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CONCEPTIONS OF DESIGN THINKING IN THE DESIGN AND MANAGEMENT DISCOURSES

OPEN QUESTIONS AND POSSIBLE DIRECTIONS FOR RESEARCH

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ABSTRACT

The concept of design thinking has received increasing attention during recent years - particularly from managers around the world. The ample attention given to design thinking has resulted in a need to understand its core essence. However, despite being the subject of a vast number of articles and books, a search for definitions of design thinking does not produce a concise portrayal or a clear-cut breakdown of what the concept encompasses. In addition to the vagueness of the concept, also the effectiveness of the approach is unclear, as the claims about the concept are not grounded on empirical studies or evaluations. This paper discusses the need for empirical research on design thinking, the relationship between two differing discourses on design thinking, as well as their focus and direction. We conclude by proposing directions for research that further explore design thinking as a management practice.

Keywords: design thinking, design research, management

INTRODUCTION

The concept of design thinking has received increasing attention during recent years - particularly from managers around the world. Management magazines and books have covered stories about the power of design thinking, suggesting that design thinking can provide significant value to innovation and management. It seems fair to say that there is a considerable amount of hype surrounding the concept - which has not gone unnoticed in the academia. Johansson and Woodilla (2010) specifically discuss the problematic

hype, and describe how it simplifies the situation. Also Cross (2010) points out how design thinking has now become “such a common-place concept that it is in danger of losing its meaning”. As the management literature offers design thinking as a cure to nearly every challenge in business, the emerging breadth of the concept has been seen to lead to its dilution (Badke-Schaub, Roozenburg & Cardoso, 2010). Indeed, as Kimbell (2009) points out, “in management practice, it seems, everyone should be a design thinker.”

The ample attention given to design thinking has resulted in a need to understand its core essence. As Dorst (2010, p. 131) points out “This eagerness to apply design thinking has created a sudden demand for clear and definite knowledge about design thinking (including a definition and a toolbox).” However, despite being the subject of a vast number of articles and books by both academics and practitioners, a search for definitions of design thinking does not produce a concise portrayal or a clear-cut breakdown of what the concept encompasses in either of the two discourses, resulting in a hazy understanding on what exactly the term denotes to.

In addition to the vagueness of the concept, also the effectiveness of the approach is unclear. The concept of design thinking is proposed to be, for example, a powerful and effective approach to innovation, producing innovations that go beyond incremental improvements (Brown, 2009, 2008), and in more general, a method leading to better and more competitive business (Martin, 2009; Clark & Smith, 2008; Boland & Collopy, 2004). In these discussions over design thinking, however, the claims are not grounded on empirical studies or evaluations (Badke-Schaub, Roozenburg & Cardoso, 2010;

Johansson & Woodilla, 2010). The evidence on the effectiveness of design thinking is anecdotal, comprising mostly of descriptions of individual cases of its utilization in organizations. The factual reliability and objectiveness of these descriptions seems uncertain at best.

In order to evaluate the claims regarding the potential of design thinking, and to determine the value the concept may bring to innovation and management, both a shared understanding and a more detailed description on what is understood by design thinking is needed. These two are needed in order to distinguish a design thinking approach from a non design thinking approach and to evaluate the outcomes of these different processes. Without this understanding, the question rises, how can one determine whether or not design thinking is applied in e.g. an organization or a project?

When examining the literature on design thinking, it becomes evident that there are two differing discourses on the topic. Badke-Schaub, Roozenburg and Cardoso, (2010), and Johansson and Woodilla (2010), for example, explicitly point out these two separate discourses, naming them as the ‘traditional design thinking approach’ and ‘the new design thinking movement’ (Badke-Schaub, Roozenburg & Cardoso, 2010), and the ‘design discourse’ and the ‘management discourse’ (Johansson & Woodilla, 2010). Both of these divisions are based on the observation, that there is one discourse with a history of roughly 50 years, and another, more recent one appearing around the change of the millennium. Where the more established discourse focuses on the cognitive aspects of designing and discusses e.g. “the way designers think as they work”, the entrant regards design thinking as an overarching “method for innovation and creating value”, and focuses on the need to improve managers’ design thinking skills for better business success. (ibid)

Adopting this division of two discourses and building on the terminology proposed by Johansson & Woodilla (2010), in this paper we use the management discourse as the starting point. Contrasting the impact it seems to have, the discourse lacks a conceptualization (and furthermore, an operationalization) of design thinking that would allow evaluation of whether and

how design thinking can be applied outside the fields of traditional design, and what are the potential benefits and limitations of design thinking.

To advance those ends, we have previously proposed a framework based on a review of literature which summarizes how design thinking is depicted in the current management discourse (Hassi & Laakso, 2011). We now propose that the framework functions as a starting point, and the concept of design thinking needs to be characterized in more detail to form a basis for determining its value to innovation and management. Additionally, the conceptions in the management discourse need to be linked with the respective research conducted in the design discourse to evaluate their validity and deepen the understanding of the elements forming design thinking as understood in the management discourse. In this paper we discuss the need for empirical research on design thinking as portrayed in the management discourse that will build on the research conducted in the design discourse. Based on a review of literature and interviews with experts representing both the academic and practitioner view on design thinking, we initiate a discussion on the relationship of the two discourses, their focus and direction, and, propose directions for research that further explore design thinking as a management practice. In the following we first describe the research methods of this study, and then move on to presenting an overview of the two discourses on design thinking, and their characteristics. We then continue by exploring the relationship of the two discourses and the potential research areas stemming from this.

RESEARCH METHODS

This paper builds on the literature discussing the existence of the two differing discourses on design thinking as well as a set of interviews that aim to generate further understanding on what these two discourses actually consist of and how they differ from each other. Interviews were conducted with ten experts from three countries; the Netherlands, Finland, and the United States. The interviewees included four academics from the field of design methodology and six experienced practitioners with a design education (industrial design or

architecture). The academics held PhDs in the field of design research, most held positions as professors and had published in notable journals and conferences. The practitioners represented positions such as CEOs or creative directors of design consultancies. All interviewees were familiar with the concept of design thinking prior to the interview and had formed their own understanding of what the concept entails. The interviews were semi-structured, explorative in nature and lasted between 60 and 90 minutes. All interviews were conducted during 2010. In the interviews, the experts were asked questions probing where they consider the roots of design thinking to be, where it has originated, and around what time. The Interviewees were also asked to suggest key literature on the concept.

DESIGN THINKING IN TWO DISCONNECTED DISCOURSES: THE DESIGN DISCOURSE AND THE MANAGEMENT DISCOURSE

IDENTIFYING TWO DISCOURSES ON DESIGN THINKING

Johansson and Woodilla (2010) provide a helpful overview of the field of design studies regarding the formulation of the concept of design thinking, or as the phenomenon is also addressed to; designerly way of knowing (Cross 1982), or how designer's think (Lawson 1980). They describe how the foundations of the concept formulated within the discourse through seminal works such as Simon (1969), Lawson (1980), Schön (1983), Rowe (1987), and Cross (1982, 2001). In the same line, Cross (2010) regards the origins of the design discourse to be in the mid-1970s and early 1980s, driven by the attempts to define design as a discipline in its own right. Design thinking as a design discourse discusses "the way designers think as they work" (Johansson & Woodilla, 2010) and the central research questions for the discourse are, for example: How do designers solve design problems? What exactly is the thinking process designers pursue during their design activities? How can thinking processes that guarantee innovation best be taught and how can they be supported in daily practice? (Badke-Schaub, Roozenburg & Cardoso, 2001) While design thinking research, emerging from architecture and design, keeps building on its broad

research history on design thinking, the concept has recently entered the management discourse, and gained increasing attention among managers. Johansson and Woodilla (2010) differentiate two separate discourses and call them the 'design discourse' and the 'management discourse'. Where the design discourse focuses on the cognitive aspects of designing and discusses e.g. "the way designers think as they work", the management discourse regards design thinking as an overarching "method for innovation and creating value", and focuses on the need to improve managers' design thinking skills for better business success. (ibid) The design discourse has a history of several decades, but design thinking as a management discourse is a more recent one, appearing around the change of the millennium. Johansson and Woodilla (2010) describe the expansion of the design thinking discussion from the design discourse to the management context as initiated and fuelled by articles and books written by principals from design consultancies, such as IDEO (Brown, 2008, 2009; Kelley, 2001). These texts typically describe the working styles of designers with a proposal of their usefulness in other contexts outside the core design disciplines.

Indeed, despite all the confusion and debate around design thinking, what is rather obvious, is this recent expansion of design into new arenas and target areas, such as strategy, services or organization design, that go beyond the realm of traditional design that is linked tightly with physical objects (e.g. Cooper, Junginger & Lockwood 2009; Kimbell 2009). It seems these new arenas include even the military where design is now considered by some to represent "the most significant change to our planning methodology in more than a generation" (Cardon & Leonard 2010). However, e.g. Cross (2010) considers the current extension of design thinking beyond the core design disciplines as an indicator of the undermining and weakening of the concept, and writes, "It is time to re-claim design thinking as a fundamental aspect of the discipline of design, something that pertains to the skilled, educated practice of designing."

At the same time, rather than viewing the current expansion as a thread, others regard the current management discourse an opportunity for the design community, by, for example, allowing "people that

were trained as designers to exert their influence outside the traditional design professions” (Dorst, Stewart, Staudinger, Paton & Dong, 2010, p. 9). However, the question of the limits and applicability of the concept to other target areas is central; which elements of design thinking can be conveyed beyond the core design disciplines, and how?

PERCEPTIONS OF THE ORIGINS AND CENTRAL LITERATURE OF THE TWO DISCOURSES

In the following we discuss how the views of the interviewed academics and practitioners in the field of design coincide with or contrast the depiction of Johansson and Woodilla (2010).

In line with Johansson and Woodilla (2010), the interviewed representatives of the design discourse (i.e. the academics) unanimously described the beginnings of the design thinking paradigm to take place in the early sixties when research embarked on finding out what designing is and how could design as a process and as an activity be improved. The interviewees describe the development of the concept to align with the overall development of design research from the first conferences on design

methods in the early sixties onwards. Within the design research stream, the interviewed academics specifically link design thinking to the analysis of the designers’ thinking processes and regularly mention Simon (1969) and Schön (1983) as keystone works with notions such as; “The concept of design thinking begun to formulate after Schön published the Reflective Practitioner in 1983.”

The perception of design thinking originating at IDEO was supported without exception by the views of the interviewed practitioner experts with statements such as “The roots of design thinking ultimately are in IDEO and their notion of user centered design.” The d.school of Hasso Plattner Institute of Design at Stanford University was also linked strongly to both IDEO and the birth of the design thinking concept. Also the representatives of the design discourse acknowledged the role of IDEO, and specifically its CEO Tim Brown, in the birth of the recent managerial discourse. Since in the design research stream, the term design thinking is used predominantly to refer to the cognitive processes of a designer and in the more recent managerial discussion it refers to a more general approach to innovation, many of the interviewed academics felt that there are two entirely different subjects called

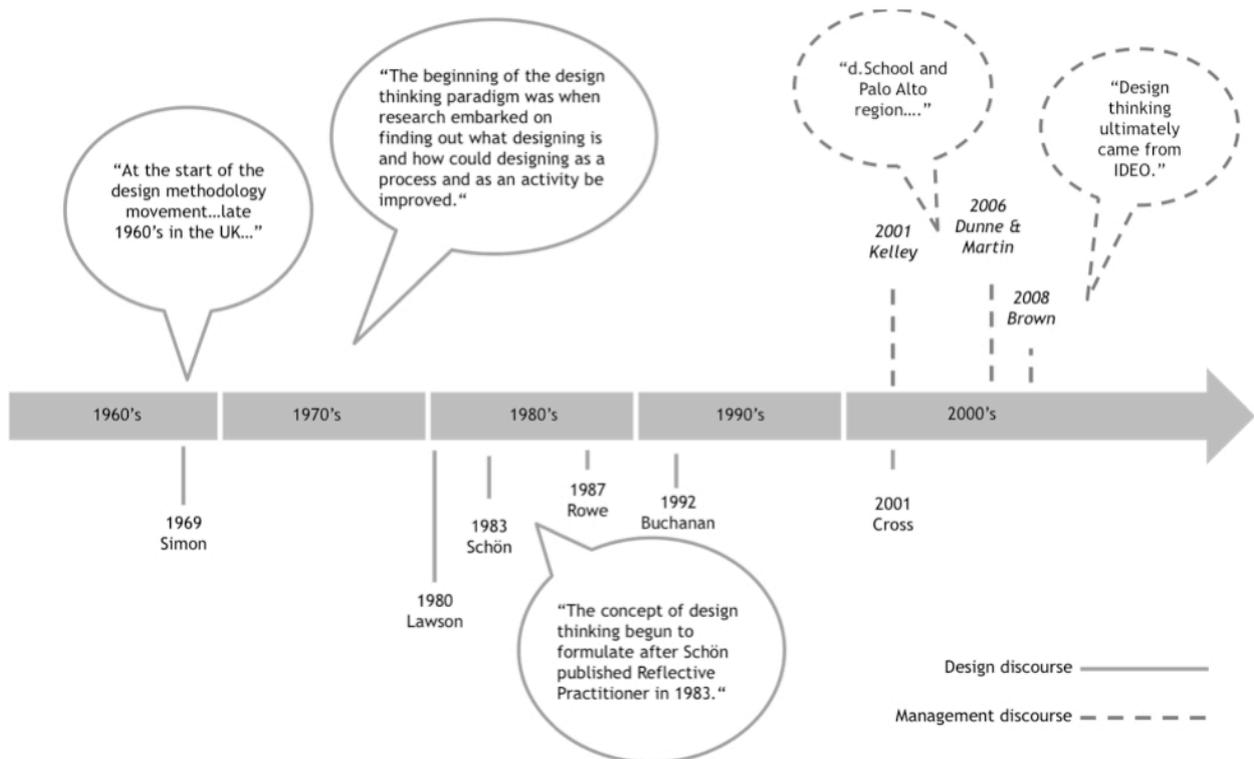


Figure 1 Roots of design thinking: views from the two discourses. References to the key literature mentioned by the respondents.

by the same name and that in much of the recent discussion there are no parallels to the actual design thinking concept that surfaced in design research in the 1980's. It was also noted that much of the recent discussion (specifically Brown) does not refer to any central literature on design thinking in the design research tradition. Interestingly, the interviewed practitioners who were knowledgeable of the ongoing managerial discussion on design thinking were mostly unaware of the 50 years of ongoing design discourse linked to the concept.

In summary, as proposed by Johansson and Woodilla, the academics considered the roots of design thinking to go back to the 1960's, whereas the practitioners considered the concept a rather recent one, spurring during the 2000's. Figure 1 presents a light summary of the interviews, including views from the interviewees representing both the design discourse and the management discourse. The figure depicts the view of the perceived origins of design thinking and the key literature referred to by the interviewees.

CONCEPTIONS OF DESIGN THINKING IN THE TWO DISCOURSES

In the previous sections we discussed how two differing discourses on design thinking have been identified. However, the question is, how these two discourses are related to each other, and how to link and distinguish the management discourse concept from that of the design discourse?

Within the field of design research, the term design thinking has gained the position of a paradigmatic concept describing design-specific cognitive activities that designers apply during the process of designing (Badke-Schaub, Roozenburg and Cardoso, 2010). Thus, design thinking research focuses on the exploration of design cognition, or the cognitive aspects of designing (Goldschmidt & Badke-Schaub, 2010). Dorst (2010) notes, that multiple models of design thinking have emerged over twenty years of research, based on widely different approaches and using models from various branches of science.

Evidently, a clear definition of design thinking is not available even in the established design discourse. However, Dorst notes design thinking to be quite a specific and deliberate way of reasoning, elements

of which have been professionalized within the design disciplines.

As Badke-Schaub, Roozenburg and Cardoso (2010) suggest, one possibility is to describe the essentials of the concept as a list of characteristic elements. These authors have done so and identified creativity, visual thinking, reasoning and expertise as characteristics of design thinking (ibid). This set of characteristics are based on thinking processes such as information search and generation, mental imagery, assessment and evaluation, structuring and learning (Goldschmidt & Badke-Schaub, 2010). Drawing on studies into design activity, Cross (1990) summarizes the concept of design thinking in the design discourse as comprising abilities of resolving ill-defined problems, adopting solution-focused cognitive strategies, employing abductive or appositional thinking and using non-verbal modelling media. However, Badke-Schaub, Roozenburg & Cardoso, (2010) conclude that there are no consensual attempts to define design thinking in the design discourse or to explore to what extent it constitutes processes different from other activities, situations or disciplines.

Whereas the preceding paragraphs were descriptions of design thinking as a design discourse, we have previously (Hassi and Laakso 2011) proposed an initial framework portraying the elements of design thinking as the concept has been characterized in the management discourse (Figure 2). Building on a review of literature, the framework summarizes how design thinking is depicted in the current management discourse; what is the common terminology and characteristics used to describe the concept of design thinking. The framework describes design thinking as consisting of three dimensions: practices, thinking styles, and mentality. Each dimension contains a set of elements of design thinking - methods, values, and concepts that repeatedly surfaced across the reviewed literature. The "practices" -category comprises of elements that are closely related to concrete activities, describing tangible approaches, ways of working, activities and the use of particular tools. The elements included in the category include: human-centered approach, thinking by doing, visualizing, combination of divergent and convergent approaches, and collaborative work style. The

elements categorized into the “thinking styles” - dimension relate to issues such as cognitive styles, methods of thinking and processing information. These elements are: abductive reasoning, reflective reframing, holistic view and integrative thinking. Abductive reasoning in particular was considered to play a critical role in design thinking and as a pre-condition for intelligent designing (Dew, 2007). The mentality-category refers to the mentality of both the individuals immersed in the work and the mentality portrayed by the organizational culture. In the framework “mentality” describes the orientation towards the work at hand, and the mental attitude with which the problems are approached and situations responded. The identified elements describe design thinking mentality as being experimental and explorative, ambiguity tolerant, optimistic, and future-oriented. In this framework, there are several recurring themes crossing the boundaries of the three groups. For instance, ‘thinking by doing’, which entails e.g. early prototyping, is represented in the practices, but it also manifests in the mentality dimension as

the explorative nature of design thinking. Similarly, the future-oriented mentality of design thinking is manifested also in the thinking styles as abductive reasoning - the continuous strive to think of “what could be”. Therefore, the elements should not be considered as separate or mutually exclusive units, but rather as partly overlapping depictions of central attributes linked with of design thinking. This framework presents design thinking as a bundle of certain elements that are interlinked and manifested through practices, thinking and mentality. The framework in Figure 2 synthesizes the current management discussion on design thinking, and is more suggestive than conclusive. As Badke-Schaub, Roozenburg and Cardoso (2010) point, there is also a downside to a definition which consists of a list of constituents; a list can never be complete, is often non-exclusive and mostly entails elements at different levels of granularity. Therefore a list-type of a definition does not satisfy. While this is true, we propose that the list-type framework functions as a solid base for further development of the understanding on the concept. Furthermore,

PRACTICES	THINKING STYLES	MENTALITY
<ul style="list-style-type: none"> • HUMAN-CENTERED APPROACH E.g. People-based, user-centered, empathizing , ethnography, observation (e.g. Brown 2008; Holloway 2009; Ward et al. 2009) • THINKING BY DOING E.g. Early and fast prototyping, fast learning, rapid iterative development cycles (e.g. Boland & Collopy 2004; Lockwood 2010; Rylander 2009) • VISUALIZING E.g. Visual approach, visualizing intangibles, visual thinking (e.g. Carr et al. 2010; Drews 2009; Ward et al. 2009) • COMBINATION OF DIVERGENT AND CONVERGENT APPROACHES E.g. Ideation, pattern finding, creating multiple alternatives, (e.g. Boland & Collopy 2004; Drews 2009; Sato et al. 2010) • COLLABORATIVE WORK STYLE E.g. Multidisciplinary collaboration, involving many stakeholders, interdisciplinary teams (e.g. Dunne & Martin 2006; Gloppen 2009; Sato et al. 2010) 	<ul style="list-style-type: none"> • ABDUCTIVE REASONING E.g. The logic of “what could be”, finding new opportunities, urge to create something new, challenge the norm (e.g. Fraser 2009; Lockwood 2009; Martin 2009) • REFLECTIVE REFRAMING E.g. Rephrasing the problem, going beyond what is obvious to see what lies behind the problem, challenge the given problem (e.g. Boland & Collopy 2004; Drews 2009; Zaccai in Lockwood 2010) • HOLISTIC VIEW E.g. Systems thinking, 360 degree view on the issue (e.g. Dunne & Martin 2006; Fraser 2009; Sato 2009) • INTEGRATIVE THINKING E.g. Harmonious balance, creative resolution of tension, finding balance between validity and reliability (e.g. Brown 2008; Fraser 2009; Martin 2010) 	<ul style="list-style-type: none"> • EXPERIMENTAL & EXPLORATIVE E.g. The license to explore possibilities, risking failure, failing fast (e.g. Brown 2008; Fraser 2007; Holloway 2009) • AMBIGUITY TOLERANT E.g. Allowing for ambiguity , tolerance for ambiguity, comfortable with ambiguity, liquid and open process (e.g. Boland & Collopy 2004; Cooper et al. 2009; Dew 2007) • OPTIMISTIC E.g. Viewing constraints as positive, optimism attitude, enjoying problem solving (e.g. Brown 2008; Fraser 2007; Gloppen 2009) • FUTURE-ORIENTED E.g. Orientation towards the future, vision vs. status quo, intuition as a driving force (e.g. Drews 2009; Junginger 2007; Martin 2009)

Figure 2 A framework explicating the common elements of design thinking, as depicted in the management discourse

although a model-based definition depicting a sequential process for design thinking as presented by Badke-Schaub, Roozenburg and Cardoso offers a concrete “if-then description”, it ignores the notion that design thinking can be used to describe other issues besides a process. As Badke-Schaub, Roozenburg and Cardoso (2010) note, designing is a complex concept consisting of more dimensions on several levels.

TOWARDS EMPIRICAL GROUNDING AND UNIFIED THEORIES

THE EMERGENCE OF DESIGN THINKING AS A MANAGEMENT DISCOURSE

As one of the experts representing the academic view interviewed for this research pointed out, an interesting question is, what has originated this recent management discourse? Did something happen within the established design discourse that initiated this new discourse? It is worthwhile to consider, whether there have been shortcomings within the field of design research that have contributed to the birth of the recent new discourse. For example, Jung, Sonalkar, Mabogunje, Banerjee, Lande, Han, & Leifer (2010) suggest, that design research has often failed to be relevant for design practice and been unsuccessful in establishing a sustainable discourse between research and practice. Jung et al. (2010) propose, that design research needs a new conceptualization of theory in order to not just study existing skills of designers, but to improve the practice of designing by creating new skills for researchers and practitioners.

Alternatively, the reasons for the emergence of the management discourse might be linked with the business environment designers operate in. Another interviewee perceived the current management discourse as a result of a situation, where other means for tackling competition have ran their course; productivity has been pushed to its limits and the road of incremental improvements have been walked to the end. As the management discourse deals with the immaterialization of design and the utilization of design methods in problem solving and development efforts of nearly any area, the question that follows is: as production and design are increasingly moving to lower cost countries, is the

new discourse a consequential survival strategy of design in industrialized western countries? Along this thought is the critical note from Don Norman (2010), in which he portrays design thinking as nothing new, simply a public relations term for an old concept of “creative thinking”, but which, nonetheless may help design break away from being viewed as a function of “making things pretty”, and moving the general perception of the contribution of design from the world of form and style to that of function and structure.

However, the reasons behind the emergence of the management discourse might be related to issues other than those “within” the realm of design research and practice. The interviewed experts also regarded the management discourse as a phenomenon rising from the need to rethink management education, i.e. from management science questioning management education, which has been over-emphasizing analytical thinking and rational problem solving. This view is supported by the rationale stated in their work by e.g. Boland & Collopy (2004) and Dunne & Martin (2006). There are no clear answers to be found to the above issues.

STORIES OF SUCCESS ARE NOT ENOUGH - THE NEED FOR EMPIRICAL RESEARCH

Badke-Schaub, Roozenburg and Cardoso (2010) and Johansson and Woodilla (2010), among others, point out that the management discourse lacks empirical evidence and is not linked to a theoretical base. Becoming evident also from the expert interviews discussed earlier in this paper, the management discourse has not so far referred to, or explicitly built on the research within the design discourse. Although the interest of the management discourse is not the better understanding of the cognitive activities of designers in the design process but rather in e.g. improving the innovation capabilities of an organization, the elements forming the concept of design thinking as understood within the management discourse have been studied in the design discourse over the last decades, and therefore acknowledging these results and developing the concept further based on these results seems necessary.

As a basis for interpreting what design thinking could mean for management, and in order to develop the concept in its more recent meaning further and gain evidence on its value, the management discourse should be linked to and build on the research carried out in the design discourse. Systematic comparison of the elements of the management discourse with the research conducted in the design discourse, allows at least two advancements; first, an initial evaluation of whether the validity of the views held within the management discourse are supported by the findings of the academic research, and, secondly, the identification of possible contradictions. As an example, Badke-Schaub et al. (2010) point out that instructions for applying design thinking to management, by e.g. Brown, are not all empirically or theoretically supported. The instructions regarding the use of emotions, empathy, visualization, methodological approaches, and teamwork - just to mention a few - are superficially discussed, without effective practical guidance, overlooking their limitations, and at least partially in contradiction to research results presented in the design discourse. The discussion on teamwork provides an example of this; although brainstorming is a frequently used method in design practice, in studies looking at team work and brainstorming methods, teams have been reported to produce fewer and less creative solutions to a given problem than when individual responses were randomly combined into groups (Goldschmidt & Badke-Schaub, 2010). In reality, the benefits of group ideation might be others than the amount or level of creativity of the ideas, such as dissemination of knowledge and social bonding, as demonstrated by a study conducted at IDEO itself by Hargadon and Sutton (1996). However, these type of views are often not given much attention by authors within the management discourse, but the rationale behind the proposed approaches seems to be based more on commonly held assumptions and beliefs. The practice of design thinking by organizational members who are not traditional designers is yet to be explored and understood in the design thinking literature (Terrey, 2010). As noted by Terrey, non-designers can demonstrate skills and strategies of designers. That is, skills and strategies linked to designers especially within the management

discourse. In order to evaluate the novelty, distinctiveness, use, application, benefits and limitations of design thinking as portrayed in the management discourse, it needs to be defined in more detail and the elements constituting it, need to be further studied as well as translated into the discipline of management. As Dorst (2010, p.133) points out, "although many of the activities that designers do (i.e., framing, ideation, creative thought) are quite universal, and thus it would be inappropriate to claim them as exclusive to design or design thinking, some of these activities have been professionalized in the design disciplines in ways that could be valuable for other disciplines."

CONCLUSION AND DISCUSSION

In this paper we have discussed the two discourses on design thinking, exploring their focus, direction and relationship through existing literature as well as expert interviews of academics and practitioners. We have also discussed the need for empirical research on the management discourse view on design thinking and argued that it should build on the research conducted in the long-established design discourse both for the validity of the claims associated with it and to develop the concept further for its beneficial utilization in different contexts. To evaluate their validity and deepen the understanding of the elements forming design thinking in the management discussion, the concept needs to be linked with the respective research conducted in the design discourse. To advance those ends, based on a review of literature, a framework summarizing how design thinking is depicted in the current management discourse was proposed previously (Hassi & Laakso, 2011). We now propose that this framework functions as a starting point for a more detailed characterization of design thinking within the management discourse that enables the evaluation of the value of design thinking to innovation and management, as well as functions as a conceptualization through which the insight from the research conducted within the design discourse can be transferred to the management discourse. We conclude the paper by proposing directions for research that further explore design thinking as a management practice. A leading question throughout the paper has been, what would the application of

design thinking to innovation and management mean and how to conduct academic research on its use, application, as well as its potential benefits and limitations? In order to do this, it is first needed to further define what design thinking really means, and what are the elements it consists of. Once the concept of design thinking is defined in more detail, the elements of the concept enable to carry out, for example, the following research directions:

1. Link the elements of design thinking as described in the management discourse framework to the research conducted within the design discourse to evaluate their validity and deepen the understanding of what these elements entail. This can be carried out by an extensive literature review, bridging together each element in the design thinking framework and the academic research on the topic the element is related to.
2. Interpret what the elements mean as management practice; can design thinking be applied to fields beyond the traditional design profession, and if yes, how? For example, how can we interpret rapid prototyping and experimentalism into the activities of strategy planning? What would that mean as management practice?
3. Study, whether the application of design thinking in management practices produces better results, compared to a non design thinking approach, and if yes, under which conditions? For example, does the utilization of a rapid prototyping approach effectively assist in strategy planning? This could be accomplished by e.g. retrospective case studies and action research.

As Badke-Schaub, Roozenburg and Cardoso (2010) point out, both the management discourse and the design discourse could learn from each other, and gain from each other in different ways. Let's find out how.

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