Design Thinking as Knowledge Work: Epistemological Foundations and Practical Implications

By Anna Rylander

Abstract

This paper argues that knowledge work and design thinking represent different approaches to problem-solving based on fundamentally different epistemologies: a rational, analytic—or “intellectual”—approach, versus an interpretive, emergent, and explicitly embodied approach. While problems to be addressed may be of similar, overlapping, or completely different character, knowledge-intensive firms and design firms have different perspectives for framing problems and different processes and resources at their disposal for solving problems. By comparing the two perspectives on problem-solving and highlighting their different epistemological roots and research traditions gaps where the two perspectives could cross-fertilize each other, for researchers as well as practitioners, are revealed.

Ever since Bell (1973) suggested that knowledge is a central feature of post-industrial societies, the role of knowledge as a primary source of value creation and the significance of experts, or knowledge workers (Drucker, 1988), have attracted a flood of interest in management theories. Yet, while the recent research focus on knowledge has undoubtedly benefited organization science, the literature still presents sharply contrasting and at times even contradictory views of knowledge (Seely Brown & Duguid, 2001).

Given the critical role knowledge and knowledge workers are assigned in the economy, the constructions of what knowledge actually is become important to the extent that they influence interpretations, evaluations, and practices of practitioners. This paper explores the various constructions of knowledge within the discourses in management studies in which the concepts of “knowledge work” and “design thinking” are embedded. It is argued that knowledge work (and so-called knowledge-intensive firms) and design thinking (and design firms) represent different approaches to problem-solving based on fundamentally different epistemologies: a rational, analytic, or “intellectual” approach, versus an interpretive, emergent, and explicitly embodied approach. The
problems to be addressed may be of similar, overlapping, or greatly differing character. But knowledge-intensive firms and design firms have different perspectives for framing the problem, and different processes and resources at their disposal for solving the problem.

**Constructions of Knowledge Work and Knowledge-Intensive Firms**

According to the rhetoric surrounding the “knowledge economy” that has dominated management studies in the past few decades, knowledge is a critical—if not the—resource and driver of (economic) development and success for nations, companies, and individuals alike.

The theorizing around knowledge organizations first began with the assertion by Sveiby and colleagues in the 1980s that the traditional management theories and tools were not suitable for contemporary organizations dependent on and trading in knowledge (Sveiby & Lloyd, 1987; Sveiby & Riesling, 1986). In the organization sciences literature, this development is reflected in the concept of the knowledge-intensive firm (KIF), a term that has become widely used and now represents a category of organizations within scholarly research. A substantial body of research reported in the organization sciences literature is now devoted to investigating KIFs and generating findings that are relevant to this type of organization.

Exactly what distinguishes a KIF is, however, less clear. A recent analysis of the literature on these firms (Rylander, 2006) showed that, at least in the lexical/technical sense, the KIF is meaningless as an organizational category. In other words, there is no set of distinctive characteristics that would allow us determine what firms qualify as KIFs. Definitions are vague and evolve around the role of “knowledge” and of knowledgeable people. As an example, according to Sheehan (2005), “Knowledge-intensive firms create value by solving clients’ problems through the direct application of knowledge. Whereas knowledge plays a role in all firms, its role is distinctive in knowledge-intensive firms. Rather than being embodied in the process or product, knowledge resides in experts and its application is customized in real time based on clients’ needs” (p. 54). KIFs have also been described as “particularly good examples of contemporary forms of ‘people dependent’ organizations” (Robertson & Swan, 2004:124). In essence, what the definitions of KIF within the scholarly literature
boil down to is that these are organizations dependent on highly qualified people to solve complex problems in a creative way.

Empirical studies of KIFs typically include professional services firms and high-tech companies, but management and IT consulting are the firms most commonly referred to and studied (Alvesson, 1995; Kärreman et al., 2002; Morris, 2001; Morris & Empson, 1998; Robertson & Swan, 2003, 2004; Starbuck, 1992). Yet there is little consistency across empirical studies as to which industries can—and perhaps more importantly, which industries cannot—be included in the category.

Even so, there are no case studies on design firms within this literature—the reason being that design work does not fit with the construction of knowledge. The literature on KIFs tends to stress knowledge as related to intellectual competencies at the expense of other possible understandings and conceptualizations of organizational life and work (Elkjaer, 2000). Schreyögg and Geiger (2007) assert that “knowledge-intensive firms are first of all firms which make intensive use and/or generate knowledge in the discursive mode” (p. 91). They reject all forms of embodied or tacit “knowledge” that cannot be verbalized and validated in an argumentative process. Similarly, Alvesson (2004, p.13) uses the concept of knowledge “to draw attention to analytic, intellectual and theory-guided activities,” proposing that “[p]ractical skills, the ability to use the body and creative talents—crucial in arts, crafts and sport for example—are not necessarily best understood in terms of knowledge,” and suggests that they might instead be called “talent-intensive” work. Yet creativity is often said to be a key feature of KIFs (e.g. Alvesson, 2004; Robertson & Swan, 2003; Sveiby & Riesling, 1986; Starbuck, 1992; Swart & Kinnie, 2003)—in fact, this seems to be one of the few aspects authors agree on.

**Constructions of Design Thinking and Design Firms**

While it is by no means a new term or concept, it is only recently that the notion of “design thinking” has found its way into the management literature. This upsurge in interest in the popular as well as academic management literature is, however, better understood within the context of a different—
parallel, albeit interlinked—discourse from that of the knowledge economy rhetoric, one that instead focuses on innovation. In particular, the popularity of the concept of design thinking concurs with a number of trends in the general management discourse on the (new) conditions for innovation, emphasizing concepts such as “open innovation” (Chesbrough, 2003) and “user-driven innovation” (von Hippel, 1988). Furthermore, the field of organization studies is witnessing an increasing (renewed) interest in design and design-oriented research, often with the aspiration of revitalizing the field (see e.g. the recent special issues in *Organization Science* and the *Journal of Applied Behavioral Science*; Bate, 2007; Dunbar & Starbuck, 2006). In addition, increasingly popular concepts in organization theory, such as organizational symbolism (e.g. Alvesson & Berg, 1992; Gagliardi, 1990) and aesthetics (e.g. Strati, 1999), implicitly emphasize the role of design in all organizational settings by highlighting the importance of visual and physical symbols and aesthetic experience in organizational life.

Like the term “knowledge work,” the term “design thinking” is composed of two ambiguous words that defy straightforward definition. Consequently, design thinking is often left with definitions such as “approaching managerial problems as designers approach design problems” (Dunne & Martin, 2006:512). While such a tautological definition offers little explanation on the phenomena to be researched, it does call attention to the two components that are addressed in this literature—that design problems are somehow different, and that the way they are addressed by designers is somehow different.

This discourse holds that designers are faced with what is often referred to as “wicked” problems. Such problems are open-ended in the sense that they are ill-defined, characterized by incomplete, contradictory, and changing requirements and complex interdependencies—that the information needed to understand the problem depends upon one’s idea for solving it. There is thus no “right” or “wrong” solution, only “better” or “worse” (Rittel & Webber, 1973). Linear techniques are clearly ill-suited for addressing such problems. The design process, on the other hand, is described as iterative and emergent, alternating between problem definition and solution, and characterized by imagination, prototyping, and empathizing with the user (Conklin, 2006; Lawson, 2006). Drawing on Simon’s
(1969) classic distinction between science and design, Liedka (2004) proposes that design thinking differs from scientific method in terms of the nature of the hypothesis they evolve around. Both depend on generating and testing solutions (hypothesis), but the scientific method seeks to uncover what is, while the aim of design is often to envision what might be, but is not yet.

Boland et al. (2008) talk about a “design attitude,” by which they mean a thorough, ongoing expectation that each project is a new opportunity to create something remarkable, and to do it in a way that has never been done before. Indeed, “Designers relish the lack of predetermined outcomes” (Boland & Collopy, 2004:9). Similarly, Dunne and Martin (2006) refer to a “design mind-set” that doesn’t worry about constraints because there is always a way to figure your way around them. Three “types of knowledge” characterize design according to Utterback et al. (2006): knowledge about technological opportunities, about user needs, and about product languages (i.e. the signs that can be used to deliver a message to the user and the cultural context in which the user will give meaning to those signs). Most importantly, however, is the balance between those types of knowledge, and the ability to integrate them.

As opposed to “knowledge workers,” who typically have a business or engineering degree, designers are predominantly trained in art schools, where processes of knowledge creation are marked by interaction with visual and physical elements as well as with words and numbers. Design schools characteristically use design studios as their central educational device. In a process of learning by doing, students are set a series of design problems to solve. They learn how to design largely by “doing” rather than by studying and analyzing (Lawson, 2006). Drawing and sketching constitute an essential part of the knowledge creation process. Designers learn to “think with their hands” (Collopy, 2004), using sketches, prototypes, and intuition to arrive at their final solutions. Schön (1983) described this process as “having a conversation” with the drawing. Design as problem-solving is thus embodied in character and requires the ability to embrace many different kinds of thought and knowledge—art, science, and technology. Design solutions therefore tend to be holistic, and designers have been referred to as “knowledge brokers” (Hargadon & Sutton, 2000).
Similarities and Differences between Constructions of Knowledge Work and Design Thinking

The brief overview of the literature on knowledge work and design thinking illustrated that these different scholarly fields within management studies address the same fundamental challenge: highly qualified people engaging in creative problem-solving. There are several critical similarities between design firms and so-called KIFs. Management consulting firms—the type of firms most frequently studied within the KIF literature—are particularly interesting in this respect. Being “value shops”—i.e., having a value-creation logic based on intensive problem-solving—management consulting and design firms have a number of key distinctive characteristics of value creation (i.e. key activities, cost, and value drivers) in common (Stabell & Fjeldstad, 1998). Results are notoriously difficult to measure and evaluate, because these firms sell experience goods that are often co-created to some extent with the client, and neither design firms not management consultants are protected by a professional body. A great deal of ambiguity and uncertainty is thus built into the business logic of design as well as management consulting firms.

However, the way in which these challenges are addressed differs in terms of the practices of management consulting and design firms, as well as between the constructions of knowledge work and design thinking in the literature, as summarized in Table 1 below.

Table 1. Constructions of Knowledge Work and Design Thinking

<table>
<thead>
<tr>
<th>Dominant constructions of</th>
<th>Knowledge Work</th>
<th>Design Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Intellectual (embrained), theory-guided</td>
<td>Practical (embodied), reflection-in-action</td>
</tr>
<tr>
<td>Problem</td>
<td>Tame/Science</td>
<td>Wicked/open-ended</td>
</tr>
<tr>
<td>Identity (social)</td>
<td>Celebrating rationality</td>
<td>Celebrating creativity (stars)</td>
</tr>
<tr>
<td>Dominant sensemaking modes</td>
<td>Verbal (interactions with people)</td>
<td>Visual (interactions with physical objects as well as people)</td>
</tr>
</tbody>
</table>

It is argued here that the differing constructions are rooted in the differing epistemological traditions of the fields of knowledge work and design thinking. In the literature on KIF, knowledge work is
construed as rational, analytical, and disembodied, or “intellectual” in character. So-called knowledge workers’ sensemaking process is conceptualized as constituted in social interactions, while the role of interactions with the physical surroundings and various kinds of sense information is not well understood, if it is recognized at all. Design firms, on the other hand, proceed from a different epistemological tradition, in which ambiguity is accepted as a natural part of the process, emphasizing reflection in action (Schön, 1983) and practical knowledge (Molander, 1996), thus nurturing different educational and work practices as well as different identities.

This distinction between “intellectual,” theory-guided/verbal and practical, embodied/visual knowledge affects problem-solving on several levels. Fundamentally, various types of sensory information—pictorial/visual, verbal/narrative, spatial/kinesthetic, haptic, etc.—affect sensemaking differently. On a social level, these constructions of knowledge influence how professionals construe their identities as either “knowledge workers” or “designers.” As Armbrüster (2004) has noted, management consulting firms respond to the ambiguity inherent in complex problem-solving by nurturing an identity of rationality, emphasizing “analytical expertise, and rationality in the sense of data-driven objectivity” (p. 1248). Design firms, on the other hand, with their affinity with the arts, are better placed to embrace ambiguity and tend to foster an identity marked by creativity and individuality.

The literature on knowledge work and design thinking has emerged within different discourses, addressing different research themes that respond to different needs and practices. The literature on knowledge work and knowledge-intensive firms typically addresses organizational issues emerging from the challenges posed by coordinating and managing highly qualified knowledge workers who are expected to act and collaborate based on their own understanding, thus invalidating bureaucratic forms of control. Consequently, research topics evolve around governance and leadership, normative forms of control, HR policies and practices, culture and organizational identity. Literature on design thinking, on the other hand, tends to focus on the nature of design problems and the design process, most commonly in the context of innovation. In this tradition the focus is thus not so much on what goes on in design firms, but on how designers and design processes, techniques, and “attitudes” can
enhance other firms’ processes. However, design thinking, as a field in management studies, is less
mature and thus less coherent, with a more limited source of empirical studies to draw from.¹

**Practical Implications**

The section above serves to highlight that design firms and knowledge-intensive firms depart from the
same basic premise: solving complex problems creatively under ambiguous and uncertain conditions. The different approaches by which design firms and management consulting firms respond to this challenge were set in the context of two different discourses representing different constructions of knowledge. These discourses have implications and consequences for practitioners. It is through the process of differentiating, fixing, naming, labeling, and classifying that social reality is systematically constructed in a continuously ongoing process (Chia, 2000). The words that we use, and more importantly, how we use them and the meanings that thus become attached to them, actively construct a version of the social world. That is, they do not just describe things; they do things. And being active, they have social and political implications (Potter & Weatherell, 1987).

The practical implications for how design and knowledge work are made sense of rising from the different epistemological foundations and discourses will be explored here, based on two themes highlighted in the section above: identity construction and problem-solving resources. To what extent do these discourses guide how knowledge workers/designers think of themselves as professionals? How do they guide their ideas about what they do—and as a consequence, how they act? Equally, how do these discourses influence how others think of what knowledge workers/designers do and the result/output of what they do?

**Constructions of knowledge and identity**

Shared identity, in organizations as in any social context, is necessary for people to perceive and interpret the world in similar ways (Haslam et al., 2003). As Weick (1995:20) put it: “Depending on

¹ This is not to say that design, or a design approach to organization studies, is a new phenomenon. Ever since Simon’s seminal work in 1969, *The Sciences of the Artificial*, there have been several waves of interest in the potential contribution of design and design science to organization studies. What is of interest in this paper is the current discourse on design thinking set in the context, as discussed above.
who I am, my definition of what is ‘out there’ will also change.” He therefore put the establishment and maintenance of identity as the first of the seven properties of sensemaking. Accordingly, a shared organizational identity is central from an organizational perspective; it provides a link between the individual and the organization, as well as guidance for attitudes and behaviors.

The organizational identities of knowledge workers are set within the context of the knowledge economy discourse. According to the rhetoric underpinning this discourse, the very word “knowledge” conjures a promise of insight, skill, prestige, and power (Blackler, 2002). Not only has this discourse captivated the field of management, but it has also long been critical to the rhetoric of politicians promoting the importance of knowledge for success in a post-industrial economy. The goal of the Lisbon Strategy, adopted by the European Council in 2000, is to make the EU “the most dynamic and competitive knowledge-based economy in the world” by 2020. Research funds are made available for conducting research in knowledge-oriented domains. The knowledge economy is a key theme in the European Union’s Fifth, Sixth, and Seventh Framework research programs. Knowledge work is associated with those who occupy a privileged position within the division of labor. Knowledge workers are understood to be highly qualified individuals who belong to, or form a distinct component of, an elite group of professional and managerial employees (Knights et al., 1993; Schultze, 2000). As a consequence, highly idealized views about professionals and the nature of knowledge are overlaid on conceptions about knowledge-intensive companies (Alvesson, 1993).

In his analysis of knowledge work, Alvesson (2001) asserts that “the extent to which knowledge is a particularly significant element in the functions of knowledge-intensive companies remains an open question” (p. 867). From a critical perspective he suggests that KIFs might be usefully seen purely as “systems of persuasion,” relying primarily on their persuasive strategies (esoteric skills) rather than expert knowledge or skills per se to convince clients of their superior ability and expertise to satisfy their expectations. In other words, the heavy reliance on knowledge—that is, the “intellectual kind,” as portrayed in the KIF literature—may be largely a myth. Furthermore, what this conceptualization of knowledge (as intellectual, theory-guided, verbal) fails to recognize is that language itself is embodied in character. As empirical research in cognitive sciences has clarified, everything that we can
experience, think, and know is dependent on how our bodies and brains cooperate in thinking and acting. In other words, all so-called “intellectual” activity is embodied (Damasio, 1994, 1999; Johnson, 1987; Lakoff & Johnson, 1999; Maturana & Varela, 1987; Varela et al., 1991).

Constructions of knowledge and problem-solving

The construction of knowledge within the discourse of knowledge work is thus not only questionable in terms of its relation to practice in such firms, but also inherently flawed. The result for knowledge-intensive firms is that a very limited—and limiting—view of knowledge is promoted in the workplace and in the understanding of what role it plays in and for organizations. The narrow focus on “intellectual” knowledge developed mainly through verbal/narrative interactions neglects embodied spatial/kinesthetic and pictorial/visual interactions. Richer sensory experience tends to reduce rather than increase ambiguity because different forms of sense information have different properties that tend to complement each other. For example, narrative knowledge, which is vivid and plausible, often has ambiguous and multivocal meanings, whereas visual knowledge, which aggregates information into depictions and patterns, simplifies it. Organizational sensemaking is therefore likely to be richer when constructed multimodally (Bürgi & Roos, 2003).

Refuting the dominant view of knowledge is no minor task; management writing has been framed in terms of rationality since Taylor’s Principles of Scientific Management in the early 20th century. The divorce between thinking and doing, between decision and execution, has been a central tenet of management science ever since (Clegg et al., 2008). Knowledge workers/management consultants’ identity celebrating rationality therefore fits right in with the general management discourse. Theoretical concepts such as work methodologies and data-driven analysis, as well as training and recruitment policies focusing on “analytical skills,” are devised to symbolize a rational approach to business issues to compensate for the ambiguity inherent in consulting work (Armbrüster, 2004). In other words, producing symbols signaling rationality to the business environment means speaking a language clients understand and feel comfortable with.
Designers, on the other hand, proceeding from a different epistemological tradition, produce symbols of creativity and do not always speak the same language as clients (Johansson & Svengren, 2008). This is probably a contributing factor to the significantly lower profitability among design firms as compared to so-called KIFs in general and management consulting firms in particular.

However, within the increasingly important discourse on the “innovation economy,” creativity is the more desirable attribute, and too heavy an emphasis on rationality may be seen to stultify organizations. It is in this context that design thinking is lauded as an approach to problem-solving.

While an approach based on rationality may be more efficient in ongoing operations, implying less risk when a problem is well defined, it is also less likely to come up with a new solution (the essence of innovation) than an approach celebrating (artistic) creativity.

Of course, in practice all complex problem-solving activities have components of rational analysis as well as creative thinking, and it is beyond the scope of this paper to discuss the extent to which these elements are present in the practices of knowledge workers and designers. But these discourses are important, because they provide the context for practitioners’ identity construction. And identities provide the basis for how we make sense of the organizations we work for—of our own role within them as well as how we interact with colleagues and clients and how we address problems. Therefore, identities leaning too heavily toward one or the other end of the scale can be constraining. From the perspective of knowledge workers, the (renewed) attention to design thinking may be seen as a trend towards loosening up restrictive identities in an increasingly complex and ambiguous world in which a purely rational approach is no longer tenable—or, put differently, is no longer rational. After all, as Roger Martin put it (Dunne & Martin, 2006:513), watching designers solve problems, “The best of what I see in business people is the same as what I see in designers at their best.” Martin posits that both enter some kind of constrained environment in which they have to solve a problem by thinking differently from anybody else: “I saw that this is what great business leaders do.” Conklin (2006) has argued that much of the frustration experienced in organizations today is due to the stubborn application of thinking, tools, and methods devised for “tame,” or scientific problems, implying a linear approach to addressing them. However, he observes, most projects today have a significant
“wicked” component. Virtually all creative work is a process of design. All problems call for designing a solution—all projects are essentially designing something.

On the flip side, the very same trend toward open innovation may render the identities of the creative designers constraining. As Fisher (1997) suggested, designers may have problems reconciling the stereotype for creative people pervading design education with the role designers often take in practice as part of cross-functional teams. Design education should therefore give future designers permission to play with different roles and identities as appropriate—in the same way as they understand that some design thinking is rational, and some is intuitive.

**Implications for further research**

The purpose of this paper was not so much to answer questions but to raise them—and, more importantly, to identify fruitful areas for further research. By comparing the two different perspectives on problem-solving and highlighting their different epistemological roots, research traditions, and practical implications, the analysis above reveals gaps where the two perspectives could cross-fertilize each other. It was noted that there are traces of both of these problem-solving logics in KIFs as well as in design firms. Professionals and researchers from both sides could benefit from learning from each other.

To begin with, a more complete comparison between the constructions of knowledge in the respective fields of research, as well as the practical consequences of these constructions in design and knowledge-intensive firms, would allow us to better understand the role of epistemological perspectives for the daily practices of such firms.

Most critically, this requires more empirical research into what goes on in design firms: how knowledge and identities are constructed in these contexts, and how different types of sense information (resources) are used in problem-solving. This would enable the building of theories to better understand and articulate design knowledge but also contribute to closing the current gap in the design management literature on the organization of design firms. Although identity is a critical theme within design management research, the attention tends to be directed towards the role of design in
identity construction in other (client) firms, and in corporate identity rather than organizational
dentity. Case studies of organizational identity in design firms are few and far between (though see
e.g. Andriopoulos & Gotsi, 2001\textsuperscript{2}). In this respect, the relatively immature and emerging field of
design management could benefit from the theoretical developments of the KIF field.

In an overview of the paradigmatic differences in terms of Burrell and Morgan’s (1979) framework
between the fields of management, design research and design management, Johansson and Wodilla
(2008) show that practically all design management research ends up in the functionalist paradigm.
This implies relying on objectivist assumptions: a positivist epistemology and a deterministic view of
human nature. As such, it is in stark contrast to the basic principles of design thinking as described in
the literature, as well as the design research literature in general.

The literature on KIF is rather broad, spanning several management disciplines, and there are certainly
case studies belonging to the functionalist paradigm within this literature. However, the majority of the
studies bear on the radical humanist paradigm (critical management studies and organizational
development) or the interpretive paradigm (cultural, hermeneutic, and interpretive theories). There is
now a considerable body of research on the organization and management of knowledge-intensive
firms within the field of organization studies, yet little research on the central themes of knowledge
work in the context of design firms. However, as the challenges to KIFs and design firms are of
similar nature, it would be instructive to explore further the central themes addressed by the KIF
literature in research on design firms.

To conclude: On the one hand, a better understanding of design thinking as problem-solving and how
value is created by designers could help in broadening the “knowledge economy” rhetoric and theories
on knowledge work as well as the practices of so-called KIFs. On the other hand, applying the
perspective of knowledge work to the work of designers could contribute to filling the gap in design

\textsuperscript{2} It is interesting to note, however, that this study frames the research as “creative industries,” including a case
study of one design firm and one advertising firm. The latter tends to end up somewhere “in between” KIFs and
design firms, occasionally being included in definitions of KIFs. For a study of identity construction in an
advertising firm, see Alvesson (1994). This illustrates the problems with setting boundaries around these
ambiguous categories.
management relating to the organization of design firms as well as the professionalization of design firms.
References


