

Strategy and Cognition: Understanding the Role of Management Knowledge Structures, Organizational Memory and Information Overload

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The nature of our thinking about strategic management changed throughout the 1990s, highlighting a number of psychological issues associated with the pursuit of effective strategy. This paper draws attention to new academic thinking from the fields of organizational and cognitive psychology and is intended to bring insights for the reflective practitioner. It is argued that we must think differently about what it means to be intelligent in a modern organization and what it takes to be an effective implementer of strategic change. In the first of two papers, the role of managerial knowledge structures is considered. The strategic risks are problems created by information overload. The need to consider cognitive styles, intuition, creativity and emotional intelligence is highlighted.

Introduction

Strategy is emotive

Strategy in organizations today is generally regarded as a more emotive affair than of old. The world has been turned upside down for managers trying to make judgements and implement change (Sparrow, 1999). As processes of globalization, downsizing, and restructuring herald deep shifts in the pattern of work and society and influence the perceptions that employees and their managers have of work, the problems associated with increased levels of emotionality at work have become an important theme in the strategic management literature. Research on a series of deep emotional issues has taken over the academic headlines, including:

- breach of the implicit or psychological contract (Morrison and Robinson, 1997; Rousseau, 1995) and the human resource management consequences of this (Sparrow and Cooper, 1998);
- an endemic lack of trust and change in the nature of trust within organizations (Kramer and Tyler, 1996);
- the perception of fairness (or lack of it) and the role of organizational justice in man-

aging accountability for events that have negative impact on material or psychological well-being (Folger and Cropanzano, 1998);

- the need for much better retrospective sense-making and ongoing creation of reality in what is a complex and ambiguous organizational world (Weick, 1995); and
- the need for organizations and their managers to make the knowledge and experience of individuals and groups more explicit and understandable (Sparrow, [J],1998).

Briner (1999) has pointed out, that until recently two parallel worlds were seen in the way in which we treated the topic of strategic management, the action of managers, and the skills and competencies that we assumed they needed. The first – and still dominating – world was rational and precise, in which “cool strategic thinking is not to be sullied by messy feelings. Efficient thought and behaviour tame emotion and good organizations manage feelings, design them out or remove them” (Fineman, 1996, p. 545). This is the school of thought that says ‘let’s keep emotion

out of this and deal with things rationally' (Cooper, 1998). The parallel (and until recently put on the back-burner) world acknowledged emotionality by considering the role of stress, levels of satisfaction, trust and the psychological contract. Emotion at work is discussed in both positive and negative ways. Positive discussion notes that organizations can and must generate feelings of excitement, high personal engagement and positively influence behaviour (what psychologists refer to as 'emotional contagion') amongst their employees. Negative discussion notes that much organizational strategy today seems to be making people more angry, resentful, anxious, or depressed.

There is still a divide in management thinking between the rational and the emotional, but with a new emphasis (Cassell, 1999). The new orthodoxy argues that emotions cannot be separated out from the managerial thought process and the process of strategic change. Both the thought processes (henceforth called cognition) and the social processes that surround strategic decision making are influenced by emotion (Daniels, 1999). Specifically, the quality of the mental models that managers develop is influenced by their emotional states. This determines the attention that managers give to information processing, the perceived level of stress and threat in the environment, and their ability to recall appropriate information. If managers live in a more emotional world, then the very content of their thought processes becomes more emotional too.

This article is intended to show why constructs such as intuition, creativity and emotional intelligence are gaining more legitimacy in the management literature. In this uncertain world, the attention of psychologists is being turned to new concepts of intelligence and analytic ability – what is called the 'intelligent unconscious'. The strategic management literature is dominated by themes of uncertainty, sense-making, and the need to surface managerial assumptions. As is so often asserted, managers are faced with an environment that is increasingly complex, ambiguous and is changing discontinuously. In theory, the rules of the past rarely guide current action (as we shall see, in practice they do, and there is the rub). Managers now have to absorb, process, make sense of, and then disseminate a bewildering flow of information in order that the organization might make effective decisions and solve problems. They must establish rich questions which redefine the problem, rather than point to immediate solutions. They cannot hide behind economic rationality and analysis, and

have to admit that they may be as lost as the rest of us, sailing and experimenting in uncharted waters, tentatively seeking answers to what are increasingly loaded questions, and understanding increasingly the limits to their power and the 'downside' to their decisions, whilst still having to manage the consequences (Sparrow, 1999). Not surprisingly, psychologists argue that the management of cognition is inextricably linked with the management of strategic risk. Why? Because this managerial role specification has given rise to concerns about the 'cognitive limits' of managers. Are they capable of such skilful thought? It is also leading to calls for new, more intelligent (in the true sense of the word) approaches to management.

The Psychological Agenda

Psychologists have studied the cognitive basis for motivation, employee performance and leadership, but until recently, have been reticent to research the field of strategic management (Cassell and Daniels, 1998). Yet, as this paper argues, they can offer organizations many insights into the challenges they currently face when implementing strategy. In part this is because the processes of decision-making and implementation are messy, highly political and continually changing, and therefore not well suited to those disciplines that rely on hypothesis-testing, rational analysis and generalisation of underlying principles from one situation to another. Yet, strategic management lies within the central arena of psychologists – it is a process that is rich in social and cognitive phenomena. In recent years there has been a blossoming of work that is helpful to managers in enabling them to better understand what happens when they enter into a strategic debate in this messy, uncertain, unpredictable world of global business. Cassell and Daniels (1998) note that psychologists have looked at strategic management from the following perspectives:

1. Strategic analysis is often imprecise, and decisions have to be taken on the basis of incomplete and ambiguous data. The importance of these decisions is reflected in intense debate and negotiation over periods of months. Moreover, the psychological impact of many of the actions that are pursued – such as downsizing and restructuring – cause distress to victim, executioner and accomplice. Psychologists contribute by examining the way in which teams of senior and middle managers

Reality as social construction

- undertake the analysis and selection of options. They have looked at how management judgements are arrived at, how inferences are made from patterns of incomplete data, and how various options are weighted in coming to decisions. Psychologists, then, can help organizations understand how to manage the cognitive, emotional and social consequences of strategic decision making.
2. Strategic formation has proved of interest to psychologists. They have looked at how managers make sense of their strategic environments as a precursor to making informed choices. Techniques have been developed to represent managers' mental models of the strategic environment. Techniques such as cognitive mapping have been used to access the underlying assumptions from which managers operate. Often unconscious assumptions are surfaced, which allows them to be debated openly by members of a management team. Psychologists therefore apply creative tools and techniques which have generally been used in other areas of research. In examining the level of cognitive communality, they have looked at the tension between the need to reconcile the cognitive diversity that exists across the minds of managers and the need to achieve consensus within strategic decision making. A central interest has therefore been to understand how managers can be trained to understand another's area of expertise so that they may deliberately encourage dissenting expert opinion and consider options from multiple perspectives.

Strategy as an Imprecise Information World: The Cognitive Perspective

Early work on strategic management from an economic perspective assumed individuals were essentially rational. It concentrated on the way they formed expectations about the outcome of their decisions, the beliefs that guided these, and the way in which managers 'calculated' probabilities. There was no explicit theory of how knowledge was actually organized, but the metaphor that guided understanding of the mind was one of computation. Individuals calculated the costs and benefits associated with various actions and then maximised, or at least satisfied, their own utility by choosing the most appropriate behaviour. Early studies of the psychology of the managerial mind analysed decision processes and organizational problem solving.

They began to challenge this view (Simon, 1946; March and Simon, 1958). They showed that the way in which organizations processed information and the quality of managerial decisions in situations when information was either uncertain or too costly to acquire was not a rational process.

By the late 1960s, the 'constructionist logic' approach focused on the meanings that managers attributed to the world, and the ways in which they constructed managerial and organization knowledge (Berger and Luckman, 1967). Reality was seen as a social construction in which managers actively combined their existing knowledge structures with external information and constructed their own environment. Weick (1979, 1995) developed this approach by pursuing the theme that reality within organizations is relative. Choices cannot be seen as being correct or incorrect against an abstract mathematical equation. The correctness of a decision is dependent on the point of view that is being used to evaluate it. A distinction was made between the downstream choice or calculation process, and the upstream process of sense-making (Porac, Meindl and Stubbart, 1996). The strategic environment is partially dependent on the perceptions of what Weick calls 'communities of believers' who have their own 'local rationalities' or 'interpretative stances'. These local rationalities are in turn embedded in a larger 'system of meaning' – some of which are individual and some of which are shared by the group.

Managerial Knowledge Structures and Cognitive Inertia

Managerial knowledge structures act as mental templates which can be imposed on an information environment in order to give it meaning (Walsh, 1995). These mental templates have been called many things, including: attentional fields; belief structures; causal or cognitive maps; dominant logic; distilled ideologies; frames of reference; schemas; mindsets; and world views. Whatever metaphor is used, they are felt to act as simplifications. More precisely, they help managers to overcome the limitations of short-term memory when they search long term memory for relevant information (Daniels, DeChernatony and Johnson, 1995). Managers pursue one of two strategies in doing so. First, they may represent their 'information world' by employing knowledge structures (or schemata) which serve as top-down or theory-driven aids to information processing. These structures are generated largely from experience

and are felt to affect a manager's ability to attend to, encode and make intelligent inferences about new information. Secondly, they may pursue a bottom-up, or data driven approach, whereby they let current or novel information contexts shape their processing and inform or develop their existing schema. The benefits of this prevailing human information processing system is that it acts as a coping mechanism under conditions of uncertainty. It is also suited to an environment in which strategic decisions are seen to evolve rather than exist in any finite state.

However, if such benefits are to be realised these individual knowledge structures must be organized correctly. This means they must contain high quality information, rich and sophisticated linkages, and be built around deep predictive constructs. They also must be utilised by highly competent managers. As is made clear by discussions on emotional intelligence, a manager might have very effective cognition but can still lack the competence to draw the benefits from this. Having rich schemata is only part of the requirement. Having appropriate knowledge structures means that the manager is able to:

- attend to the most meaningful events in his or her environment,
- encode and retrieve information more effectively,
- produce better interpretations,
- make more appropriate and accurate interpretations, and
- solve problems more quickly.

The validity of this logic tends to rely on the researchers showing the negative consequences of poor knowledge structures. Although Weick (1995) argues that reality is all relative and socially constructed, many academics take a more judgmental view that argues that at any point in time knowledge structures may still be more or less functional. Relying on top-down knowledge structures that are not optimal can also produce many negative consequences and actually limit the manager's understanding of the environment. The liabilities include stereotypic thinking, mis-controlled information processing, inaccurate filling of data gaps, rejection of apparently discrepant but important information, refusal to disconfirm cherished hypotheses and inhibition of creative problem solving. The consequence has variously been called blind spots, collective strategic myopia, selective perception, tunnel vision and grooved thinking (Walsh, 1995). These are all problems of 'cognitive inertia' – the inability of strategists to revise their mental models quickly enough – and they revolve

around managers using 'old maps' to 'navigate new environments' (Reger and Palmer, 1996).

Research has looked at how managers use mental models to analyse the competitive positioning strategy of their organization, and how they view the structure of their industries and markets (see for example Calori *et al.*, 1994; Hodgkinson and Johnson, 1994). Managers have clear mental models of their competitive worlds and the environment, the boundaries of the competitive arena, who their rivals are, and on what basis they can compete. They use these mental models to determine appropriate strategic action. Moreover, strategists from rival firms can come to develop very similar mental models over time as they frequently exchange information during business interactions and share similar technical problems and problem-solving ideas. The way that strategists see the world is then 'socially constructed' and based on common underlying recipes that are seen to be effective (Huff, 1982).

In an analysis of the volatile estate agency industry, Hodgkinson (1997) found that both the individual and collective cognitive maps of the industry remained remarkably narrow and insensitive to important cues during a period of rapid industrial restructuring. Cognitive inertia – unless challenged by periodic in depth reviews that enable managers' world maps to catch up with material changes in the business environment – can lead to the ultimate demise of whole industries. Work on schematic information processing shows that knowledge structures can be both enabling and crippling (Walsh, 1995). In asking whether managers (and their strategies) are rational or not, the propensity of managers to see the world through blinkered eyes should be seen simply as a source of error (Evans and Swift, 1997). It is another strategic risk that has to be managed.

Loss of Organizational Memory

There are two significant strategic risks associated with the modern construction of organizations and jobs: the loss of organizational memory; and the risks associated with dysfunctional decision making by the information-overloaded manager. The field of strategic management is replete with stories of firms repeating corporate blunders, blissfully unaware of any sense of continuity. 3M talks of the 'shadow organization'. Strategists refer to it as 'organizational' or 'corporate memory'. Organisations are highly dependent on the complex knowledge that

resides within the net sum of an organization's employees' – their experiences of events, projects, knowledge of clients and contacts, their awareness of decision making styles and their assumptions about working practices and relationships. In the west, much of this intelligence has recently been 'externalised' or 'outsourced'. Today, managers say "I don't need to know that, I just need to know... who to ask, where to look, where to go to find out, or know that it is known by others". There is of course also a cross-cultural element associated with this lack of attention to the past. In the UK at present, there are only three Professors of Business History. In Japan there are over 400 (van de Vliert, 1997).

Risks Associated with the Information Overloaded Manager

In addition to the risks associated with relying on the knowledge structures of managers and in outsourcing much organizational memory, managers also rarely have the time now even to apply what knowledge they have. Information has been defined as 'that which alters or reinforces understanding' (Daft, 1995). When there is too much information around, it has the opposite effect – information overload. What do we know about information overload and why is it going to be a problem that will affect strategy implementation? Information load is defined as "... a complex mixture of the quantity, ambiguity and variety of information that people are forced to process. As load increases, people take increasingly strong steps to manage it" (Weick, 1995, p. 87). It is typically measured in terms of the:

1. number and difficulty of decisions and judgements the information requires,
2. time available to act,
3. quality of information processing required,
4. predictability of the information inputs.

Much of the information that managers are faced with is problematic in this regard. Four qualities of information are associated with overload: low quality, low value, high ambiguity, and an ever decreasing 'half-life' in terms of the currency it carries (Sparrow, 1998). These qualities – highly descriptive of much of the information dealt with by managers today – increase the load in a number of ways:

- low quality information requires the manager to add the mental effort to make it of any worth to the issue at hand;

- low value information requires an assessment of its explanatory power in relation to other sources of information;
- contradictory information requires an assessment of what must remain ambiguous and what can be deduced to be certain; and
- information that only has a short period of relevance requires quick processing and dissemination.

Not only do many of these actions waste time, they also carry negative properties both at the organizational and individual level. At the organizational level, managers become blinded to more important matters and divert attention to irrelevant issues. The ill-conceived actions of over-burdened managers can also generate the potential for unjustified risk-taking and error. The increased volume and load of information forces managers to devote far more time to the process of information search (skills that have become critically important in many roles) and far too little time on processing or learning from the information. A key management challenge is to find ways to utilize the available brain power of the organizations' employees whilst not getting them bogged down under a welter of data.

At the individual level, information overload can lead to managers feeling that they are 'drowning' in a sea of information (this syndrome is also called communication pollution or information anxiety). At a personal level, information overload is associated with feelings of inability to cope and inadequacy of knowledge and has been identified as a source of stress. The problems associated with this syndrome have not yet received much attention in the strategic management literature. Overload implies an excessive burden and encumbrance that is sustained with difficulty. The potential for dysfunctional decision making is clear to see when the effect that overload has on cognition is outlined. Managers cease to operate effectively as load increases and begin to demonstrate dysfunctional behaviour. In coping with the volume of information (let alone its complexity and ambiguity) they begin to neglect large portions of it and try to 'punctuate' its flow in predictable ways. This 'punctuation' begins with omission, then greater tolerance of error, mis-cueing or mis-attributing the source of information, filtering its message, abstracting its meaning, attempting to use multiple channels to decode and transmit its content, and finally through seeking escape! These punctuations serve to highlight the residual information, and therefore heighten the im-

Information search takes time

pect of misperceptions on subsequent 'sense-making'.

Closely related to 'volume-induced' information overload is 'complexity-induced' overload (Huber and Daft, 1987). Uncertainty is increased because of three elements, referred to as: numerosity (the number of separate elements to be dealt with), diversity (the range of information sources and media), and inter-dependence (the complexity of causal relationships between the information elements). Employees may be exposed to information that conveys a greater number of diverse elements which interact in a variety of ways. The greater the complexity, the more the untrained person searches for and relies on habitual and routine cues. This creates the potential for disaster, as in the nuclear industry, where the combination of a reliance on complex technologies, numerous transformation processes, and inexperienced operatives makes the unexpected commonplace.

Organizational Interactions and Information Overload

Organizational interactions also lie at the heart of information load. In this sense, it is the strategists, organization designers, systems analysts and ergonomists who have first created – and then tried to deal with – the problem of information overload. When strategic change is implemented, the implementation usually entails a redesign of the interactions needed to operate effectively. Managers act as information brokers, managing a web of natural 'interactions' that take place within the organization. This is called the 'intra-organizational information market'. Managers need to have a "good" mental model of how knowledge and information is shared across the people with whom they need to interact (in order to deliver an important business process, product or service). This need becomes paramount as we move towards virtual forms of organization (Sparrow and Daniels, 1999). The current explosion in 'electronic connectivity' and the number of 'interactions' that now surround jobs is expected to increase the information load associated with many jobs. Research by McKinsey consultants shows that the overall 'interactive capability' in developed countries is set to increase markedly over the next decade (Butler *et al.*, 1997). Workers will be able to process existing interactions in less than half the time.

Until recently, our ability to manipulate and process information and data outstripped our ability to communicate and interact, but

today managing the quantity and quality of interactions is a key strategic management skill. All interactions have the same economic purpose – the exchange of goods, services or information – but they involve different cognitive requirements for data gathering and searching, co-ordination, communication, collaborative problem solving, and monitoring of transactions. They occur in many forms, and each medium is associated with a different load and richness of information. Managers have to seek the right party with whom to exchange information, arrange the presentation of the information, manage its brokerage, integrate it with other databases, and monitor the performance of the interaction. Whilst interactions are not the only source of information overload (time spent in individual analysis and data processing plays a role), they represent the largest and most rapidly expanding element of most work. Interactions are shaped increasingly by computing and communications technologies. Networking technologies make it more 'economic' to share a piece of information with a colleague or a group, or to work with different people inside the organization, customers or suppliers outside the organization, or parties around the world. Each additional node in a network required to implement the strategy effectively increases the scope for interactions exponentially, not arithmetically (Butler *et al.*, 1997). E-mails flow freely through organizations and by-pass traditional hierarchies, functions and vertical routes of previous information flows. For example, it is estimated that 60 percent of information communicated through electronic mail would never reach the recipient if not for computer-based mail systems (Fisher, 1993). An employee at Sun Microsystems typically receives 120 messages a day, a 50 percent increase from the early 1990s. The problem is that e-mails tempt managers to act faster, thereby doubling their impact on information load. This is because managers used to be able to rely on secretaries as an information filter, but today for example there are 14% fewer secretaries in the US than a decade ago, but many more managers connected to electronic systems.

Competencies for the Future, or New Management Fads?

The new types of interaction and increased information load in many jobs are re-inforcing the need for managers to develop new mindsets and for the organization to consider new concepts of intelligence. The ability to

A managerial skills agenda

manage information overload and cope with information anxiety is seen as a key management competency (Stewart, 1994; Wurman, 1989). To expect all managers to improve their cognitive capabilities to cope with information overload is a route to chaos. Not all managers may be capable of such development, the organization might not have enough depth of talent capable of being developed, and even the most competent manager has cognitive limits. Organisations must also analyse some of the structural reasons why the overload has come about in the first place. Nonetheless, a validity study of high performance competencies in a sample of 140 managers conducted by Cockerill and Schroder (1993) lends support to the argument that cognitive competencies – defined in a broad behavioural manner – are the most predictive of business unit performance under uncertain environmental conditions. Out of seven high performance competency factors (information search, conceptual complexity, team facilitation, impact, charisma, proactive orientation, and achievement orientation) the assessed score of the managers on the two cognitive factors (information search and cognitive complexity) were the most predictive of subsequent business unit performance. The two cognitive competencies operationalised by Cockerill and Schroder (1993) were linked by them to constructs previously identified in the Burns and Bass's Transformational Leadership studies (Burns, 1978; Bass, 1984), Boyatzis's AMA Competency Study (Boyatzis, 1982), the F.C.E.M. competency study (Huff, Lake and Schaalman, 1983); and the Princeton complexity theory studies (Schroder, Driver and Streufert, 1967). They are:

1. Information search – defined as the ability to gather many different kinds of information and use a wide variety of sources to build a rich informational environment in preparation for decision making in the organization (correlated with business performance at $r=0.35$, $p<.01$)
2. Conceptual complexity – defined as the ability to link information to form and compare alternate conceptions of and solutions to managerial problems, issues and situations (correlated with business performance measure at $r=0.4$, $p<.001$). It consisted of two elements: concept formation (a creative and logical process of forming ideas based on a range of information and linking different kinds of information separated spatially and over time to form concepts, hypotheses); and conceptual flexibility (viewing events from

multiple conceptions or perspectives simultaneously and considering the relationships between different options or strategies to arrive at decisions). Under a stable environment, the link between these cognitive management competencies and business unit performance disappeared.

There is a managerial skills agenda that cuts across the information processing perspective in this article. Managers believe increasingly that the rules of the past are no longer a guide to the future. We see renewed attention given to more subjective, intangible, implicit cognitive skills and a return to the analysis of 'telling' individual differences that may help managers cut through a chaotic environment, including the:

1. Investigation of less tractable areas of human cognition, such as intuition (Claxton, 1998) and creative processes that help managers adapt to sudden crises and major adjustments (Finke, Ward and Smith, 1992; Finke and Bettle, 1996; Rickards and Moger, 1999),
2. Management of emotions in organizations and the role of emotional intelligence (Goleman, 1995; Ryback, 1998).

However, are we looking at another set of catchy-sounding concepts, or is there any support for these ideas? In a subsequent paper I will consider some of the latest work on cognition and cognitive styles and the debates around these concepts.

Summary

This article has argued that managers cannot avoid having to deal with emotionality in today's world. In analyzing problems they work in a context of low trust and difficult issues of fairness and equity. Cool, rational strategic thought is often not appropriate in such a context. In any event, the actors are incapable of it. As managers try to make sense of this complex and ambiguous world, the quality and appropriateness of their knowledge structures comes to centre stage. These cognitive structures can be remarkably insensitive to important but subtle changes in the strategic environment. Cognitive inertia is a significant risk. Many current changes in organizational form, such as downsizing and outsourcing, also carry risk, primarily through the potential loss of organizational memory. However, the most significant issue is the problem of information overload.

The article has outlined a number of ways in which information load is increasing, and

has noted the individual and organizational problems that can arise. This analysis therefore sets the pretext for the one to follow. It can be seen why the popular and academic literature is shifting its attention to more subjective, tacit and unconscious forms of intelligence and reasoning. Does the answer lie in developing intuitive skills, creativity and emotional intelligence? The potential contributions they can make seems to be self evident, but are these facets of the intelligent unconscious valid, practical and assessable? The debates around this will be picked up in a subsequent article.

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