

**DESIGN THINKING AS KNOWLEDGE WORK:
EPISTEMOLOGICAL FOUNDATIONS AND PRACTICAL IMPLICATIONS**

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Abstract

This paper argues 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 completely different character. But knowledge-intensive firms and design firms have different perspectives for framing the problem, different processes and resources at their disposal for solving the problem. By comparing the two different perspectives on problem-solving and highlighting their different epistemological roots, research traditions and practical implications, gaps where the two perspectives could cross-fertilize each other, for researchers as well as practitioners, are revealed.

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Introduction

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) has 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 and 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 different 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 completely different character. But knowledge-intensive firms and design firms have different perspectives for framing the problem, 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 80's that the traditional management theories and tools were not suitable for contemporary organizations dependent on and trading in knowledge (Sveiby and Lloyd 1987, Sveiby

and 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 knowledge-intensive firms (KIFs) (Rylander 2006/Rylander and Peppard *in review*) showed that the KIF is meaningless as an organizational category in the lexical/technical sense. 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 knowledgeable people. As an example, according to Sheehan (2005:54) “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.” KIFs have also been described as “particularly good examples of contemporary forms of ‘people dependent’ organizations” (Robertson and Swan 2004, p. 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 most commonly referred to and studied (Alvesson 1995; Kärreman *et al.* 2002; Morris, 2001; Morris and Empson 1998; Robertson and Swan 2003, 2004; Starbuck 1992). Yet there is little consistency across empirical studies as to what industries can – and perhaps more importantly, what industries *cannot* – be included in the category.

Nonetheless, there are no case studies on design firms within this literature. The reason is 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; Roberson and Swan 2003; Sveiby and Riesling 1986; Starbuck 1992; Swart and Kinnie 2003a) – in fact, this seems to be one of the few aspects authors agree on.

Constructions of Design Thinking and Design Firms

While 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 in the context of a different – parallel, albeit interlinked – discourse from that of the knowledge economy rhetoric, instead focusing 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 and Starbuck 2006). In addition, increasingly popular concepts in organization theory such as organizational symbolism (e.g. Alvesson and 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 and Martin 2006:512) While such a tautological definition offers little explanation on the phenomena to be researched, it calls 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 – 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 and Webber 1973). Linear techniques are clearly ill-suited for addressing such problems. Instead, the design process 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, on-going 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. "Designers relish the lack of predetermined outcomes" (Boland and Collopy 2004:9). Similarly, Dunne and Martin (2006) refers 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 it” rather than by studying and analyzing it (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, (social) science and technology. Design solutions therefore tend to be holistic and designers have been referred to as “knowledge brokers” (Hargadon and 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 and Fjeldstad 1998). Results are notoriously difficult to measure and evaluate as these firms sell experience goods that are often co-created to some extent with the

client, and neither is 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, how these challenges are addressed differs between 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

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

It is argued here that the different constructions are rooted in the different 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 at all recognized. Design firms on the other hand proceed from a different epistemological tradition, where 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, different sensory information, such as pictorial/visual, verbal/narrative, spatial/kinaesthetic, haptic etc. affect sensemaking differently. On a social level, these constructions of knowledge influence how professionals construe their identities as “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”. 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 have 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 that 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 from¹.

Practical implications

The section above served 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 on-going process (Chia 2000). The words that we use, and more

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.

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 and 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, about what they do – and consequently, 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?

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 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 the organizational perspective; it provides a link between the individual and the organization, it provides 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). This discourse immerses not only the field of management, but has long been critical 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 programmes. 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, conceptions about knowledge-intensive companies take over highly idealized views about professionals and the nature of knowledge (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 - as portrayed in the KIF literature; i.e. the “intellectual kind” - in KIFs 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 and Johnson 1999; Maturana and Varela 1987; Varela *et al.* 1991).

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 work place and for 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/kinaesthetic and pictorial/visual interactions. Richer sensory experience tends to reduce rather than increase ambiguity because these different forms of sense information have different properties. 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 (Bürge and Roos 2003).

Refuting this view of knowledge is no minor task as 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, producing symbols of creativity do not always speak the same language as clients (Johansson and 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, 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 respectively. But these discourses are important as 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 towards 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 where a purely rational approach is no longer tenable – or put differently, is no longer rational. As Roger Martin put it (Dunne and Martin 2006:513), watching designers solve problems, “I saw that this is what great business leaders do.” They enter some kind of constrained environment where they want to do something that is near impossible. They have to figure it out by thinking differently from anybody else. “The best of what I see in business people is the same as what I see in designers at their best”.

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 flipside, the same very trends towards open innovation may render the identities of the creative designers constraining. As Fischer (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 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

design firms. Both professionals and researchers within the respective fields could benefit from learning from the other.

To begin, a more complete comparison between the constructions of knowledge in the respective fields of research/discourses as well as among practitioners and the practical implications of these constructions in terms of identity work as well as sensemaking resources would allow us to better understand the practice of creative problem-solving as well as the role of epistemological perspectives for the daily practices of such firms.

Most critically, this requires more empirical research on 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. While 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 identity. Case studies of organizational identity in design firms are few and far between (though see e.g. Andriopoulos and Gotsi 2001²). 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) shows 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.

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.

The literature on KIF is rather broad, spanning over several management disciplines, and there are certainly case studies belonging to the functionalist paradigm among this literature. However, the majority of the studies bear on the radical humanist paradigm (such 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 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 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 management relating to the organization of design firms as well as the professionalization of design firms.

References

- Alvesson, M. 1993. 'Organization as rhetoric: knowledge-intensive companies and the struggle with ambiguity', *Journal of Management Studies*, **30** (6), 997-1015
- Alvesson, M. 1994. 'Talking on Organizations – Managing Identity and Impressions in an Advertising Firm', *Organization Studies*, 15(4):535-563
- Alvesson, M. 1995. *Management of Knowledge-Intensive Companies*. Berlin/New York: de Gruyter
- Alvesson, M. 2000. 'Social identity and the problem of loyalty in knowledge-intensive companies', *Journal of Management Studies*, **37** (8), 1101 - 1122.
- Alvesson, M. 2001. 'Knowledge work: ambiguity, image and identity', *Human Relations*, **54** (7), 863-886.
- Alvesson M. 2004. *Knowledge Work and Knowledge-Intensive Firms*. New York: Oxford University Press. 271 pp.
- Alvesson, M., and Berg, P.-O. (1992). *Corporate culture and organizational symbolism : an overview*. Berlin ; New York: de Gruyter.
- Andriopoulos, C., and Gotsi, M. 2001. 'Living' the Corporate Identity: Case Studies from the Creative Industry, *Corporate Reputation Review*, 4(2): 144-154
- Armbrüster T. 2004. Rationality and its symbols: signalling effects and subjectification in management consulting. *Journal of Management Studies* 41:1247-69
- Bate, P. 2007. Bringing the Design Sciences to Organization Development and Change Management. *Journal of Applied Behavioral Science*, 43(1): 8-11.
- Beckman, S. L. and Barry, M. 2007. Innovation as Learning Process: Embedding Design Thinking, *California Management Review*, 50 (1): 25-56
- Bell D. 1973. *The Coming of the Post-Industrial Society: A Venture in Social Forecasting*. New York

- Blackler, F. (2002) 'Epilogue: knowledge, knowledge work and organizations', in N. Bontis, and C.W. Choo (eds) *The Strategic Management of Intellectual Capital and Organizational Knowledge*. New York: Oxford University Press.
- Boland, R. J., and Collopy, F., 2004. Design Matters for Management. In Boland, R. J., and Collopy, F., (eds.) *Managing as Designing*, Stanford: Stanford University Press. pp. 3-18
- Boland, R. J., Collopy, F., Lyytinen, K., and Yoo, Y. 2008. Managing as Designing: Lessons for Organization Leaders from the Design Practice of Frank O. Gehry, *Design Issues* 24(1): 10-25
- Bürgi, P., and Roos, J. 2003. Images of Strategy. *European Management Journal*. 21(1): 69-78
- Burrell, G., and Morgan, G. 1979. *Sociological paradigms and organisational analysis: elements of the sociology of corporate life*. London: Heineman Educational Press
- Chesborough, H. 2003. *Open Innovation: The New Imperative for creating and profiting from technology*. Boston, MA: Harvard Business School Press
- Chia, R. (2000) 'Discourse analysis as organizational analysis', *Organization*, 7, 3, 513–18.
- Clegg, S., Kornberger, M., and Pitsis, T. 2008. *Managing and Organizations*. London: Sage Publications
- Collopy F. 2004. "I think with my hands" On balancing the analytical and the intuitive in designing. In *Managing as Designing*, ed. RJ Boland, F Callopy, pp. 164-73. Stanford, CA: Stanford University Press
- Conklin, J. 2006. *Dialogue Mapping: Building Shared Understanding of Wicked Problems*, Wiley
- Damasio, A. R. (1994). *Descartes' error : emotion, reason and the human brain*. London: Picador.
- Damasio, A. R. (2000). *The feeling of what happens*. New York, NY: Harcourt.
- Drucker P. 1988. The coming of the new organization. *Harvard Business Review* January-February

- Dunbar, R. L. M. And Starbuck, W. H. 2006. Learning to Design Organizations and Learning from Designing Them. *Organization Science*. 17(2): 171-178
- Dunne, D., and Martin, R. 2006. Design Thinking and how It Will Change Management Education: An Interview and Discussion. *Academy of Management Learning & Education*. 5(4): 512-423
- Elkjaer, B. (2000) 'Learning and getting to know: the case of knowledge workers', *Human Resource Development International*. **3** (3), 343 – 359.
- Fisher, T. 1997. The designer's Self-Identity – Myths of Creativity and the Management of Teams. *Creativity and Innovation Management*. 6(19): 10-18
- Gagliardi, P. (1990). *Symbols and artifacts : views of the corporate landscape*. New York: de Gruyter
- Hargadon, A. and Sutton, R. A. 2000. Building the innovation factory. *Harvard Business Review* May-June:157-66
- Haslam, A. S., Postmes T., and Ellemers, N. 2003. More than a Metaphor: Organizational Identity Makes Organizational Life Possible. *British Journal of Management* 14:357-69
- Hippel, E. von. 1988. *The Sources of Innovation*. New York: Oxford University Press
- Johansson, U. and L. Svengren. 2008. *Möten kring design. Om relationerna mellan designer, tekniker och ekonomer i fem svenska företag*. Lund: Studentlitteratur.
- Johansson, U., and Wodilla, J. 2008. Towards a Better Paradigmatic Partnership Between design and Management, Paper presented at the *International DMI Education Conference*, 14-15 April, Paris, France
- Johnson, M. 1987. *The body in the mind : the bodily basis of meaning, imagination, and reason*. Chicago: Univ. of Chicago Press.
- Kärreman, D., Svenningsson, S., and Alvesson, M. (2002) 'The return of the machine bureaucracy? Management control in the work settings of professionals', *International Studies of Management and Organization*, **32** (3), 70-92.

- Knights, D., Murray, F. and Willmott, H. (1993) 'Networking as knowledge work: The study of strategic interorganizational development in the financial services industry', *Journal of Management Studies*, **30** (6), 975-95.
- Lakoff, G., and Johnson, M. (1999). *Philosophy in the flesh : the embodied mind and its challenge to Western thought*. New York: Basic Books.
- Lawson B. 2006. *How Designers Think*. Oxford: Architectural Press
- Lehrer K. 2000. *Theory of Knowledge*. Boulder, Colorado: Westview Press
- Liedka, J. 2004. Design Thinking: The Role of Hypothesis Generation and Testing. In Boland, R. J., and Collopy, F., (eds.) *Managing as Designing*, Stanford: Stanford University Press. pp. 193-197
- Maturana, H. R., & Varela, F. J. (1987). *The tree of knowledge : the biological roots of human understanding*. Boston: Shambhala
- Molander B. 1996. *Kunskap i handling*. Göteborg: Daidalos
- Morris, T. (2001) 'Asserting property rights: knowledge codification in the professional service firm', *Human Relations*, **54** (7), 819-838
- Morris, T. and Empson, L. (1998) 'Organisation and expertise: an exploration of knowledge bases and the management of accounting and consulting firms', *Accounting, Organizations and Society*, **23** (5/6), 609-624.
- Potter, J. and Wetherell, M. (1987). *Discourse and Social Psychology: Beyond Attitudes and Behaviour*. London: Sage.
- Rittel, H. W., and Webber, M. M. 1973. Dilemmas in a General Theory of Planning, *Policy Planning*, 4: 155-169
- Robertson, M. and Swan, J. (2003) 'Control - what control? Culture and ambiguity within a knowledge intensive firm', *Journal of Management Studies*, **40** (4), 831-58.

- Robertson, M. and Swan, J. (2004) 'Going public: the emergence and effects of soft bureaucracy within a knowledge-intensive firm', *Organization*, **11** (1), 123-148.
- Rylander, A. 2006. *Making Sense of Knowledge Work*. Doctoral dissertation, Royal Institute of Technology: Stockholm
- Rylander, A. and Peppard, J. *In review*. What *Really* is a Knowledge-Intensive Firm? Under review for *Organization*.
- Schultze, U. (2000) 'A confessional account of an ethnography about knowledge work', *MIS Quarterly*, **24** (1), 1-39.
- Schön D. A. 1983. *The reflective practitioner : how professionals think in action*. New York: Basic Books. x, 374 s. pp.
- Schreyögg, G. and Geiger, D. (2007) 'The Significance of Distinctiveness: A Proposal for Rethinking Organizational Knowledge'. *Organization*. **14** (19), 77-100.
- Sheehan, N. T. 2005. Why old tools won't work in the "new" knowledge economy. *Journal of Business Strategy*.26(4): 53-60
- Simon, H. A. 1969. *The Sciences of the Artificial*, Cambridge MA: MIT Press
- Spender J-C. 2002. Knowledge management, uncertainty, and an emergent theory of the firm. In *The strategic management of intellectual capital and organizational knowledge*, ed. N Bontis, CW Choo, pp. 148-62. New York: Oxford University Press
- Stabell, C. B. and Fjeldstad, Ø. D. (1998) 'Configuring value for competitive advantage: on chains, shops and networks'. *Strategic Management Journal*. **19**(5), 413-437.
- Starbuck WH. 1992. Learning by knowledge intensive firms. *Journal of Management Studies* 29:713-40
- Strati, A. (1999). *Organization and aesthetics*. Thousand Oaks, Calif. ; London: SAGE.

Sveiby, K. E. and Riesling, A. (1986) *Kunskapföretaget – Seklets Viktigaste Ledarutmaning?* Malmö: Liber AB.

Sveiby, K. E., and Lloyd, T. (1987) *Managing Know-How: Add Value by Adding Creativity*. London: Bloomsbury.

Swart, J. and Kinnie, N (2003) 'Sharing in knowledge-intensive firms', *Human Resource Journal*, **13** (2), 60 -75.

Utterback, J., Vedin, B. A., Alvarez, E., Ekman, S., Sanderson, S. W. Tether, B., and Verganti, R. 2006. *Design-Inspired Innovation*, Singapore: World Scientific Publishing

Varela FJ, Thompson E, Rosch E. 1991. *The embodied mind : cognitive science and human experience*. Cambridge: MIT Press. xx, 308 pp.

Weick, K. E. 1995. *Sensemaking in organizations*. Thousand Oaks, Calif.: Sage. xii, 231 ; pp.