines are sticky, and they form the mental space in which individuals and the collective of the organization make sense of what is possible and what is impossible. The dominant logics and designs in the SMV organisation also influence opportunity perceptions. Dominant designs of an organizations make managers perceive matters based on own world view and make them blindfold to alternative views of the world (Prahalad, 2004). Attractive opportunities for value creation might thus be ignored.

Following Mitchell et al. (2000) one might in short say that social cognition embedded in the organization and the interorganizational space of the enterprise influence arrangements scripts, willingness scripts and ability scripts in the organization. The scripts are framing, driving, constraining and hindering the opportunity creation of managers. Design thinking might help managers to expand existent perception of reality, for example through working with altering stakeholders perceived scripts (Mitchell et al., Op cit.). However, different constraints embedded in not least the intersubjective realm of the participatory design thinking process may impede the balance between dedication to co-creation of everyday operations and the drive and ability to explore future opportunities.

The cognitive spaces of managers are mixed and embedded in their past professional experiences, the routines instituted in the organization they oversee as well as the relational practises in the ecosystem they co-manage. On one hand these practises are of key importance for the functioning of the organization. On the other hand, they constrain the space for rejuvenation and opportunity recognition and tend to lead to extension failures (Miles and Snow, 1992) as well as organizational stress (Huff et al., 1992). After all, the SME management find they are constantly caught in a split between spaces of daily duties and long-term dreams.

While the design thinking literature has a prime attention with the individual organizations' application of design thinking, less noticed perhaps is with the drivers and constraints influencing opportunity creation in an interorganizational setting. This setting is particularly important to target in the contextual setting of SME manufacturers.

In their everyday practise, many SMEs rely on engineering design in construction as well as CAD/CAM in their co-design with stakeholders in the value chain. As such, SME suppliers are highly engaged in and depend on activities embedded with contracting customers as well as with suppliers of materials, components and operative services. Thus, SMEs' opportunity creation unfolds in spaces that are transient and cross organizational borders and thus involve activities out of ownership control of the SME manager.

## 5. Case foundation and methods

To uncover important constrains for design thinking, we have in this contribution selected five SMEs. These SMEs participate in 'ReThink the Future', a Danish project running in the period 2017-2019. ReThink the Future is a sub-project of the larger EU-funded program Design2innovate (D2I, 2018). The aim of 'ReThink the Future' is to support the participating managers and staff in creating new opportunities for development and growth. The project is organized around four workshops and homework between the workshops. The workshop process is guided by design thinking research facilitators and Liedka and Ogilvie's (2011) design thinking model. Two top managers from each company participate in the workshops. Customers, suppliers, experts, employees, etc. also participate. Table 1 presents details on each of the five SME cases.

Table 1. Case presentation

	Enterprise profile	Year of birth	Staff no.	Capabilities	Core activity	Key markets	Development focus in the 'ReThink the Future' project
<b>CP</b>	Family owned SME specialized in functional metallic plating. Solutions are found and developed in a tight collaboration with customers in a range of fields as: electronics (printed circuit boards), engineering, food, medical, and pharmaceutical industry.	1986	30-32	Craft, laboratory, plating recipes	Solution oriented recipe development for plating. Recipes are a basic design tool.	B2B + Export	Simplicity as a strategy. Want to focus on reducing customer-/ product portfolio and increasing process automation.
<b>HM</b>	Family owned machine tool enterprise skilled in craftsmanship with modern digital equipment cutting, molding and related machine-based processes. HM works as a sub- supplier to a limited number of customers inside the apparel industry and the like.	1813	13	High-tech crafting and component crafting	Custom-tailoring parts and components to fit into customers' final products. Design embedded in tools and CAD/CAM.	B2B Danish home market	Development in sales. Want to shift from a reactive to a proactive sales strategy.
<b>TT</b>	Tool manufacturer in ownership transition. Small affiliate in Malaysia. Leading manufacturer in Europe, designing, constructing and producing tools for the global thermo-forming industry. Customers in the food sector, the toy industry and the medical and perfumery sectors.	1990	35 In DK	Tool Construction and digital crafting.	Customer driven product development	B2B + Export	Increased professionalism in the sales and delivery processes. Want to grow and maintain quality and customer satisfaction.
<b>TM</b>	Family owned enterprise that design, develop and construct machines and machine components. Focus on equipment for agriculture, gardening and the transport industry. Main share of production is components and semi-manufactured products to the building industry and the machine industry. TM process all types of metal (steel, stainless steel and aluminum) on customers' demand.	1975	35	Blue collar crafting + digital construction and crafting	Traditional crafting. Digital tools and CAD/CAM construction.	B2B Danish home market	Growth in sales. Want to go change from a defensive to an offensive sales strategy.
<b>AT</b>	Family owned building construction enterprise. Supplier of building and construction projects. Acts as a main contractor as well as a sub supplier to other contractors. Key market are business and shop facilities, public buildings and concrete constructions. Strong focus on constructions and buildings in the high-quality segments.	1974	40	Craft in building and construction. Digital construction design.	Construction design and development.	B2B Danish home market	Organizational rejuvenation. Want scale up the organization to make it fit the company's growth and growth strategy.

The five SMEs have been selected based on primarily three criteria. First, we have included only small firms with 10-40 employees. Using a rough typology, the five enterprises can all be associated with

phase 1 and 2 of Greiner’s (1998) growth model. Secondly, the five SMEs are all located up-stream in the value chains. This invade their mindset and the landscape forming their perceptions of opportunities. Thirdly, the SMEs selected are typical for many small enterprises on B2B markets. The five companies rely heavily on the success of the user-producer interactions that take place through the value adding production chain.

Triangulation of data sources are inductively explored and generated during the four workshops. The data sources are observation notes, audio recording, photography, facilitators/researchers’ reflection notes, notes from homework support, as well by the outcomes produced during the workshops, e.g. visual images and prototypes. Moreover, in advance of and after the workshop-series the five companies are visited and interviewed to capture barriers of design thinking. Table 2 provide an overview of the data collected. The table shows that company AT participate only in three workshops.

Table 1. Overview of data

Company	Before workshop 1	Workshop 1	Between workshops	Workshop 2	Between workshops	Workshop 3	Between workshops	Workshop 4	After workshops
CP	D, I, F	O, F, A, P, S	P, C, D	O, F, A, P, S	F, C, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, C, I, D
HM	D, I, F	O, F, A, P, S	P, C, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, C, I, D
TT	D, I, F	O, F, A, P, S	P, C, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, C, I, D
TM	D, I, F	O, F, A, P, S	P, C, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, H, D	O, F, A, P, S	F, C, I, D
AT	D, I, F	O, F, A, P, S	P, C, D	O, F, A, P, S	f, H, D	O, F, A, P, S			F, C, I, D

D = desk research; I = Interview; F = Facilitator/research reflection meeting(s); O = Observation; F = Field notes; A = Audio recording; P = Photography; S = Sketches, visual images and prototypes; C = Company visits; H = Homework support.

The analysis of the data includes three mutual-dependent qualitative coding processes. First, an open coding process focused on what are going on in each company’s design thinking process. Based on careful and deep peer examinations of the various sources of data, reflections and interpretations regarding each of the five companies’ design thinking processes are detailed written down in research memos. Then, we engage in a process of selective coding. The research team traces and selects the main themes on cognitive barriers revealing from each company case. Cross-case analysis of the data are finally carried out. Systematically, we compare the five design thinking processes and search for similarities and differences in cognitive barriers and themes across the five cases.

During all coding activities, we are constantly linking our empirical interpretations and emerging research themes to theories, concepts and existent knowledge. Theoretical interpretation is of essential importance in studies on cognition. The underlying cognitive mechanisms of humans are not directly observable. Data analysis in the realm of cognition therefore requires deep iterative interpretation processes between empirical comprehension and analytical models and theories (Laukkanen, 1990).

Our process of data analysis is also developed and qualified in close interaction with the managers participating in the ReThink the Future project. The workshop-series and several company visits offer the opportunity to ongoingly share and discuss the data and emerging research themes with the participating managers.

## 6. Constrains for design thinking - five themes

The analysis undertaken lead to five themes that in combination give a comprehensive image of how mental and contextual factors combined form constraints for design thinking among the managers explored here. The five themes shortly presented here are not uniform themes among the SME managers, and the themes do not reveal in any specific order in the data. But all together our analyses show the five dominant themes:

- Dominant designs and fears
- Operation-centered empathy gap
- Jumping to implementation
- Caught in the present and near future
- Little sense of urgency

### 6.1 Dominant design and fears

The first theme signifies the forces of the dominant designs (Utterback and Abernathy, 1975) and the architecture of the systems in which the SMEs unfold not only their production activities but also relationships with customers and suppliers. The SMEs work as suppliers to other enterprises and depend on blue prints and design briefs delivered by their customers. Thus, it reveals from the analysis that the SMEs tend to follow a path of least resistance (Senge, 2008) and align to requested designs. The SMEs are more tailored by their customers than acting as custom developers. They accept more than question the dominant design of the system to which they contribute, and it affects the managers' opportunity perception.

Statements such as 'We do not control our customers, our customers control us', 'my customers are my guiding star' and 'we are at the bottom at the hierarchy' are expressed by several managers. This reactive cognition easily turns into obstructions during design thinking exercises aimed at opening and exploring new opportunities. Few new ideas are generated and those opportunities considered tend to be very adapted to the managers' sense of what satisfy the customers.

Since the SMEs are dependent on the mindset, strategies, initiatives and expectations residing with their customers and are vulnerable to changes in the co-production patterns with customers, the data also indicate that the managers fear to break with the dominant design of the system. This limits the managers' incentives to seek new opportunities in the design thinking process. It is simply sensed to be nebulous and dangerous.

However, it is important to point out that the managers' expression of reactivity is mixed with visions of becoming proactive and in control of their handling of business and customers. It is reflected in the SMEs' development focus during the consultancy-driven design thinking process (table 1), and in managers explicated concern that their companies are too passive in their sales efforts. Some of the SMEs included are driven forward with a pile of orders that keeps them more than busy, and thus they have almost no sales work.

During the design thinking process CP succeeds in becoming more strategic and proactive in their approach to customers, and they do strategically cut the number of customers. However, six months after the design thinking process, the company is back in the same situation prior to the process. The dominant designs of the system combined with the managers' cognitive bias seem to make it tough for the enterprise to make persistent progress.

## 6.2 Operation-centered empathy gap

During the design thinking process the SME managers work with human-centered design thinking exercises, such as customer journey mapping and B2B customer personas, to open-up their space for opportunity perception.

However, while some managers found the exercises valuable, others of the managers did not, at least in the first phase of the design thinking process. Statements such as ‘the customer journey was the least useful part of the process’ and ‘we did not learn anything new about our customers’ reflect that these managers have difficulties with understanding the value of the customer-centered design methods, and thus the exercises did not give rise to awareness of new opportunities. The negative experiences with the exercises might reflect that some of the managers do feel that they do have needed insights into their customers, due to their long-term relations with them and a rather stable customer base.

The analysis also reveal that the managers themselves are operation focused, technicians and craftsmen. This operative orientation is also reflected in the SMEs web sites, where they display their machine tool park and technical facilities. The skills as craftsmen with a focus on processes and investments at the workshop floor influence how the managers talk about and illustrate customers’ thinking, feeling and conducts in their customer journey or personas-making. They tend to focus on the operative processes and technical aspects in their image of their customers.

In some cases, the customer journey thus tends to turn into a tool to detect relative simple and easy to solve inefficiencies and problems in the production process or sales. E.g. based on the journey mapping the management team of TM realizes a need to have a cutting machine in-house instead of buying the service from an external partner. Based on the customer journey, another manager identifies a key error in the company’s internal production process. The managers also showed difficulties with illustrating his customer’s journey. Instead the manager illustrated the inside operational processes of the company.

The strategic and innovative value of human-centered design is less discussed and explored, because it requires a level of cognitive abstraction and a mindset which is out of step with the craft-based reflections in praxis dominating the world of the SME managers. Consequently, the managers restrict themselves from perceiving interesting new value-creating ideas and opportunities, e.g. from opportunity spaces of building more innovative and long-term collaborative relations with customers.

## 6.3 Jumping to implementation

This theme revolves around the issue that daily matters of the SMEs are planned and executed with high intensity. Time for exchange of information and task partitioning with customers and suppliers are rigorous and limit opportunity perception and the room for design thinking. Many statements reflect the that SMEs have a tight daily agenda operating their businesses: ‘We are very busy, just trying to keep up. We have no time to develop’.

During the ReThink design thinking process the SMEs are confronted with ‘what is?’ exercises focused on understanding their present situation and reals problem space of the SMEs (Liedtka, 2011). However, the data reveal that the managers lack time and experience to reflect on and re-frame a problem or to explore new opportunity spaces. Therefore, the road from idea to execution is short in the SMEs, i.e. reflections on alternative solution spaces are ignored. Instead managers are inclined to jump to conclusion and solution implementation. Due to the sparse time to wonder, managers also refrain from engage relevant stakeholders in the creation of solutions space. This

might lead to missed opportunities and transformative solutions. In addition, the data shows that the managers face great difficulties in pointing out and defining the challenges facing the SMEs.

The analysis also illustrates that the SME managers seem to give priority to intuitive information processing, i.e. they tend to act fast on 'gut feeling'. Therefore, the managers only work superficially with the problem and solution space of design thinking. As an illustration, the managers of AT acknowledge a need for making major changes in their organizational chart during the design thinking process. Overnight they change the chart and move straight forward to implement the new organization chart. Little time is left to wonder whether this new chart is the right option for the company or reflecting on alternative charts and testing out how the new organizational structures might work in practice.

Since design thinking involved abstract synthesizing, framing and visioning (Gruber et al., 2015), the managers' tendency to jump to implementation constrain their ability to carry out the design process. In fact, our data reflects that managers tend to become stressed by the design process they follow. The part of the design process aiming to frame and visualize the problem space of the SME in a holistic way, make the managers express stressfulness. They realize the extent and complexity of the problem space and of the ground-breaking task confronting them. This pressure leaves them in a spirit of resignation.

## 6.4 Caught in the present and near future

Although the workshop consultations had a focus on opening the SMEs up for attractive future opportunities (e.g. 3D print, sustainability), the SMEs all maintained a strong focus on their present and near future framed by their order books. Since the SMEs suffer from myopia, the managers find it difficult to project, simulate or 'wild carding' future challenges and opportunities. The data illustrates again that the problem is that the small enterprises are heavily embedded in their present day-to-day operations, routines developed and the exchange habits with customers and suppliers. It constrains their future-oriented thinking of strategic opportunities.

Therefore, the SME managers' capability of future orientation is limited due to an implicit strategy perspective of logical incrementalism (Quinn, 1982). Small steps into the near future are the norm of the SMEs more than leapfrogging. This hampers fundamental reflections on options to rejuvenate their business models through future-oriented design thinking exercises.

However, during the design thinking exercises some managers explained that their firm distinctly depend on the unknown future actions of their customers. To anticipate future actions of their customers several managers focus their attention on investment in more advanced machine tools and technology to prepare their businesses for the next moves of their customers. While design thinking typically generates images of many alternative future spaces for opportunities and actions, this was less the case in the design thinking process of the SME managers. They show difficulties with stepping outside the own conception of the world and grasp the world of design thinking.

## 6.5 Little sense of urgency

The final theme reflects how the managers have a positive spirit about their own performance and express vocal and behaviourally that they don't really feel a deep sense of urgency to explore for new future opportunities, which seems to be a general tendency among SME managers (Woodcock et al., 2000). The very optimistic mindsets work in themselves as constraints for the design thinking process. The consultants realized this constraint during the workshops. There was a need for nudging the managers to make them point to and reflect on current or anticipated burning platforms confronting their firms. The consultants made exercises visualizing three future scenarios for the

SMEs, the likely future, the desirable future and the worse future. The analysis indicate that the managers do not take aboard the dangers revealed from the scenario of the worse future. One company, being a supplier of tool to the plastic industry, relies heavily on the future of plastics including restrictions and substitutions of the future. But they postpone worries and focus on more incremental ways to develop their current business.

## 7. Discussion

Overall, the five themes reflect paradoxical issues indicating that design-driven perceptions of new opportunities require a cognitive ability to question and reframe the existing structural landscapes, practices and logics that the SME managers are embedded in. All themes somehow reflect the problem of institutionally embedded agency (Leca and Naccache, 2006). The managers show difficulties with perceiving with fresh eyes the structures and logics that determine them.

Institutionalized routines centered round the managers' factory facilities and day-to-day specific problem solving, as well as relational habits and mutual exchange across stakeholders constitute major constraints to rejuvenation of the managers' opportunity perception. In paradoxical ways, the social and environment setting create cognitive inertia that work as constrains for design thinking. It is paradoxical, since new ideas and opportunities most often become promising because they point to opportunities for breaking inertia.

Overall three types of inertia are seen across the themes. One type of inertia is linked to the dominant designs and inter-organizational relations of the system that the SME participate in. Another type is the internal forces inside the SME organization, influencing managers' absorption capacity and openness towards new opportunities. Finally, the managers' experience, professional identities and habits create cognitive filters that distract design thinking.

Liedka (2015) studies conceptually managers' cognitive biases for design thinking. She highlights nine typical management biases and proposes that design thinking in theory can work a method for bias reduction. Our inductive and explorative study indicates that the real world has a way of making everything more complicated. Design thinking can by no means not easily debiasing the cognitive setup of managers. We complement and stretch the scope of Liedka's (2015) research by also emphasizing the role of social practice and tight organizational contexts in shaping cognition.

A point of our analysis is that to make design thinking work in the SME practice, there is a need to emphasize with the managers' mental and contextual landscapes being resistant to change. As stated by Kierkegaard in the start of this contribution. If design thinking consultants and other design thinkers wants to succeed in taking firms to a new place, they first and foremost must take care to find the actors of the firms and organizations where they are and depart from there. Otherwise design thinking faces a lot of barriers and becomes of little use to the firms. Inspired by logics of ethnographic approaches, design thinking in practices requires deep domain specific understanding of the unique natural setting of SMEs, the humans within the setting, and these humans' work activities (Blomberg et al., 1993). Based on this understanding, design thinking processes can be designed to disrupt managers' existent cognitive ways of processing information and to make managers think and act in new and more lateral ways (de Bono, 1992).

One way to lower the barriers of design thinking might be to introduce and unfold design thinking by making strong connections to the cognitive practices and activities that the managers and firms are already familiar with. On the surface, the five SMEs are not acquainted with design thinking. From a practise view, however, the managers reckon that they do engage in designing every day, though

silent design activities (Gorb and Dumas, 1987). Design takes place in the programming of the SMEs' digital tools, the drawing up suggested changes and technical corrections to the drawings delivered by their customers, or even sometimes the SMEs make full prototypes satisfying the ideas proposed by their customers. Following Kimble (2009) we may add the perspective that the managers are also designing organizational frames, workshop facilities, the outlay of the machine tool park and the formal rules, frames and routines forming everyday life of the enterprise. This is taking place in an incremental manner based on evolving needs and new technologies available.

Overall, these daily practises are the foundation of the cognitive patterns evolving as well. Practise is mirrored in cognition and vice versa. So, these SMEs do engage in designing, and they do practise reflection in action (Schön, 1983), but not in a design thinking way. Design thinking somehow requires that the managers' step out of their comfort zones and key expertise domains to act and think in ways that they would not normally do.

The analysis also indicates that a barrier for design thinking is to believe that the focus of design thinking is the individual SME. The interactions and relationships framing the SMEs must also be in focus. In the contextual setting of SMEs, design thinking's ability to open for new spaces of opportunity creation depends very much on instituted practices in supply chain management performed by the SMEs' main customers and suppliers. In other words, design thinking must take place across organizational borders and depend on the inclusion of participatory insights and reflections to see and change the cognitive interplay between actors. Moreover, relationship building and the development of mutual exit barriers across stakeholders of the value chain must be included if design thinking is meant to walk the talk with SMEs working on industrial B2B markets. No business, or individual or organization for that matter, is an island (Håkansson & Snehota, 1989).

## 8. Conclusive Remarks

Our explorative research indicates that the hat of design thinking is a powerful hat. But design thinking is also a speculative beauty, since one hat does not fit all. This conference paper was introduced with the adjunct tittle – 'is there a small beast in the box?'. The title is a metaphor to the beauty box created with the promises of design thinking. We find that one thing is the generic creation of new perspectives on how to shape transformation of enterprises. Another thing is the practise of design thinking in the concrete context of the actors and organizations it aims to address. Meaning that there is not such a thing as a universal context (Flyvbjerg, 2011). The practise of design thinking takes place in a huge diversity of dynamics and contexts, each with their peculiarity concerning habits, social practised, cognition and dominating images of possible futures. The diversity of practise communities (Wenger, 1998) where design thinking is tried to turn into practice does not fit the rather circumscribed and decontextualized hat of design thinking, which there seems to be consensus about in the managerial design thinking literature (Liedtka, 2015).

A preoccupation with the tools and processes of design thinking of their own right is insufficient. It might foster a danger that the beauty of design thinking might be transformed into a 'beast', at least seen from the perspective of the users of design thinking.

The boundary conditions and limitations of this contribution are in many ways obvious. This is just a first and explorative step to understand the constrains for design thinking in the context of SMEs from a cognitive stance. Our small-scale contribution opens for several new directions that future researchers can choose to investigate. Overall, there is a need for delving further into the constrains for design thinking in various contextual settings. Our contribution also suggests that the cognitive perspective deserves more attention from scholars in the managerial-oriented design thinking

literature. We are indeed calling for research that studies cognition as mental processes shaped by and shaping the social and environmental dynamics, and how it all affects the promising field of design thinking.

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