

**What is strategic competence and does it matter? Exposition of
the concept and a research agenda**

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Abstract

Drawing on a range of theoretical and empirical insights from strategic management and the cognitive and organizational sciences, we argue that strategic competence constitutes the ability of organizations and the individuals who operate within them to work within their cognitive limitations in such a way that they are able to maintain an appropriate level of responsiveness to the contingencies confronting them. Using the language of the resource based view of the firm, we argue that this meta-level competence represents a confluence of individual and organizational characteristics, suitably configured to enable the detection of those weak signals indicative of the need for change and to act accordingly, thereby minimising the dangers of cognitive bias and cognitive inertia. In an era of unprecedented informational burdens and instability, we argue that this competence is central to the longer-term survival and well being of the organization. We conclude with a consideration of the major scientific challenges that lie ahead, if the ideas contained within this paper are to be validated.

Introduction

The contexts in which modern organizations are operating and the concomitant demands being placed on the individuals whom work within them have changed dramatically over recent years. Strategists are increasingly faced with a complex, ambiguous and continuously changing environment and organizational actors across all levels of the hierarchy, managers and non-managers alike, are having to absorb, process, make sense of, then disseminate a bewildering flow of information in order to make decisions and solve problems. Indeed, such are the levels of disorder, stress and unpredictability within the contemporary workplace that D'Avini (1994) coined the term 'hypercompetition' in an attempt to

characterize the typical organizational response to this state of affairs. While some writers have questioned the validity of D'Avini's thesis. Such is the scale of social and technological change presently confronting organizations that the information processing and knowledge management capabilities required to manage the situation are at a premium. The problem, however, is that "change is incessant and not fully describable or predictable" (Tsoukas & Sheppard, 2004, p.137). In attempting to develop the organizational systems and processes and social practices that can best cope with this environment, a central premise of this article is that the resultant organizational designs, processes and practices, are fundamentally incompatible with the capabilities of many of the individuals who must work within them.

In addressing this issue, we argue for the existence of a meta-level strategic competence that integrates rationality with intuition in order to bring about the faster strategic reactions that are ultimately required if organizations are to survive these complex and turbulent times. Our purpose is to reflect upon state of the art developments that are currently taking place across a number of disparate literatures, spanning the individual, group, and organizational levels of analysis with a view to identifying new theoretical insights through which we might better understand the competency requirements for improving working practices and enhancing individual and organizational effectiveness. We maintain that the changes we are currently witnessing within the new workplace are placing potentially dysfunctional information processing burdens on key individuals and groups as they seek to skilfully steer the organization over the longer-term. Our ultimate goal is to identify new lines of inquiry that might lead to the development of human resource management interventions for overcoming these difficulties.

Pettigrew, Thomas and Whittington (2002) have argued that within the field of strategic management the actor and the human being have become lost among a welter of independent variables at the levels of the firm and the sector, with relatively limited attention paid to the individual and the networks they inhabit. We agree with their view that most executive behaviour is about living with and managing in issue-driven contexts. Accordingly, as researchers we need to focus on the capabilities of the human actor in coping with and managing the strategic context, and consider carefully the implications of this for the design of

organizations. In an era in which organizations are faced with unprecedented informational burdens and instability, our key message is that cognitive competence is crucial to strategic responsiveness and the organization's capacity to learn and renew itself.

Against this backdrop, we define strategic competence as the ability of organizations (or more precisely their members) to acquire, store, recall, interpret and act upon information of relevance to the longer-term survival and well-being of the organization. Using the language of the resource based view of the firm (Grant, 1996), this meta-level competence represents a confluence of individual and organizational characteristics, suitably configured to enable the organization to proactively detect those weak signals indicative of the need for change and act accordingly, thereby minimising the dangers of cognitive bias and cognitive inertia. These signals are then selected, filtered, stored, recalled and interpreted in a fashion that enables particular individuals and groups to respond appropriately to the prevailing contingencies.

This is not to say that organizations or individuals are merely passive processors of information. On the contrary, a central skill underpinning strategic competence is the ability to proactively shape the thought processes of others through the inter-related processes of sensemaking and sense-giving (Gioia and Chittipendi, 1991; Maitlis, 2005). Strategic competence is thus underpinned by a mixture of computational processes and processes of social construction (Lant and Shapira, 2001a, 2001b).

Drawing on the insights of theory and research from the fields of strategic management, industrial and organizational psychology and sociology, social cognition, cognitive psychology and work on personality and individual differences, in this paper we shall demonstrate how our notion of strategic competence links processes of individual, intra-organizational and inter-organizational learning and cognition with the demands on organizations for high levels of performance and creativity, underpinned by processes that enable knowledge to be managed effectively. As we shall see, our analysis not only suggests a number of key theoretical propositions that need to be tested in follow up empirical work, but also the development of some potentially promising interventions that might foster this meta-level competence.

Foundational Concepts at the Individual Level of Analysis

The central defining concepts of our notion of strategic competence are taken from the rapidly developing trans-disciplinary field of *managerial and organizational cognition* (see for example Eden, 1992; Eden and Spender, 1998; Hodgkinson and Thomas, 1997; Huff, 1990; Lant and Shapira, 2001b; Meindl et al., 1996; Porac et al, 1989; Walsh, 1995). Research conducted from a managerial and organizational cognition perspective has directly challenged the fundamental assumption of rationality, on which many of the dominant theoretical perspectives within the strategy field - such as the design school (Christensen *et al.*, 1982), the planning school (Ackoff, 1983; Ansoff, 1965; Steiner, 1969) and the positioning school (Porter, 1980, 1985) - are to varying extents implicitly or explicitly based.

Bounded rationality, mental representations and heuristic processing strategies

The earliest work of cognitive scientists such as Broadbent (1958) demonstrated that individuals are characterised by a number of fundamental limitations that preclude the processing of information to the extent implied by rationale theories of strategy making. At best, individuals can only strive to attain rationality within the limitations imposed by human information processing system (Simon, 1957). Managerial and organizational cognition researchers (e.g. Schwenk, 1984) have identified two principal ways in which strategists attempt to deal with the limitations imposed by the human information processing system.

The first approach entails the development of simplified, mental representations of reality, variously referred to as 'schemata' (Bartlett, 1932), 'cognitive maps' (Tolman, 1932) and 'mental models' (Johnson-Laird, 1983). Over the past 10-15 years or so MOC researchers have used these notions, collectively known as 'mental representations,' in an effort to better understand the processes of strategy formulation and implementation (see, e.g., Eden and Spender, 1998; Huff, 1990; Walsh, 1995). For example, a growing body of research has explored the ways in which individuals and groups represent the competitive environments in which their businesses are operating (e.g. Hodgkinson and Johnson, 1994; Porac and Thomas, 1990, 1994; Porac et al., 1989, 1995; Osborne, Stubbart & Ramaprasad,

2001; Reger and Huff, 1993). Strategists attend to only a limited subset of all the potentially available competitors and define their competitive territories in relatively narrow ways (Porac et al., 1989, 1995), with the consequent danger that potentially significant players might be overlooked (Zajac and Bazerman, 1991). Furthermore, once formed, actors' mental models of the competitive arena are slow to change, thus rendering individuals and the organizations to which they belong vulnerable to the actions of new entrants and other innovations the significance of which might not be realised until such time that the potential for adaptation has been severely eroded (Hodgkinson, 1997; Reger and Palmer, 1996).

The second approach entails the use of heuristic processing strategies, simplifying assumptions and rules of thumb that reduce the computational burdens on individual decision makers (Tversky and Kahneman, 1974), thereby focusing attention on selected portions of the problem and surrounding environment (see, e.g., Das and Teng, 1999; Schwenk, 1984). Although the use of heuristics reduces the information processing requirements on the decision maker, there are also significant risks involved, in that their deployment may lead to sub-optimal outcomes. Typical biases, each of which come to the fore during different stages of the decision process, include:

- a general tendency to inappropriately bolster a hypothesis or conclusion by reliance on pre-existing beliefs and only seeking information that supports these (confirmation bias) (Nickerson, 1998);
- decision accounts that are based on what seems like good explanations of conclusions rather than real insights into the decision process (plausibility bias) (Jonathan, Evans & Over, 1996);
- the application of heuristics, which may be flawed for a variety of reasons, such as errors in probabilistic reasoning, selective perception and so forth (Schwenk, 1984) and consequential biases identified by behavioural decision research (Tversky & Kahneman, 1974; Das & Teng, 1999); and
- acting in a way that runs against initial attitudes and standards (post decision regret) results in changing attitudes and beliefs to justify conduct and comport

with the new behaviour (cognitive dissonance) (Harmon-Jones & Mills, 1999).

Such cognitive biases in human judgment and decision making have a bearing on the strategic management process through restricted information search, generation of alternatives using beliefs to anchor or restrain judgements, and using analogies in the final evaluation stage of a group decision to justify their point of view, leading to an overestimation of the extent to which past experiences are applicable, partial descriptions of strategic alternatives, and the devaluation and dismissal of vitally important information by the group. The deployment of heuristics can also result in decision-makers being over-confident in their decisions and can create a misdirected search for certainty and a consequent *illusion of control* (Fischhoff, 1975; Fischhoff, Slovic and Lichtenstein, 1977; Langer, 1975).

When we consider this work on mental representations and heuristics and biases in the context of the complex and turbulent environments in which modern organizations are operating, it becomes clear that at the individual level cognitive skills are paramount, whilst at the organizational level systems and processes that enable more effective social construction come to the fore. Strategic competence as we have defined it represents the ability of organizations and individual employees to work within their cognitive and social limitations in such a way that they are able to maintain an appropriate *level of responsiveness* to the contingencies confronting them, minimising the dangers of cognitive bias and cognitive inertia highlighted above. As we shall see, this has crucial implications for the design of modern organizations.

Locus of control

We have argued that organizations that develop the capability to process information strategically are more likely to proactively shape their own destiny, whereas strategically incompetent organizations are more likely to react to their environments. Psychologists concerned with the analysis of personality and individual differences have used the term *locus of control* to capture a construct that has a bearing on this capability. This construct reflects the beliefs of

individuals about who controls the key events in their lives. It refers to a *generalised belief in the external or internal control of reinforcement* (Rotter, 1966). Individuals with extreme external locus of control beliefs are marked by a strong tendency to attribute the various outcomes in their lives to luck, chance, and powerful others or institutions; they believe that uncontrollable forces cause the events in their lives. Individuals with a tendency towards extreme internality, by contrast, trust their capacity to influence the environment and believe that they can control the events in their lives through their own efforts and skill.

This construct has been the subject of a number of investigations within the field of strategic management (see, e.g., Boone, de Brabander and Hellemans, 2000; Boone, de Brabander and van Witteloostuijn, 1996; Miller, 1983; Miller, Kets de Vries and Toulouse, 1982; Miller and Toulouse, 1986). In particular, researchers have analysed relationships between the locus of control beliefs of Chief Executive Officers (CEOs) and various strategic, structural and performance variables associated with their firms. Inter alia, these studies have revealed significant correlations between CEO internality and the tendency for firms to engage in strategic planning (often for a period of several years hence), to seek information about the business environment and to lead rather than follow competitors. Moreover, business organizations led by internally-oriented CEOs are more likely to inhabit dynamic and hostile environments, and to consult specialist technical staff in decision making, the structure of these organizations being relatively differentiated in nature (Miller, Kets de Vries and Toulouse, 1982; Miller, 1983; and Miller and Toulouse, 1986).

Clearly, to the extent that locus of control beliefs are influenced by actors' past experiences of success and failure to attain mastery of the business environment, we would expect to find that this variable has a bearing on the way in which actors process strategic information and represent this information in their mental models. On the basis of a detailed review of the literature on top executives, Finkelstein and Hambrick (1996) identified how this might occur. Locus of control beliefs influence an individual's field of vision, selective perception and interpretation of information in a variety of ways: for example, 'internals' devote greater effort to environmental scanning, using a wider array of sources, and notice and are aware of a greater proportion of the information that they scan in

comparison to their external counterparts. It follows that these differences are likely to be reflected in the structure and content of actors' mental models of strategic issues and problems, the mental models of internally-oriented individuals being relatively enriched in comparison to those of externally oriented individuals. This hypothesis is clearly worthy of investigation in future work. The extent to which it is uniformly desirable for organizations to select individuals on the basis of internal locus of control beliefs and/or to foster such beliefs is another question that also requires careful investigation. Clearly, a key danger associated with excessive internality is that individuals or groups might develop *illusions of control* (Fischhof, 1975; Fischhof et al., 1977; Langer, 1975; Willman et al., 2001). Hence, it may be advisable to select individuals with intermediate internal-external control expectancies throughout the top team, or, indeed, the wider organization as a whole. Alternatively, a strategy of building teams comprising mixed control expectancies might prove more helpful in the longer run. The relative merits of these two alternative prescriptions should form the focus of research attention as a matter of some urgency.

Dual information processing strategies

As argued above, strategic competence requires the formation of rich cognitive maps. However, herein lies a potential dilemma. On the one hand, strategists need to be able access and process a considerable volume of information with attention to detail. Often it is in the detail that real insights can occur that will prevent organizations from embarking on courses of action that are destined to failure from the outset and/or will enable them to recognize when hitherto unforeseen problems are beginning to emerge, so as to be able to take the necessary corrective action. On the other hand, too much information is also problematic, given the limited processing capabilities of the individual manager to process information. Clearly two sorts of competency are required to deal with this paradoxical state of affairs. Analytical skills are needed in order to process detail, while a second, complementary set of skills is also required, enabling individuals to monitor the 'bigger picture', in a more holistic fashion.

Dual processing theories in cognition stem from three sources:

- sense making and ‘practical intelligence’ studies concerned specifically with the retrieval and use of tacit knowledge (Brockmann and Anthony, 2002; Gioia and Ford, 1996; Hogarth, 1987; Parikh, Neubauer and Lank, 1994; Thomas, Clark and Gioia, 1993);
- models of parallel systems of perception and information processing (Chaiken and Trope, 1999; Gilbert, 2002; Hogarth, 2001; Kahneman, 2003; Kahneman and Frederick, 2002; Payne and Bettman, 2004; Sloman, 1996, 2002; Stanovich and West, 2000); and
- personality and individual difference psychology studies of ways of gathering, organising, processing and evaluating information (Epstein, 1990, 1991, 1998; Epstein et al., 1996).

Although these theories differ in terms of the general properties distinguished for each system, and the relative independence of each system, they share the view that two separate processes are involved in reasoning with each leading to a different construction of the task (Sadler-Smith and Sparrow, 2007). The theories account for the ways in which processing is skilfully accomplished. Stanovich and West (2000) proposed the neutral labels of ‘System 1’ and ‘System 2’ for two such contrasting processes. System 1 has the properties of automaticity and heuristic processing and is associated with interactional intelligence (the ability to model other minds in order to read intentions and make rapid interactional moves). It is “relatively unconscious, automatic, highly associative, rapid, contextualised, parallel, evolved early, is relatively independent of language, and generates feelings of certitude. System 1 thinking is related to what is commonly called intuition” (Payne and Bettman, 2004, p.125). System 2 thinking has the properties of analytic intelligence and is characterised as “controllable, conscious, constrained by working memory, rule-based, serial, develops with age and is vulnerable to aging, is related to language, and is less characterised by feelings of certitude” (Payne and Bettman, 2004, p.125).

This general distinction between controlled and automatic processing has found credence in the recent strategy literature, as a basis for enriching understanding of the information processing dilemmas confronting individuals involved in the strategic management process. For instance, Reger and Palmer (1996) argued that

controlled and automatic processing strategies are central to an understanding of how cognitive inertia comes to develop in managerial assessments of competition. The reason that managers fail to notice significant changes in their business environments is due to a tendency to monitor competitors' actions automatically, using extant cognitive categories. Clearly, if managers are to survive the rigours of complexity and turbulence confronting them at the present time, not only must they develop finely honed analytical skills, but also processing strategies that enable them to cut through the detail in order to take action under time pressure with less conscious cognitive effort, thereby freeing up capacity for creativity and innovation.

Dual processing theories are relevant to our discussion of strategic competence for two reasons:

1. they stress the use of complimentary forms of information processing, and
2. they attach significance to the role of affect.

There is a growing consensus that many of the cognitive processes associated with intuitions have a source in, or relationship to, affect. Recent work portrays intuition as an experiential phenomenon that is based upon tacit knowledge, and in which there is an inter-play of cognitive and affective processes (Sadler-Smith & Sparrow, 2007; Sinclair & Ashkanasy, 2005). Muramatsu and Honoch (2005) have also argued for links between emotion and intuitive processing by combining ideas from evolutionary psychology and neuroscience, noting that whilst historically, cognition and emotions have been seen as competing explanations, it is now considered that: "emotions can be viewed as information-processing systems just like memory and perception" (Muramatsu and Hanoch, 2005, p. 209, p. 214).

Individual differences in the processing of strategic information

The ultimate skill that needs to be fostered at this juncture is be the ability to adapt the ways in which information is processed, switching back and forth from 'habits of mind to active thinking,' as appropriate to each particular situation. Louis and Sutton (1991) have aptly coined the phrase 'switching cognitive gears' to characterize this vital competence, arguing that effectiveness may be as much a

function of an individual's capacity to sense when such a switch is required, as to process information in one mode or another (see Hodgkinson and Sadler-Smith, 2003).

How might organizations identify individuals who possess this capability and foster it in others? The recent work of Epstein and his colleagues is particularly illuminating in this connection. In keeping with our line of reasoning above, *cognitive-experiential self theory* (CEST) developed by Epstein and colleagues' (Epstein, 1990, 1991, 1998; Epstein et al., 1996) asserts that analytic and intuitive processing are independent processes, each served by separate cognitive systems. Epstein (2000, p.671) argues that the two systems "...operate in parallel and are interactive". This is different to the System 1-2 model, which, based on cognitive continuum theory, sees the two processing modes as mutual opposites.

Cognitive style

Responses to these orthogonal scales have been shown to differentially correlate with a variety of measures of personality, achievement, interpersonal relations and emotional adjustment (Epstein et al, 1996). It is clear from a number of studies using these scales and work on individual differences in the processing of information more generally (e.g. Allinson and Hayes, 1996; Robey and Taggart, 1981) that this requirement for dual processing strategies notwithstanding, many individuals are marked by an overriding preference for one approach or the other, i.e. cognitive style.

Cognitive style influences the way in which managers scan the environment for new information, organize and interpret this information, and incorporate their interpretations into the mental models and subjective theories that guide their actions (Hayes and Allinson, 1998). Clearly it is an important factor underlying the development of strategic competence, in that those individuals who process information in ways that fail to recognize important changes to their situation may also fail to update their knowledge and skills, as required for their continuing effectiveness. This failure to adapt may not only have drastic implications for their individual careers, but also the wider organization as a whole.

On the basis of the above theorizing it would be useful to explore the extent to which and in what ways self-report instruments for the assessment of individual

differences in information processing styles and strategies such as the REI, the cognitive style index (CSI) (Allinson and Hayes, 1996) might be used as a basis for the selection and development of individuals and teams involved in the business of organizational strategizing (Hodgkinson & Sadler-Smith, 2003). In order to do this, however, we also need to better understand the nature of intuitive decision making and the extent to which the competence may be developed or not.

Intuition reflects knowledge that is not expressed in words or other symbols and therefore must be acquired through perceptual and other non-symbolic mental processes (Sadler-Smith & Shefy, 2004). However, this form of knowing is based on a number of mechanisms, each of which now needs to be better incorporated into theories of intuition. Whilst intuition, incubation and insight share the common feature of involving unconscious processing to varying degrees, they are separate processes. For Sadler-Smith and Shefy (2004), insight (literally “seeing” a solution) means the solution of a problem. This might be seen in a non-visual sense, but the eventual solution is at a level of conscious understanding that enables articulation of the problem’s elements and inter-relationships. Not all intuitions become insights and not all insights come from antecedent intuitions or validating processes of incubation. In short, intuition is an antecedent form of knowing, incubation is a transformation process, and insight is an outcome. In reviewing the literature, Sadler-Smith and Sparrow (2007) argue the questions that now need to be addressed concern: how access mechanisms associated with the separate processes of incubation, insight and intuition operate; how intuitive and pre-inventive expertise is represented in schemata; how attentional mechanisms operate; and what are the meta-cognitive monitoring techniques that enable rapid perceptual framing and responses to emotional memory?

The distinction between insight and intuition in particular signals the need for social processes to surround individual competence. We return to this later when we discuss the social processes necessary to enable the organizational competence of foresight. However, to summarize the arguments so far, we have identified a major dilemma for strategists, namely, the need to process strategic information in

sufficient detail to attain mastery over the environment, without becoming so overwhelmed in the detail as to stifle the ability to respond with agility. Two alternative processing strategies have been highlighted, one entailing rational analysis, the other involving the use of heuristics and intuition to enable managers to cut through the detail so as to facilitate creativity and innovation. We have also identified some individual differences that likely have a major bearing on the ability of managers to deploy in appropriate balance these processing strategies, a vital prerequisite for the attainment of strategic competence at the individual level. This work on individual differences thus has important implications for the design of personnel selection and training and development interventions. It also has some highly significant implications for organizational design, to which we return in due course.

Sensemaking and sense-giving/thought leadership as meso-level bridging processes

First we turn to consider the role of sensemaking and sensegiving, vital links between individual and organizational level processes. Sensemaking is the process whereby members of an organization confront surprising or confusing events, issues and actions. It both precedes decision making and follows it, but it is still a relatively unexplored social process (Maitlis, 2005). Sensegiving concerns the attempts of individuals to influence the outcome and communicate their thoughts about a change to others in order to gain their support.

Our notion of strategic competence requires linkages between the above research on individual differences and research on shared cognition (which looks at cognition from a social constructivist perspective). We maintain that one of the roles of strategic leaders is to meet this requirement, creating insights within the followers' own mental representations (Gioia and Chittipendi, 1991; Hellgren and Melin, 1993; Lindell et al., 1998; Dunford & Jones, 2000). Rouleau (2005) has also argued that middle managers, through their close interface with external stakeholders, play a vital role in the interpretation and selling of a strategy.

An effective vision is one that can lead to the development of shared mental models. Silvester, Anderson and Patterson (1999) argued that a leader's sharing

of their own cognition and the exposure to new sources of information that this usually involves can create learning by altering other team members' attributions of cause and effect influences. As more attributions are altered towards internal ones (a “we can do it mentality”) this serves to increase self-efficacy among leaders and followers alike. In turn, the resulting sense of agency creates a feeling of psychological empowerment among the team.

An important research task that has yet to be completed is to integrate the work that has examined the political skills and tactics that appear to underpin the process of sense-giving/thought leadership at the organizational level, with the voluminous work on individual cognition and leadership behaviours. In introducing the notion of thought leadership as a component of strategic competence, we do not wish to imply the endorsement of an overly simplistic top-down view of strategizing. On the contrary, we view sensemaking and sense-giving as fundamentally inter-twined, multi-directional processes, pervading all organizational levels, strategies being the product of a negotiated order (Johnson, 1987; Pettigrew, 1973, 1985; Maitlis, 2005). Nonetheless, there are a number of interesting avenues for further research. In particular, it would now be useful to know to what extent: there are fundamental differences in the ways in which such thought leadership is attempted (and countered) across varying organizational levels; the various individual differences variables discussed in the previous section have a bearing on this key competence; and there is any degree of linkage between differing approaches to leadership, or leadership style, and the way in which sensemaking and sense-giving are accomplished?

Implications for Organizational Design

As noted in the opening sections, organizations operate in an increasingly turbulent environment and this has heralded changes in the nature of work and organizational forms. We have argued that to operate effectively in this new context individuals require the ability to operate with a balanced set of cognitive skills. This has raised fundamental questions as to how they do this, but it also has implications for the selection and development of individuals and the design of organizations that they inhabit. In the opening section we have reviewed how

the field of cognitive science at the individual level has been applied to the strategy arena. We now demonstrate that there are important implications for organization design. Organizations cannot afford to put individuals into situations where they are overloaded with information but equally they do not want individuals who are informationally-lean. In the following section we move to the next level of analysis and consider some of the prerogatives that have been established recently in the organization design, organizational forms and knowledge management literatures. Our analysis demonstrates that we either have to rethink the design of organizations and the principles on which they are based, or alternatively we have to adapt the individuals who are placed into the new designs.

We consider now in greater detail the development of strategic competence at the organizational level. The organizational aspects of strategic competence outlined in the following sections are intertwined fundamentally with the individual difference factors previously discussed: clearly the possession of individual facets of strategic competence are only of value if supporting collective and organizational facets co-exist. Structural forms and cultural characteristics at the organizational level both reinforce the emergence of the appropriate individual characteristics associated with strategic competence and enable the generation of effective social construction of meaning (Weick, 1995). However, whilst strategists must have an initial perspective that recognises the importance of the following series of team and organizational level competences, they also need the process skills to manage others in ways that allow these higher-level competences to deliver their benefits. Group dynamics can attenuate or amplify individual ideas, thus serving an editing role in terms of which individuals persist in voicing their ideas. The skilful management of group processes is thus vital for strategic competence to exist.

Strategic thought cannot be understood without also understanding action and the learning resulting from action. However, we are faced with the problem that many of the writings on knowledge management, organizational learning and the learning organization have been tantamount to little more than a repackaging of established concepts, theories, frameworks and tools from other, better established areas of the management disciplines (Hodgkinson and Sparrow, 2002). These

terms have to be translated into ‘actionable knowledge’ (Argyris, 1999), i.e. knowledge which is at one and the same time both scientifically rigorous and useful to practitioners.

The learning organization is an institution that identifies, promotes and evaluates the quality of its learning processes, whilst organizational learning is the process through which individuals acquire chunks of knowledge, develop and spread this knowledge within the organization, gain acceptance of it, and recognize it as being potentially useful (Huber, 1991; Tsang, 1997). Critics of the latter construct maintain it is an oxymoron because learning requires disorganization and increased variety whereas organizing creates the capacity to forget and leads to a reliance on procedures that reduce requisite variety (cf. Weick and Westly, 1996). We argue, however, that discarding this notion at this juncture would be premature. There are some important insights emerging into how principles of organizational learning can support current information-driven and distributed organizational designs. The organizational learning field makes two sets of important distinctions:

1. Explicit versus tacit knowledge and learning,
2. Knowledge and learning that resides within the individual versus that which resides within collectives.

These perspectives each emphasise the importance of different *sets* of organizational and individual competences, but also imply different *routes* to gaining these competences.

New organizational forms – and in particular the N-form – have received considerable attention within the strategic management literature. This work has highlighted the importance of integration mechanisms for bringing together the varied knowledge of small numbers of individuals to produce organizational solutions (Fenton and Pettigrew, 2000). It has also indicated the need to understand the nature of the intra-organizational information markets that operate within them. The ability to control and manage the quantity and quality of information that flow through these markets is central to organizational survival (Hansen, 1999; Hansen et al, 1999; Hansen and Haas, 2001).

As such, the individual-level process skills of the strategist outlined in the earlier sections of this article are supported at the organizational level by designs based on principles of redundancy and overlapping business processes, internal competition, strategic rotation of actors, free access to information (reduced information differentials) and single, integrated databases. The work on organizational design most relevant for our purposes has focused on three key phenomena, the:

- role of integration mechanisms in the enhancement of flows of information across cross-unit linkages (Galbraith, 1973; Tushman, 1977);
- facilitation of searches for knowledge that is not immediately available (Hansen, 1999); and
- transfer of complex knowledge without message distortions (Zander and Kogut, 1995).

The strategic importance of informational interactions that now have to be managed appears to be increasing markedly, following several major developments in information and communication technologies and fundamental changes to the design of organizations. Renewed attention is therefore also being given the design of *intra-organizational information markets* within organizations as a source of strategic competence in which the brokering of information across internal and external markets is considered *the* major commodity traded (Van Wijk and van den Bosch, 2000).

It follows from the previous discussion that this form of organization has not been thought through from a cognitive perspective. We have pointed out that in order to be an effective broker of information, employees need appropriate mental models of the organization and insight into how knowledge and information needs to be shared across those people who need to interact. Moreover, in information-rich environments the scarcest resource is the attention that people can devote to information (Ocasio, 1997; Simon, 1997). Key nodes in the network may be at risk of information overload whilst nodes at the periphery may not be in tune with the sensemaking that exists in the core of the network. This reinforces the importance of individual differences discussed above in resolving these problems. Second, these organizational forms tend to have a much greater reliance on teams

and distributed cognition. This provides a very different context for the social construction of meaning and the competences needed by the individual strategist to foster and/or cope with this social construction. Many organizations are likely to be ill equipped to meet the challenges posed by major changes in the economy and the wider technological environment that might soon engulf them.

The role of strategic leaders in this context therefore is to help transform the social capital that resides within the tacit knowledge of the organization into more explicit intellectual capital. However, their contribution is viewed in different ways (Whittington, 1993). The rationalistic school considers that the strategist thinks on behalf of the whole organization and provides predictability through the setting of clear objectives and intentions and effective communication. The evolutionary school, by contrast, considers strategy to be a label placed upon emergent behaviour. Organizations develop a memory that captures previously successful strategies. The processual school places more attention on the processes that strategic leaders use to creatively destroy outmoded practices and attitudes and then manage in order to make the organization more flexible, adaptable and receptive to change. Organizations learn from mistakes, and the ability to learn equates to the ability of an organization to reconstruct and adapt its knowledge-base (Pettigrew and Whipp, 1991). We turn attention now to what is involved in this reconstruction of the organizational knowledge base.

Foundational Concepts at the Organizational Level of Analysis

We now explain the ways in which strategic leaders can elicit the more tacit aspects of strategic management. In doing so it is important to note that tacit knowledge has been viewed in two different ways. It has been viewed as either knowledge that in essence is hard to access and communicate (Nonaka, 1991) but ultimately capable of articulation and surfacing into an arena suitable for an analytical style of cognitive processing. It has also been viewed as knowledge that is of a different order that lies outside the conscious and rational modes of cognition (Spender, 1998). The competences needed to elicit this form of tacit knowledge are those based on automatic processing (see our earlier discussion of controlled versus automatic processing). However, access is required to different

forms of memory. The reconstruction and adaptation of the organizational knowledge base requires that strategists inquire into implicit intelligence or tacit knowledge through *five* capabilities. Each must be mastered by strategic leaders and other managers involved in strategic thinking. We centre discussion on the role and implications of:

- tacit knowledge transfer;
- the role of communities of practice and global expertise networks;
- organizational knowledge structures and memory;
- team cognitions and the management of distributed cognition; and
- foresightful and high reliability organizations.

Theories of action and knowledge transfer across communities.

First we must consider how knowledge that is tacit in nature but capable of processing through the use of analysis can be articulated and made explicit through the possession of a number of processual skills that ensure effective group dialogue and the subsequent cognitive and behavioural change that this creates within the group (Leroy and Ramanantosa, 1997; Starbuck and Hedberg, 2001). Of these skills the competency of collective dialogue (van der Heijden and Eden, 1998), known too as organizational inquiry, rumour and conflict or strategic conversation has received considerable attention. Top teams may face the challenge of developing more elaborate and thorough consensus and shared perceptions of reality (Ginsberg, 1990). Viewed from this perspective, cognitions are considered to belong only to individual managers (Eden, 1992) and learning entails the construction, testing and restructuring of their theories of action. The processual skills of the strategic leader improve the quality of group communication, thereby facilitating the exchange and testing of individual knowledge and theories of action and the generation of new and shared group insights. Processual skills are needed to manage tacit knowledge because without them group dynamics will attenuate or amplify individual ideas and bring an editing role to what individuals persist in voicing to the world. In order for an organization to possess strategic competence, such editing has to be both

intelligent and additive. This editing only takes place in a managed and skilful environment.

Strategic competence then involves the ability to transfer tacit knowledge between individuals, collectives and systems (Brown and Duguid, 1991, Orr, 1990). A convergence of ideas from the fields of educational sociology, developmental psychology and management and organization studies has helped us understand how these collective and intuitive processes work. Ultimately, organizational learning is not just something that takes place within the head of individuals but is a political process embedded in the culture of the organization and the interactions, informal exchanges and knowledge transfer across the communities within it.

Activity theory, derived from the work of sociologists and educationalists (Engestrom, 1987,1993) shows that knowledge is not a commodity that individuals or organizations have or acquire (a passive absorption of knowledge) but is better conceptualised as an 'infrastructure of knowing' which is generated through actual participation in the practice and engagement in the performance. Organizations define the parameters around both formal groups of learners associated with a particular profession and the informal, rapidly changing constituencies of people who might be brought together through a series of interactions, thereby creating 'legitimate peripheral participation' (Lave and Wenger, 1991).

Communities of practice (CoPs) are one of the mechanisms through which collective knowledge can be created, held and transferred. They have been the subject of much recent debate (see Handley, Sturdy, Fincham & Clark, 2006; Roberts, 2006). Attention has focused on unstructured, spontaneous, self-managing and emergent groups, and the social interactions within and without them, that surround learning, the ways in which meaning is negotiated and materialises through processes of participation and engagement, and the development of shared repertoires of knowledge. Handley et al (2006) note that the term has been used quite loosely (although to be fair this criticism could be applied to the discourses that surround most all of the constructs discussed in this article) and that there are many other organizational forms in which collective goal-orientated learning activity shares characteristics of mutual engagement,

joint enterprise and shared repertoires, such as temporary groups or project teams with wide constituencies.

Although the extent to which such processes can be managed is open to debate, managers (and their organizations) are assumed to be able to identify the networks that might constitute a community of practice at any one point of time and facilitate the development of such communities by encouraging the alignment of new practices that result (Brown & Duguid, 2001; Wenger & Synder, 2000) or by promoting the lateral processes and organizational forms that might assist their operation. However, Roberts (2006) notes many unresolved questions and limitations that remain. As with any social institution or negotiation process, the management of recognition and power within and without the community is important (Blackler & McDonald, 2000). So too is the management of trust and its impact on motivations to share knowledge (Andrews & Delahage, 2000). Handley et al (2006) examine the situated learning that takes place in CoPs from the perspective of both individual learners and the socio-cultural context into which CoPs have to be embedded. In reality participation may not be full but rather consist of many forms of marginal identification (be that in terms of formal activity or inside the minds of participants).

For Roberts (2006), the size that CoPs may take requires an understanding of the issue of critical mass and how such communities, in isolation, or as part of wider “constellations of practice”, lead to the formal codification of knowledge and the development of centres of excellence (Sparrow, 2005). A centre of excellence is an organizational unit that embodies a set of organizational capabilities. note that are explicitly recognised as an important source of value creation (Frost, Birkinshaw & Prescott, 2000). There needs also to be a strategic remit, such as the intention to leverage or disseminate these capabilities to other parts of the firm.

Social constructionists point to the need for organizations to have cultures, structures and systems that enable the acquisition of learning through: team processes of learning, reflection and appreciative enquiry; co-inquiry, as opposed to expert-student relationships; joint planning forums; long time-span projects; and dialogues across communities. Lindkvist (2005) noted that there are many current business pressures inside organizations that make the operation of CoPs

either inappropriate (pressures of speed and cost) or more likely pursued in lip-service only. Hodgkinson and Sparrow (2002) argue that the operation of CoPs is also highly dependent on the skills of participants and the extent to which managers and other key actors possess the requisite skills listed above is highly questionable. CoPs involve multiparty negotiations and therefore conflicts. A number of social processes influence the degree of sensemaking within such negotiations (Maitlis, 2005). For Maitlis (2005), a number of social processes affect the level of animation and control in sensemaking processes, including: leadership influence and the competence of sensegiving (discussed earlier); strategies of political influence and upwards issue-selling; the social roles of actors; and the degree to which there is collective mind and heedful interactions. Attention has also been given to feedback and upward communication mechanisms (Tourish & Robson, 2006). The relationship between power and transmission of critical upwards communication and the existence of a series of factors that engender a communications climate are important. We should therefore add a number of other social processes shown to be important in any exchange relationship become important to Maitlis's list, such as identification, internalisation, commitment and attachment, ownership, and perceived support.

Strategic competence therefore requires:

- the introduction of practices that govern the legitimate peripheral participation within a business process or work practice in ways that allow communities to understand their own trajectories (where did we come from, where are we now, where do we want to go next and how do we get there?) and learn through the development of their own identities, professions and skills (Elkjaer, 1999).
- the introduction of organizational forms (such as centres of excellence) that can create sufficient critical mass inside organizations to influence the conduct of strategy.
- specific abilities of participants, and surrounding organizational practices, to engender necessary processes of social construction inside CoPs and similar organizational forms.

Moreover, little is understood about how the unconscious modes of thought and cognitive biases discussed at the beginning of this article impact the influence that power and trust have on the operation of such communities, or the resultant levels of foresight. We still need to explain how such communities may change and innovate (Fox, 2000). Our previous discussion of the cognitive processes associated with intuition and dual processing has relevance to this question.

Decoding organizational level knowledge structures

The discussion of shared repertoires of knowledge in the previous section assumes that such knowledge is decipherable. Clearly, many of the cognitions and theories of action that must be made more explicit may not just reflect individual cognitions but in fact reflect this more collective sense of knowing. We must also therefore consider a second issue, which is how the internalisation of knowledge within organizational institutions and organizational memory, though its representation of knowledge that is tacit in nature, is considered in the literature as being capable of analytical processing. Linking back to our earlier discussion of individual level factors, organizational memory serves to reinforce elaborative rather than automatic, heuristic processing, producing greater sensitivity to past history and political influences, and increases the richness of the strategist's cognitive maps. For example, Lyles and Schwenk (1992) argued that the worldviews of senior managers become encoded, stored and retrieved in the organization's knowledge structures (the shared beliefs that define the expected relationships, behaviours and actions of the organization's members). This includes: cultural language, symbols, stories, sagas; the transformation logics implicit in the standard operating procedures; the organizational structure and roles allocated to people; and the physical structure of the environment (Walsh and Ungson, 1992). Protagonists argue that if decoded, such organizational memory is a strategic competence because it avoids repetition of past mistakes, adds legitimacy to new decisions, draws on history to frame sharper questions, and helps control and co-ordinate implementation (Sparrow, 1994). These send 'higher-order reference signals' to managers that serve to guide their behaviour (Weick, 1979), as do external archives (former employees, competitors, business historians and archival sources). Modular forms of organization that inter-

connect and co-ordinate self-organizing business processes (Daft and Lewin, 1993) and distributed knowledge systems (Tsoukas, 1996) have also been forwarded as vehicles to achieve this institutionalisation of tacit knowledge. There are then multiple ways of knowing within organizations and organizational knowledge resides not only within the minds of individuals but also within collectives and within organizational artefacts. The strategic management process has to be aligned with the knowledge flows to and from individuals that arise from deeper institutional structures. In examining how individuals interact with knowledge-embedded artefacts that surround them, it is evident that strategists have to both individually attend, and ensure collective decoding of, this institutionalised tacit knowledge.

Team cognitions

However, such decoding is not sufficient. It is becoming widely accepted that organizations have shifted more to team-based work structures that require interdependence of goals and performance (Salas, Dickenson, Converse & Tannenbaum, 1992; Kozlowski & Bell, 2003). Strategists therefore must also understand how shared cognition within teams may reside not within individuals taken in isolation, nor just within institutions and organizational memory artefacts outside them, but also within *the interactions* between the activities of group members (Gibson, 2001). Shared cognition is an important indicator of a team's readiness or preparedness to take on a strategic task. It ensures that the process of performance and the necessary interaction between team members is understood. Cues have to be interpreted similarly and decisions must be compatible in order for there to be greater accuracy, efficiency and quality of output, more accurate predictions of group performance, and greater levels of cohesion and trust (Cooke at al, 2000).

We can be guided here both by work undertaken by human factors experts on the nature of team mental models and work on upper echelons theory as applied to consensus of executive beliefs in top teams. Team mental models represent an emerging cognitive state that vary in terms of accuracy and levels of similarity to other team members' maps (Ilgen, Hollenbeck. Johnson and Jundt, 2005) but

team members need accurate and similar representations for their teams to be effective (Marks, Sabella, Burke and Zaccaro, 2002; Smith-Jentsch, Campbell, Milanovich and Reynolds, 2001). Hodgkinson and Sparrow (2002) argue that strategic competence therefore must entail management of both what has to be shared between teams (i.e. insight into what is task-specific knowledge, task-related knowledge, knowledge of team-mates, and attitudes and beliefs) and the nature of this sharing (i.e. understanding of whether knowledge has to be shared or overlapping, similar or identical, complimentary or compatible, or distributed) (Cannon-Bowers and Salas, 2001). Mathieu, Heffner, Goodwin, Salas and Cannon-Bowers (2000) drew attention to the importance of effective team interaction mental models (which serve to integrate perceptions about collective interdependence). More is needed, however, beyond such collective understanding of a team's resources, goals and performance strategies. A range of work has drawn attention to the additional competences that are central to effective distributed cognition or team cognition systems.

The first competence is information sampling or pooling behaviours (Stasser et al, 1995) whereby group behaviour under the unmediated influence of leadership, expertise and status leads to dysfunctional information sampling, initial gravitation to favoured shared cognitions and limitations in the way that knowledge is organized and inter-connected by individuals. The earlier discussion of the necessary skills to create true dialogue across communities of practice is an important mediator in this regard. The impact of diversity on team use of information (range, depth and integration) has formed the basis of recent study (Dahlin, Weingart and Hinds, 2005). The second competence is cognitive consensus (Klimoski and Mohammed, 1994; Knight et al, 1999; Sutcliffe and Huber, 1994) whereby strategic consensus is reached via the mediation of group processes that shape the wider decisional arena through policy capturing, agreement seeking, risk judgement, and conflict management strategies. The third competence is transactive memory (Hinsz, Tindale and Vollrath, 1997; Moreland, 2000; Wegner, 1987). This has been defined as a cooperative division of labour for learning, remembering and communicating relevant team knowledge (Wegner, 1987).

Ellis (2006, p. 580) notes that "... team interaction mental models and transactive memory are conceptually and empirically distinct constructs". Different parts of the organization may gain insight into where to acquire knowledge, not just through the development of common, shared and overlapping knowledge based on processes of convergence, similarity and agreement, but instead through the development of complementarity, predictability and compensation based on insight into distributed and differentiated capabilities. From an information processing perspective, Ilgen et al (2005) consider that levels of specialisation (memory differentiation), co-ordination (ability to work together effectively) and credibility (team members' beliefs about the reliability of other team members) represent the emergent cognitive manifestations of transactive memory. From a social psychology perspective, Hollingshead (1998a, 1998b) focuses on directory updating (learning who knows what), information allocation (information communication to experts) and retrieval co-ordination (requests for information known to be within a teammates' expertise) behaviours. Transactive memory has been measured and studied in a number of team performance settings recently (Austin, 2003; Ellis, 2006; Lewis, 2003) and along with team interaction mental models has been shown to usefully mediate the impact that stress has on team performance (Ellis, 2006).

Foresight and high reliability organizations

Finally, we must explain how team-level cognition is more than just the result of there being a shared understanding of overlapping (common) and distributed knowledge residing in individual minds, but may also be considered to comprise the creation of a collective mind. This understanding can not only be gleaned by paying close attention to the communication processes that have to take place between a group's members, but may also be studied mainly through the examination of the notion of foresight (Tsoukas & Sheppard, 2004) and how organizations act as high reliability systems (Weick, Sutcliffe and Obstfeld, 1999).

Contemporary discussion of notions of sensemaking, double-loop learning and scenario planning all allude to the notion of foresight. Foresight is a broader

notion than forecasting. It is defined as the ability to see through apparent confusion to spot developments before they become trends, to see patterns before they fully emerge, and to grasp relevant features that shape the direction of future events (Tsoukas & Sheppard, 2004). Foresight is in turn the product of preceding insight. It can therefore be seen as both as an individual competency (see our earlier discussion of insight and intuition at the individual level) but also as a collective quality or socially-embedded organizational capability – a background skill. In this latter context organizations need systems, processes, social practices and cultures that sustain the capability. In short, an organization full of intuitive and insightful managers would be but nothing without the capabilities discussed in the following sections.

The organizational capability of foresight engenders actions that provide the organization with a memory of past relevance, focus of attention on the present, but expectation of the need for future adjustment and coping, what Tsoukas and Sheppard (2004, p.140) refer to as “memories of the future” and “thinking in time streams”. They cite the work of Neustadt and May (1986) who consider that with regard to foresightful policy decision making, there are three elements to this organizational capability: recognising that the future has no place to come from but the past; that what matters for the future in the present is departures from the past that affect predictive values; and a continuous comparison and constant oscillation from present to future to past and back that is “heedful” of prospective change. It is that latter element of heedfulness that links work on foresight to other concepts, notably that of high performance organizations.

High reliability theory (Weick, 1987; Roberts, 1990) argues that organizational forms must be designed to allow variation in the activity being carried out, but stability in the cognitive processes (or cognitive architecture) that makes sense of this activity. Organizations concerned with reliability enact collective mental processes that are more fully developed than those that are only concerned with efficiency. Instead of arguing that organizations have to have a shared mental model and a complete understanding of the world that is shared, the message is that organizations can be designed in such a way that very little may need to be in common, but what must happen is that the necessary co-ordinating mechanisms

must be in place. The fact that they are successful in achieving this is evident by the minimal number of disasters that occur in the world.

This kind of theorising is more in line with Tsoukas's (2003) criticism that the management studies field has misrepresented tacit knowledge and his assertion that tacit knowledge cannot be captured, translated or converted, but may be displayed and manifested in what we do, high reliability theory does however suggest that tacit knowledge is at least analysable and can be synthesised in ways that belie the constraints of the organization's design. We can better understand knowledge creation processes through the study of culture (Roberts, 1989,1990; Weick, 1987). Returning briefly to the opening discussion of hyper-competition, researchers in the high reliability theory area argue that by analysis of high reliability organizations we can construct, discover and correct unexpected events that are capable of escalating into serious problems and establish what is necessary for both reliable performance and adaptive learning (D'Aveni, 1994). Ericksen and Dyer (2004) have examined the links between high reliability organization and strategic HRM systems.

Work in the area is premised on the observation that "reliable systems are smart systems" (Weick and Roberts, 1993, p.260). Organizations, and the strategists who provide guidance to them, can foster fully developed mental processes through greater reliance on controlled information processing (Schneider and Shiffrin, 1977), mindful attention (Langer, 1989) and heedful action (Ryle, 1949). For example, Weick et al (1999) adapted Langer's (1989) concept of "mindfulness" (an enriched awareness concerned with the conservation of attention, interpretation of weak signals, differentiation of wisdom, and reframing of understanding that is induced by there being concern for the potential of catastrophe) to capture these stable underlying cognitive processes and architecture. High reliability theory therefore argues that the strategic management field can move beyond the analysis of standardized routines towards the study of a collective competence. Whilst organizations do not have the ability to think or cognize for themselves, their requirement for the ability to handle unforeseen situations in ways that actually forestall unintended consequences evidences the contribution provided by the construction of a stable cognitive infrastructure that encapsulates tacit knowledge. When individuals take heed they act carefully,

critically, consistently, purposefully, attentively, studiously, vigilantly and conscientiously. It is the application of these adverbs to the social interactions that take place between individuals that creates the competence of collective mindfulness. Social interactions managed in this way contribute to the mutual construction of the activity, help the collectivity to represent and envisage necessary activity, and then interrelate this activity to the system that they work within. It relies on generative learning strategies that foster the creation of new ways of understanding a situation through the capability to see the systems and circular influences that control events (Senge, 1992). Strategists therefore have to avoid letting the interactions within their organizations become institutionalized, routine and habitual, and ensure that risk-taking and learning behaviour is not constrained by the cognitive inertia associated with cultural problems such as deviance normalisation, as seen in various disasters (Starbuck and Hedberg, 2001).

Future Research Directions

Either we need to modify the organizational forms or we have to work with the individuals who work within them. In this article we have outlined the notion of strategic competence, defined as the ability of individuals (and collectives through the use of external artefacts) to successfully acquire, store, recall and interpret strategic information, thereby converting such information into strategic knowledge. Clearly there is need for more scientific work if our vision for the longer-term development of organizations utilising our notion of strategic competence is to be realised. We conclude by mapping out some of the principal research challenges that lie ahead. There are three pressing concerns that need to be addressed in future research in respect of the wide-range of individual-level factors that have a major bearing on the attainment of strategic competence, the need to:

- Clarify the conceptual nature of these individual-level factors, and to refine the measurement techniques currently in use as a basis for operationalising them.

- Understand how central elements, such as dual forms of processing, interact with each other
- Demonstrate empirical linkages between these factors and the structure and content of individual's mental representations of strategic issues and problems.

Sadly, many of the individual-level constructs that we have identified as potentially important factors in the attainment of strategic competence are beset by problems of conceptualisation and measurement. For example, in the case of the locus of control construct, strategic management researchers are divided as to whether this construct is more appropriately assessed using the well-known Rotter (1966) I-E Scale or domain specific scales designed specifically for use in organizational research (see, e.g. Boone and De Brabander, 1993; Hodgkinson, 1992, 1993; Littunen and Storhammar, 2000). As observed earlier, the cognitive style construct has similarly been the subject of theoretical and psychometric controversy.

If research on the psychology of strategic management is to progress beyond present levels we must ultimately develop the capability to disentangle the myriad of potential cause and effect relationships that have a bearing on the strategic management process. Nowhere is this more apparent than in respect of the mass of research that has been concerned with actors' mental representations of competitive industry structures and the analysis of cognitive processes in top management teams. Despite the widespread popularity of the many available cognitive mapping techniques such as those outlined in Huff (1990), Fiol and Huff (1992) as a basis for eliciting and representing strategists' conceptions of strategic issues and problems scant attention has been given to ascertaining the reliability and validity of these procedures (Hodgkinson, 2001). Clearly this needs to be rectified if our understanding of strategic competence is to progress beyond present levels. Furthermore, as we have seen, it is now possible to delineate many forms of strategic knowledge, some being amenable to investigation through such direct methods of elicitation, the majority of which are not. Current methods of assessment are only scratching the surface, not getting at 'deep cognition' within organizations. In parallel to developments in this area, investigation in the future will also need to ascertain the degree of linkage

between the various relevant individual differences variables that we identify in the first part of the paper and the structure and content of actors' mental representations of strategic issues and problems. Future work also needs to give far greater prominence to the nature and significance of affective variables in the strategy process. In particular, as noted by Daniels (1998, 1999) the recent upsurge of interest in cognitive processes in strategic management has neglected to consider the potential impact of emotions on strategic cognition.

As the field moves beyond the analysis of individual-level knowledge structures, and more attempts are made to decode collective knowledge within and between organizational institutions, we shall be presented with a striking set of challenges, both in research terms and from a practitioner point of view. Organizations face significant hurdles in attempting to create sufficient levels of knowledge convergence or cognitive consensus and we need to better understand the processes at work. Attempting to uncover the ways in which individual, collective and system-embedded behaviours and characteristics impact on knowledge convergence and cognitive consensus will become a key pursuit. A major unresolved theoretical and empirical issue, however, is the extent to which such consensus or convergence is necessary or desirable, as exemplified by recent debates in the top management team literature (see, e.g. Finkelstein and Hambrick, 1996; Hodgkinson, 2001a, 2001b).

Alternative mechanisms for the transfer of tacit knowledge above and beyond individual-to-individual interaction and exposure are now being sought. Indeed, researchers appear to have under-estimated the role of distributed knowledge and we now urgently need to understand the impact that different knowledge management strategies and systems are having on the development of strategic competence. In some cases there may be a fundamental mismatch in terms of the requirements imposed by the new working practices we have highlighted, involving decentralised and distributed decision-making and new patterns of communication, and the level of readiness and individual competence on the part of the members of "the wider team" to accept the increased responsibilities associated with these practices

CONCLUSIONS

We have argued that the literatures on organization design and form and knowledge management have not considered sufficiently the parallel developments outlined above within the field of management cognition and cognitive psychology. Indeed, much of the emerging literature connecting strategy and organization is psychologically naïve. It is evident that the nature of the competence needed for managers to operate effectively within the new forms of organization now emerging is of a qualitatively different order to that typically selected for and developed within extant managerial populations. If firms do not select and develop the requisite competences, then no matter how elegant their organization designs, they will not deliver the anticipated benefits. There are clear parallels here to the historical debates around socio-technical systems and man-machine interfaces. The benefits of a technology are not realised if the system operator finds ways of by-passing, or messing up, the system.

An important academic message from the paper is that it is evident that there are many strategic issues currently facing modern organizations that have been under-addressed in general, and particularly by industrial, work and organizational psychologists, such new forms of work organization; the virtualisation of organization design and work processes; and the changing boundaries between organizations, their customers and suppliers. Much of the current thinking in respect of these issues and problems has been shaped by work from fields such as organizational sociology and economics. There is now a real opportunity for more inter-disciplinary work in these areas to enrich our understanding of these vital topics. As our psychological insight into the process of strategic management continues to mature, we shall likely see its knowledge base and methods being applied to, and used to cross-inform, *other emerging fields of study*. Hopefully, the strategic competence notion outlined in this paper will help to facilitate such a dialogue.

References

- Ackoff, R.L. (1983). 'Beyond prediction and preparation'. *Journal of Management Studies*, 20, 59-69.
- Allinson, C.W. and Hayes, J. (1996). 'The Cognitive Style Index: A measure of Intuition-Analysis for organizational research'. *Journal of Management Studies*, 33 (1), 119-35.
- Andrews, K.M. and Delahaye, B.L. (2000). 'Influences on knowledge processes in organizational learning: the psychosocial filter'. *Journal of Management Studies*, 37 (6), 797-810.
- Ansoff, H.I. (1965). *Corporate Strategy*. New York: McGraw-Hill.
- Argyris, C. (1999). *On Organizational Learning (2nd Edition)*. Oxford: Blackwell.
- Austin, J.R. (2003). 'Transactive memory in organizational groups: the effects of content, consensus, specialization, and accuracy on group performance'. *Journal of Applied Psychology*, 88, 866-878.
- Bartlett F.C. (1932). *Remembering: A Study in Experimental and Social Psychology*. London: Cambridge University Press.
- Blackler, F. and McDonald, S. (2000). 'Power, mastery and organizational learning'. *Journal of Management Studies*, 36 (4), 833-51.
- Boone, C. and De Brabander, B (1993). 'Generalised versus specific locus of control expectancies of Chief Executive Officers'. *Strategic Management Journal*, 14, 619-625.
- Boone, C. and De Brabander, B. (1997). 'Self-reports and CEO locus of control research: A note'. *Organization Studies*, 18, 949-971.
- Boone, C., De Brabander, B. and Hellemans, J. (2000). 'Research note: CEO locus of control and small firm performance'. *Organization Studies*, 21, 641-646.
- Boone, C., De Brabander, B. and van Witteloostuijn, A. (1996). 'CEO locus of control and small firm performance: An integrative framework and empirical test'. *Journal of Management Studies*, 33, 667-699.
- Broadbent, D.E. (1958). *Perception and Communication*. London: Pergamon Press.
- Brockmann, E.N. and Anthony, W.P. (2002). 'Tacit knowledge and strategic decision making'. *Group and Organization Management*, 27 (4), 436-455.
- Brown, J.S. and Duguid, P. (1991). 'Organizational learning and communities-of-practice: towards a unified view of working, learning and innovating'. *Organization Science*, 2 (1), 40-57.
- Cannon-Bowers, J.A. and Salas, E. (2001). 'Reflections on shared cognition'. *Journal of Organizational Behaviour*, 22, 195-202.
- Chaiken, S. and Trope, Y. (1999). (eds.) *Dual-Process Theories in Social Psychology*. New York: The Guildford Press.
- Christensen, C.R., Andrews, K.R., Bower, J.L., Hamermesh, G, and Porter, M.E. (1982). *Business Policy: Text and Cases (Fifth Edition)*. Homewood, IL.: Irwin.

- Cooke, N.J., Salas, E., Cannon-Bowers, J.A. and Stout, R.J. (2000). 'Measuring team knowledge'. *Human Factors*, 42, 151-173.
- D'Avini, R.A.I. (1994). *Hypercompetition*. New York: Free Press.
- Daft, R.L. and Lewin, A.Y. (1993). 'Where are the theories for the 'new' organizational forms? An editorial essay'. *Organization Science*, 4 (4), i-vi.
- Dahlin, K.B., Weingart, L.R. and Hinds, P.J. (2005). 'Team diversity and information use'. *Academy of Management Journal*, 48 (6), 1107-1123.
- Daniels, K. (1998). 'Towards integrating emotions into strategic management research: trait affect and perceptions of the strategic environment'. *British Journal of Management*, 9, 163-168.
- Daniels, K. (1999). 'Affect and strategic decision making'. *The Psychologist*, 12 (1), 24-27.
- Das, T.K. and Teng, B.-S. (1999). 'Cognitive biases and strategic decision processes'. *Journal of Management Studies*, 36, 757-778.
- Dunford, R. and Jones, D. (2000). 'Narrative in strategic change'. *Human Relations*, 53, 1207-26.
- Eden, C. (1992). 'Strategic management as a social process'. *Journal Management Studies*, 29, 799-811.
- Eden, C. and J.-C. Spender (Ed's.) (1998). *Managerial and Organizational Cognition: Theory, Methods and Research*. London: Sage.
- Elkjaer, B. (1999). 'In search of a social learning theory'. In M.Easterby-Smith, J.Burgoyne and L.Araujo (eds.) *Organizational Learning and the Learning Organization: Developments in Theory and Practice*. London: Sage.
- Ellis, A.P.J. (2006). 'System breakdown: the role of mental models and transactive memory in the relationship between acute stress and team performance'. *Academy of Management Journal*, 49 (3), 576-589.
- Engestrom, Y. (1987). *Learning By Expanding: An Activity Theoretical Approach To Developmental Research*. Helsinki: Orientat Consultit.
- Engestrom, Y. (1993). 'Developmental studies of work as a test bench for activity theory. The case of primary care in medical practice'. In S.Chaiklin and J.Lave (eds.) *Understanding Practice: Perspectives on Activity and Context*. Cambridge: Cambridge University Press.
- Epstein, S. (1990). 'Cognitive-experiential self-theory'. In L. Pervin (Ed.), *Handbook of Personality Theory and Research*. New York: Guildford Press.
- Epstein, S. (1991). 'Cognitive-experiential self-theory: an integrative theory of personality'. In R. Curtis (Ed.), *The Relational Self: Convergences in Psychoanalysis and Social Psychology*. New York: Guildford Press.
- Epstein, S. (1998). 'Emotions and psychology from the perspective of cognitive-experiential self-theory'. In W. F. Flack and J. D. Laird (Eds.), *Emotions in Psychopathology: Theory and Research Series in Affective Science*. New York: Oxford University Press.
- Epstein, S. (2000). 'The rationality debate from the perspective of cognitive-experiential self-theory'. *Behavioral and Brain Sciences*, 23 (5): 671.

- Epstein, S., Pacini, R., Denes-Raj, V. and Heir, H. (1996). 'Individual differences in intuitive-experiential and analytical-rational thinking styles'. *Journal of Personality and Social Psychology*, 71, 390-405.
- Ericksen, J. and Dyer, L. (2004). 'Toward a strategic human resource management model of high reliability organization performance'. *Center for Advanced Human Resource Studies Working Paper 04-02*. Ithaca, NY: Cornell University.
- Fenton, E.M. and Pettigrew, A. (2000). 'Theoretical perspectives on new forms of organizing'. In A.M. Pettigrew and E.M. Fenton (Eds.) *The Innovating Organization*. London: Sage.
- Finkelstein, S. and Hambrick, D. C. (1996). *Strategic Leadership: Top Executives and Their Effects on Organizations*. St. Paul, MN: West.
- Fiol, C.M. and Huff, A. S. (1992). 'Maps for managers. Where are we? Where do we go from Here?' *Journal of Management Studies*, 29, 267-285.
- Fischhoff, B. (1975). 'Hindsight and foresight: the effect of outcome knowledge on judgement under uncertainty'. *Journal of Experimental Psychology: Human Perception and Performance*, 1, 288-99.
- Fischhoff, B., Slovic, P. and Lichtenstein, S. (1977). 'Knowing with certainty: the appropriateness of extreme confidence'. *Journal of Experimental Psychology: Human Perception and Performance*, 3, 552-64.
- Fox, S. (2000). 'Communities of practice, Foucault and actor-network theory'. *Journal of Management Studies*, 37 (6), 853-867.
- Frost, A., Birkinshaw, J.M. and Prescott, C.E. (2002). 'Centers of excellence in multinational corporations'. *Strategic Management Journal*, 23 (11), 997-1018
- Galbraith, J.R. (1973). *Designing Complex Organizations*. Reading, MA: Addison-Wesley.
- Gibson, C.B. (2001). 'From knowledge accumulation to accommodation: cycles of collective cognition in work groups'. *Journal of Organizational Behaviour*, 22, 121-134.
- Gilbert, D.T. (2002). 'Inferential Correction'. In T. Gilovich, D.Griffin and D.Kahneman (eds.) *Heuristics and Biases: The Psychology of Intuitive Judgements*. Cambridge: Cambridge University Press. Pp. 167-84.
- Ginsberg, A. (1990). 'Connecting diversification to performance: a sociocognitive approach'. *Academy of Management Review*, 15 (3), 514-35.
- Gioia, D.A. and Chittipeddi, K. (1991). 'Sensemaking and sensegiving in strategic initiation'. *Strategic Management Journal*, 12, 433-48.
- Gioia, D.A. and Ford, C.M. (1996). 'Tacit knowledge, self-communications, and sense making in organizations'. In L. Thayer (Ed.) *Organization Communication: Emerging Perspectives*. Norwood, NJ: Ablex. Pp. 83-102.
- Grant, R. M. (1996). 'Toward a knowledge-based theory of the firm'. *Strategic Management Journal*, 17, 109-122.
- Handley, K., Sturdy, A., Fincham, R. and Clark, T. (2006). 'Within and beyond communities of practice: making sense of learning through participation, identity and practice'. *Journal of Management Studies*, 43 (3), 641-53.

- Hansen, M.T. (1999). 'The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits'. *Administrative Science Quarterly*, 44, 82-111.
- Hansen, M.T. and Haas, M.R. (2001). 'Competing for attention in knowledge markets: electronic document dissemination in a management consulting company'. *Administrative Science Quarterly*, 46 (1), 1-28.
- Hansen, M.T., Nohria, N. and Tierney, T. (1999). 'What's your strategy for managing knowledge?' *Harvard Business Review*, 77 (2), 106-116.
- Harmon-Jones, E. & Mills, J. (1999). (eds.) *Cognitive Dissonance: Progress on a Pivotal Theory in Social Psychology*. Washington: American Psychological Association
- Hayes, J. and Allinson, C.W. (1998). 'Cognitive style and the theory and practice of individual and collective learning in organizations'. *Human Relations*, 51 (7), 847-871.
- Hellgren, B. and Melin, L. (1993). 'The role of strategists' way-of-thinking in strategic change processes'. In J.Hendry, and G.Johnson with J. Newton (eds.) *Strategic Thinking: Leadership and the Management of Change*. Chichester: John Wiley.
- Hinsz, V.B., Tindale, R.S. and Vollrath, D.A. (1997). 'The emerging conceptualization of groups as information processors'. *Psychological Bulletin*, 121, 43-64.
- Hodgkinson, G.P. & Sadler-Smith, E. (2003). 'Complex or unitary? A critique and empirical reassessment of the Allinson-Hayes Cognitive Style Index'. *Journal of Occupational and Organizational Psychology*, 76, 243-268
- Hodgkinson, G.P. (1992). 'Development and validation of the strategic locus of control scale'. *Strategic Management Journal*, 13, 311-317.
- Hodgkinson, G.P. (1993). 'Doubts about the conceptual and empirical status of context-free and firm-specific control expectancies: A reply to Bonne and De Brabander'. *Strategic Management Journal*, 14, 627-631.
- Hodgkinson, G.P. (1997). 'The cognitive analysis of competitive structures: A review and critique'. *Human Relations*, 50, 625-654.
- Hodgkinson, G.P. (2001). 'The psychology of strategic management: Diversity and cognition revisited'. In C. L. Cooper and I. T. Robertson (Eds.), *International Review of Industrial and Organizational Psychology Volume 16*. Chichester: Wiley.
- Hodgkinson, G.P. and Johnson, G. (1994). 'Exploring the mental models of competitive strategists: The case for a processual approach'. *Journal of Management Studies*, 31, 525-551.
- Hodgkinson, G.P. and Sparrow, P.R. (2002). *The Competent Organization: A Psychological Analysis of the Strategic Management Process*. Milton Keynes: Open University Press.
- Hodgkinson, G.P. and Thomas, A.B. (Eds.) (1997). 'Thinking in organizations'. *Journal of Management Studies*, 34 (Special Issue), 845-952.
- Hogarth, R.M. (1987). *Judgement and Choice*, New York: John Wiley and Son.

- Hogarth, R.M. (2001). *Educating Intuition*. Chicago: Chicago University Press.
- Hollingshead, A.B. (1998a). 'Communication, learning and retrieval in transactive memory systems'. *Journal of Experimental Social Psychology*, 34:, 423-442.
- Hollingshead, A.B. (1998b). 'Retrieval processes in transactive memory systems'. *Journal of Personality and Social Psychology*, 74, 659-671.
- Huber, G.P. (1991). 'Organizational learning: the contributing process and the literatures'. *Organization Science*, 2 (1), 88-115.
- Huff, A.S. (1990). (Ed.) *Mapping Strategic Thought*. Chichester: John Wiley and Sons.
- Ilgen, D.R., Hollenbeck, J.R., Johnson, M. and Jundt, D. (2005). 'Teams in organizations: from I-P-O models to IMO models'. In S.T. Fiske, A.E. Kasdin and D.L. Schacter (Eds.) *Annual Review of Psychology*. Volume 56. Palo Alto, CA: Annual Reviews. pp. 517-543.
- Johnson, G. (1987). *Strategic Change and the Management Process*. Oxford: Basil Blackwell.
- Johnson-Laird, P.N. (1983). *Mental Models*. Cambridge: Cambridge University Press.
- Jonathan, S.T. Evans, B.T. & Over, D.E. (1996). 'Rationality and reasoning', *Psychology*, 109-117.
- Kahneman, D. (2003). 'Maps of bounded rationality: psychology for behavioural economics'. *The American Economic Review*, December 2003, 1449-1475.
- Kahneman, D. and Frederick, S. (2002). 'Representativeness revisited: Attribute substitution in intuitive judgement'. In T. Gilovich, D.Griffin and D.Kahneman (eds.) *Heuristics and Biases: The Psychology of Intuitive Judgements*. Cambridge: Cambridge University Press. Pp. 49-81.
- Klimoski, R. and Mohammed, S. (1994). 'Team mental model: construct or metaphor?' *Journal of Management*, 20, 403-437.
- Knight, D., Pearce, C.L., Smith, K.G., Olian, J.D., Sims, H.P., Smith, K.A. and Flood, P. (1999). 'Top management team diversity, group process, and strategic consensus'. *Strategic Management Journal*, 20, 445-65.
- Kozlowski, S.W.J. and Bell, B.S. (2003). 'Work groups and teams in organizations'. In W.C. Borman, D.R. Ilgen & R. Klimoski (Eds.) *Comprehensive Handbook of Psychology*. Volume 12: *Industrial and Organizational Psychology*. New York: Wiley. pp. 333-376.
- Langer, E.J. (1975). 'The illusion of control'. *Journal of Personality and Social Psychology*, 32 (2), 311-38.
- Langer, E.J. (1989). 'Minding matters: the consequences of mindlessness-mindfulness'. In L. Berkowitz (ed.). *Advances in Experimental Social Psychology*, Volume 22. New York: Academic Press.
- Lant, T.K. and Shapira, Z. (2001b). 'Introduction: Foundations of research on cognition in organizations'. In T.K. Lant and Z. Shapira (eds), *Organizational Cognition: Computation and Interpretation*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

- Lant, T.K. and Shapira, Z. (Eds.) (2001a). *Organizational Cognition: Computation and Interpretation*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Lave, J. and Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- Leroy, F. and Ramanantsoa, B. (1997). 'The cognitive and behavioural dimensions of organizational learning in a merger: An empirical study'. *Journal of Management Studies*, 34, 871-894.
- Lewis, K. (2003). 'Measuring transactive memory systems in the field: scale development and validation'. *Journal of Applied Psychology*, 88, 587-604.
- Lindell, P., Melin, L., Gahmberg, H.J., Hellqvist, A. and Melander, A. (1998). 'Stability and change in a strategist's thinking'. In C.Eden and J.-C. Spender (eds) *Managerial and Organizational Cognition: Theory, Methods and Research*. London: Sage.
- Lindkvist, L. (2005). 'Knowledge communities and knowledge collectivities: a typology of knowledge work in groups'. *Journal of Management Studies*, 42 (6), 1189-210.
- Littunen, H. and Storhammar, E. (2000). 'The indicators of locus of control in the small business context'. *Journal of Enterprising Culture*, 8, 343-360.
- Louis, M.R. and Sutton, R.I. (1991). 'Switching cognitive gears: from habits of mind to active thinking'. *Human Relations*, 44, 55-76
- Lyles, M.A. and Schwenk, C.R. (1992). 'Top management, strategy and organizational knowledge structures'. *Journal of Management Studies*, 29 (2), 155-174.
- Maitlis, S. (2005). 'The social processes of organizational sensemaking'. *Academy of Management Journal*, 48 (1), 21-49.
- Marks, M.A., Sabella, M.J., Burke, C.S. and Zaccaro, S.J. (2002). 'The impact of cross-training on team effectiveness'. *Journal of Applied Psychology*, 85, 971-986.
- Mathieu, J.E., Heffner, T.S., Goodwin, G.F., Salas, E. and Cannon-Bowers, J.A. (2000). 'The influence of shared mental models on team process and performance'. *Journal of Applied Psychology*, 85, 273-283.
- Meindl, J.R., Stubbart, C. and Porac, J.F. (Eds.) (1996). *Cognition Within and Between Organizations*. Thousand Oaks: Sage.
- Miller, D. (1983). 'The correlates of entrepreneurship in three types of firms'. *Management Science*, 29, 770-791.
- Miller, D. and Toulouse, J.M. (1986). 'Chief executive personality and corporate strategy and structure in small firms'. *Management Science*, 32, 1389-1409.
- Miller, D., Kets de Vries, M.F.R. and Toulouse, J.M. (1982). 'Top executive locus of control and its relationship to strategy-making, structure, and environment'. *Academy of Management Journal*, 25, 237-253.

- Moreland, R.L. (2000). 'Transactive memory: learning who knows what in work groups and organizations'. In L.Thompson, D.Messick and J.Levine (eds.) *Shared Cognition In Organizations: The Management of Knowledge*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Muramatsu, R. and Hanoch, Y. (2005). 'Emotions as a mechanism for boundedly rational agents: the fast and frugal way'. *Journal of Economic Psychology*, 26, 201-221.
- Neustadt, R.E. and May, E.R. (1986). *Thinking in Time: The Uses of History for Decision Makers*. New York: Free Press.
- Nickerson, R.S. (1998). 'Confirmation bias: a ubiquitous phenomenon in many guises'. *Review of General Psychology*, 175, 2.
- Nonaka, I. (1991). 'The knowledge-creating company'. *Harvard Business Review*, November-December, 96-104.
- Ocasio, W. (1997). 'Towards an attention-based view of the firm'. *Strategic Management Journal*, 18, 187-206.
- Orr, J.E. (1990). 'Sharing knowledge, celebrating identity: community memory in a service culture'. In D. Middleton and D. Edwards (eds), *Collective Remembering*. London: Sage.
- Parikh, J., Neubauer, F. and Lank, A. (1994). *Intuition: The New Frontier of Management*, Santa Cruz, CA: Blackwell Business.
- Payne, J.W. and Bettman, J.R. (2004). 'The information-processing approach to decision making'. In Koehler, D.J. and Harvey, N. (eds.) *Blackwell Handbook of Judgement and Decision Making*. London: Blackwell Publishing. Pp. 110-32.
- Pettigrew, A.M. (1973). *The Politics of Organizational Decision Making*. London: Tavistock.
- Pettigrew, A.M. (1985). *The Awakening Giant: Continuity and Change in ICI*. Oxford: Blackwell.
- Pettigrew, A.M. and Whipp, R. (1991). *Managing Change for Competitive Success*. Oxford: Blackwell.
- Pettigrew, A.M., Thomas, and Whittington, R. (2002). *Handbook of Strategy Management*. London: Sage.
- Porac, J.F. and Thomas, H. (1990). 'Taxonomic mental models in competitor definition'. *Academy of Management Review*, 15, 224-240.
- Porac, J.F. and Thomas, H. (1994). 'Cognitive categorization and subjective rivalry among retailers in a small city'. *Journal of Applied Psychology*, 79, 54-66.
- Porac, J.F., Thomas, H. and Baden-Fuller, C. (1989). 'Competitive groups as cognitive communities: The case of Scottish knitwear manufacturers'. *Journal of Management Studies*, 26, 397-416.
- Porac, J.F., Thomas, H., Wilson, F., Paton, D. and Kanfer, A. (1995). 'Rivalry and the industry model of Scottish knitwear producers'. *Administrative Science Quarterly*, 40, 203-227.
- Porter, M.E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free press.

- Porter, M.E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press.
- Reger, R.K. and Huff, A. S. (1993). 'Strategic groups: A cognitive perspective'. *Strategic Management Journal*, 14, 103-124.
- Reger, R.K. and Palmer, T.B. (1996) Managerial categorisation of competitors: Using old maps to navigate new environments. *Organization Science*, 7: 22-39.
- Roberts, J. (2006). 'Limits to communities of practice'. *Journal of Management Studies*, 43 (3), 623-39.
- Roberts, K.H. (1989). 'New challenges in organizational research: high reliability organizations'. *Industrial Crisis Quarterly*, 3, 111-25
- Roberts, K.H. (1990). 'Managing high reliability systems'. *California Management Review*, 32 (4), 101-13.
- Robey, D. and Taggart, W. (1981). 'Measuring managers' minds: the assessment of style in human information processing'. *Academy of Management Review*, 6, 375-383
- Rotter, J.B. (1966). 'Generalised expectancies for internal versus external control of reinforcement'. *Psychological Monographs: General and Applied*, 80, Whole No. 609.
- Rouleau, L. (2005). 'Micro-practices of strategic sensemaking and sensegiving: how middle managers interpret and sell change every day'. *Journal of Management Studies*, 42 (7), 1413-41.
- Ryle, G. (1949). *The Concept of Mind*. Chicago: University of Chicago Press.
- Sadler-Smith, E. and Shefy, E. (2004). 'The intuitive executive: Understanding and applying "gut feel" in decision making'. *The Academy of Management Executive*, 18 (4), 76-92
- Sadler-Smith, E. and Sparrow, P.R. (2007, in press). 'Intuition in organizational decision making'. In G.P. Hodgkinson and W.H Starbuck (eds.) *The Oxford Handbook of Organizational Decision Making*, Oxford: Oxford University Press.
- Salas, E., Dickenson, T., Converse, S.A. and Tannenbaum, S.I. (1992). 'Toward an understanding of team performance and training'. In R.W. Swezey & E. Salas (eds.) *Teams: Their Training and Performance*. Norwood, NJ: Ablex. pp. 3-29.
- Schneider, W. and Shiffrin, R.M. (1977). 'Controlled and automatic human information processing: 1. detection, search and attention'. *Psychological Review*, 84, 1-66.
- Schwenk, C.R. (1984). 'Cognitive simplification processes in strategic decision making'. *Strategic Management Journal*, 5, 111-28.
- Senge, P.M. (1992). 'The leader's new work: building learning organizations'. *Sloan Management Review*, Fall, 7-23.
- Silvester, J., Anderson, N.R. and Patterson, F. (1999). 'Organizational culture change: An inter-group attributional analysis'. *Journal of Occupational and Organizational Psychology*, 72, 1-23.
- Simon, H.A. (1957). *Administrative Behaviour*. 2nd Edition New York: Macmillan.

- Simon, H.A. (1997). 'Designing organizations for an information-rich world'. In D.M. Lambertson (ed.) *The Economics of Communication and Information*. Cheltenham: Edward Elgar.
- Sinclair, M. and Ashkanasy, N.M. (2005). 'Intuition: Myth or a Decision-making tool'. *Management Learning*, 36 (3), 353-370.
- Sloman, S.A. (1996). 'The empirical case for two systems of reasoning'. *Psychological Bulletin*, 119, 3-22.
- Sloman, S.A. (2002). 'Two systems of reasoning'. In T. Gilovich, D. Griffing and D. Kahneman (Eds.) *Heuristics and Biases: The Psychology of Intuitive Thought*. New York: Cambridge University Press. Pp. 379-96.
- Smith-Jentsch, K.A., Campbell, G.E., Milanovich, D.M. and Reynolds, A.M. (2001). 'Measuring teamwork mental models to support training needs assessment, development and evaluation: two empirical studies'. *Journal of Organizational Behavior*, 22, 179-194.
- Sparrow, P.R. (2005). 'Knowledge management in Global organizations'. In G. Stahl and I. Björkman (eds.) *Handbook of Research into International HRM*. London: Edward Elgar. Pp. 113-138.
- Sparrow, P.R. (1994). 'The psychology of strategic management: emerging themes of diversity and cognition'. In C. L. Cooper and I. T. Robertson (Eds) *International Review of Industrial and Organizational Psychology Volume 9*. Chichester: Wiley.
- Spender, J.-C. (1998). 'The dynamics of individual and organizational knowledge'. In C. Eden and J.-C. Spender (eds.) *Managerial and Organizational Cognition: Theory, Methods and Research*. London: Sage.
- Stanovich, K.E. and West, R.F. (2000). 'Individual differences in reasoning: implications for the rationality debate?' *Behavioral and Brain Sciences*, 23 (5), 645-65.
- Starbuck, W.H. and Hedberg, B. (2001). 'How organizations learn from success and failure'. In M. Dierkes, A.B. Antal, J. Child and I. Nonaka (eds.) *Handbook of Organizational Learning and Knowledge*. Oxford: Oxford University Press.
- Stasser, G., Stewart, D.D. and Wittenbaum, G.M. (1995). 'Expert roles and information exchange during discussion: the importance of knowing who knows what'. *Journal of Experimental and Social Psychology*, 31, 1-22.
- Sutcliffe, K.M. and Huber, G.P. (1998). 'Firm and industry as determinants of executive perceptions of the environment'. *Strategic Management Journal*, 19, 793-807.
- Thomas, J.B., Clark, S.M. and Gioia, D. (1993). 'Strategic sense making and organizational performance: linkages among scanning, interpretation, acquisition and outcomes'. *Academy of Management Journal*, 36, 239-270.
- Tolman, E. C. (1932). *Purposive Behaviour in Animals and Men*. New York: Century.
- Tourish, D. and Robson, P. (2006). 'Sensemaking and the distortion of critical upward communication in organizations'. *Journal of Management Studies*, 43 (4), 711-30.

- Tsang, E. (1997). 'Organizational learning and the learning organization: a dichotomy between descriptive and prescriptive research'. *Human Relations*, 50 (1), 89.
- Tsoukas, H. (1996). 'The firm as a distributed knowledge system: a constructionist approach'. *Strategic Management Journal*, 17, 11-25.
- Tsoukas, H. (2003). 'Do we really understand tacit knowledge?' In M. Easterby-Smith and M.A. Lyles (eds.) *Handbook of Organizational Learning and Knowledge Management*. Malden, MA: Blackwell Publishing. Pp. 410-427.
- Tsoukas, H. and Sheppard, J. (2004). 'Coping with the future: developing organizational foresightfulness'. *Futures*, 36, 137-44.
- Tushman, M.L. (1977). 'Special boundary roles in the innovation process'. *Administrative Science Quarterly*, 22, 587-605.
- Tversky, A. and Kahneman, D. (1974). 'Judgment under uncertainty: Heuristics and biases'. *Science*, 198, 1124-1131.
- Van der Heijden, K. and Eden, C. (1998). 'The theory and praxis of reflective learning in strategy making'. In C.Eden and J.-C. Spender (eds) *Managerial and Organizational Cognition: Theory, Methods and Research*. London: Sage.
- Van Wijk, R.A. and van den Bosch, F.A.J. (2000). 'The emergence and development of internal networks and their impact on knowledge flows: the case of Rabobank Group'. In A.M. Pettigrew and E.M.Fenton (eds.) *The Innovating Organization*. London: Sage.
- Walsh, J.P. (1995). 'Managerial and organizational Cognition: notes from a trip down memory lane'. *Organization Science*, 6 (3), 280-321.
- Walsh, J.P. and Ungson, G. (1992). 'Organizational memory'. *Academy of Management Review*, 16 (1), 57-91.
- Wegner, D.M. (1987). 'Transactive memory: a contemporary analysis of the group mind'. In G.Mullen and G. Geothals (eds.) *Theories of Group Behaviour*. New York: Springer-Verlag.
- Weick, K.E. (1979). 'Cognitive processes in organizations'. In B.M. Straw (ed.) *Research in Organizational Behaviour, Vol. 1*. 41-74. Greenwich: JAI Press.
- Weick, K.E. (1987). 'Organizational culture as a source of high reliability'. *California Management Review*, 29, 112-27.
- Weick, K.E. (1995). *Sensemaking in Organizations*. Thousand Oaks: Sage.
- Weick, K.E. and Roberts, K.H. (1993). 'Collective mind in organization: heedful interrelating on flight decks'. *Administrative Science Quarterly*, 38, 357-81.
- Weick, K.E. and Westley, F. (1996). 'Organizational learning: affirming an oxymoron'. In S.R. Clegg, C. Hardy and W.R. Nord (eds.) *Handbook of Organization Studies*. London: Sage.
- Weick, K.E., Sutcliffe, K.M. and Obstfeld, D. (1999). 'Organizing for high reliability: processes of collective mindfulness'. In B.M.Staw & R. Sutton (eds.) *Research in Organizational Behavior, Volume 23*. Greenwich, CT: JAI Press. Pp 81-123.

Wenger, E. and Snyder, W.M. (2000). 'Communities of practice: the organizational frontier'. *Harvard Business Review*, Jan-Feb, 139-45.

Whittington, R. (1993). *What Is Strategy And Does It Matter?* London: Routledge.

Willman, P., O'Creevy, M.P., Nicholson, N. and Soane, E. (2001). 'Knowing the risks: theory and practice in financial market trading'. *Human Relations*, 54, 887-910.

Zajac, E.J. and Bazerman, M. H. (1991). 'Blindspots in industry and competitor analysis: implications of interfirm (mis)perceptions for strategic decisions'. *Academy of Management Review*, 16, 37-56.

Zander, U. and Kogut, B. (1995). 'Knowledge and the speed of the transfer and imitation of organizational capabilities: an empirical test'. *Organization Science*, 6, 76-9.