An IC-based Conceptual Framework for Developing Organizational Decision Making Capability

Christine van Winkelen and Jane McKenzie
University of Reading, UK
Christine.vanWinkelen@henley.reading.ac.uk
Jane.McKenzie@henley.reading.ac.uk

Abstract: Organizations need to be able to access, coordinate and integrate knowledge more efficiently than ever before to make sense of the complex and unpredictable forces shaping business conditions. Often knowledge is sourced from diverse yet interconnected networks of individual experts and organisations. In this environment, it is hard to ensure that decisions are based on the best available knowledge and do not work against one another. More alliances and inter-organizational partnerships and various contractual relationships with individuals broaden the range of perspectives and values to be considered, which makes it even harder to determine what a "good" decision looks like. The proposition underpinning this research is that intellectual capital investments can help turn organizational decision making into the dynamic capability required to handle a changing world. The aim is to present a conceptual framework that can be used to target these investments more effectively. A focused literature review of current decision making research to identify the relevant knowledge and knowledge management perspectives identified five factors that map to the IC framework: human capital factors involve accessing and developing experts, as well as supporting reflective practice; structural capital factors involve using technology to structure, integrate and provide access to explicit knowledge resources, as well as designing an effective decision review process; and finally a relational capital factor based on adopting an integrated approach to internal and external collaboration. IC investments in these five areas could enhance decision making in different contexts. Most importantly, the organizational capacity to recognise and respond to different situations with the most appropriate approach to decision making would improve over time. We are not suggesting this is a complete set of factors, but it is a coherent approach to investments in five areas that can contribute to better organizational decision making capability. Further research is recommended to confirm this.

Keywords: decision making, knowledge management, intellectual capital, dynamic capabilities

1. Introduction

Many organizations, both private and public sector, find they need to depend on a wider variety of knowledge resources to better serve the needs of increasingly demanding and sophisticated customers. There is also a trend is towards more varied and complicated inter-organisational relationships and a variety of contractual relationships with individuals.(McKenzie and van Winkelen 2008). This creates challenges for organisational decision making given the definition of a decision adopted here: *"a* "*decision" is a commitment to a course of action that is intended to yield results that are satisfying for specified individuals*" (Yates and Tschirhart 2006, p422). As Yates and Tschirhart point out, "*the specification of beneficiaries is critical, implicating what is arguably the single feature of decision problems that distinguish them most sharply from more general problems – differences among people in the values they attach to decision results*". More alliances and inter-organisational partnerships and different contractual relationships with individuals increase the problem of determining what a "good" decision looks like, particularly in complex and rapidly changing environments. Yet, the speed of strategic decision making in particular, has been shown to be directly related to firm performance (Baum and Wally 2003) making the time taken to explore and benefit from different knowledge bases even more problematic.

Consistent with Simon's (1960) classical view of decision making involving three stages of intelligence, design of alternatives and choice between options, we take an integrative perspective on the knowledge management implications of the full process. The purpose of this research is to identify those factors that will enable knowledge managers to help build decision making capability in their organizations as the internal and external environment evolves. This capability building approach is consistent with a view of strategy that sustainable success comes from constructing and consolidating distinctive resources and capabilities over the long term (Barney 1991, Prahalad and Hamel 1990, Stalk et al. 1992).

Investments in intellectual capital are viewed as the basis for developing this capability. The components of intellectual capital have been defined in subtly different ways in the literature, though the three core components are consistently human capital, structural and relational capital. The

Reference this paper as
van Winkelen, C and McKenzie, J. "An IC-based Conceptual Framework for Developing Organizational Decision making Capability" *Electronic Journal of Knowledge Management Volume 8 Issue 2 (pp209 - 216), available online at www.ejkm com*

definitions adopted in this paper are slight modifications of those used by Sveiby (2002). The term human capital encompasses all the individuals available to work for the organization. Relational capital encompasses all the external players in the industry (customers, suppliers, strategic partners, key members of the industry, regulators etc.). This is in line with thinking about the extent of an organization's "value net" (Allee 2000). The term structural capital describes the systems, processes, culture and other mechanisms for capturing and coordinating the knowledge available within the formal boundaries of the organization.

2. Literature review

Although a single definition of a decision is possible, there is very little else that remains consistent across all decision making situations. The following sections provide an overview of current research into human decision making processes and the characteristics and implications of different decision making contexts. For an overview of the historical development of decision making, see for example Buchanan and O'Connell (2006). Knowledge and knowledge management perspectives are introduced throughout the review and synthesised into an IC-based conceptual framework at the end.

2.1 Human decision making

The influential book "A Behavioral Theory of the Firm" (Cyert and March 1963) has shaped understanding of many aspects of organizational behaviour for 30 years (see Argote and Greve 2007 for a review). Amongst these is a view of how people make decisions in organizations; basically flawed humans with incomplete information seek to make good enough decisions through negotiation with others. This triggered detailed exploration of key influences on human decision making. Various perspectives have been adopted, amongst them the psychological perspective which starts from the cognitive mechanisms people have developed to cope with their environment and identifies heuristics which speed up decision making, but have potential traps associated with them (Tetlock 1991).

Studies of the risks associated with decision-making when viewed from the psychological perspective have identified a number of biases, summarised in Table 1.

Table 1: Cognitive biases that affect decision-making

Bias	Description
Escalation	Commitment to a losing course of action: stems from holding to initial positive beliefs in the face of negative new information (1)
Anchoring	Giving disproportionate weight to the first information received (2)
Status-quo	Preferring alternatives that preserve the status quo (2)
Sunk-cost	Making choices that justify past choices (2)
Confirming-evidence	Seeking information that supports own point of view and avoiding information that does not (2)
Framing	The choice made about how to position the question, for example as a gain or a loss, or in relation to particular reference points (2)
Over-confidence	Tendency of most people to be over confident in their accuracy with which they make estimates or forecasts (2)
Prudence	Tendency to be over cautious, adjusting estimates or forecasts "to be on the safe side" (2)
Recallability	Being over influenced by past dramatic events or those that have left a strong impression (2)
Preference for outsiders	Valuing knowledge from external sources more than from internal ones (3)

Key to references: (1) (Biyalogorsky et al. 2006) (2) (Hammond et al. 2006) (3) (Menon and Pfeffer 2003)

All the recommendations to manage cognitive and emotional biases involve improving access to knowledge or increasing individual and organisational reflection. They include exposing decision makers to additional experience and analysis, stimulating more debate and providing opportunities for challenge and oversight (Campbell et al. 2009). Paying attention to the emotions of decision makers and other stakeholders is known to be important to prevent "toxic decision processes" escalating within organizations, which shape current behaviours unproductively as well as creating future emotional biases (Maitlis and Ozcelik 2004). Finding ways to introduce multiple stakeholder perspectives in decision making is a way to access the range of pertinent value systems and emotional issues.

There is a growing acknowledgement that decision makers need to think in new ways if they are to be effective in more complex organizational environments. For example, one model of the way strategic decision makers need to behave in conditions of uncertainty, ambiguity, and contradiction identifies three "non-conventional thinking capacities" (McKenzie et al. 2009). These involve delaying crystallising an interpretative frame of reference to define the problem, exploring multiple interpretations and perspectives of the situation and, having identified potential contradictory elements, acknowledging the tensions and seeking creative solutions that address them by encompassing the value judgements of more stakeholders. Such thinking complements conventional thinking capacities normally learned in response to expectations to frame a problem space, simplify contradictions and make a choice. The emphasis that this model places on personal reflection, engaging with other stakeholders in a collaborative process and integrating multiple perspectives through a deliberate process is similar to Snowden and Boone's (2007) recommendations for the style of leadership that is needed in complex situations.

Such views are somewhat contradictory to Buchanan and O'Connell's (2006) explanation of the current fascination with "gut" decision-making. This values the courage for making the decision, as much, if not more than, the quality of the decisions themselves. Their review highlights the extent to which this has gained popular attention as demonstrated by Gladwell's book "Blink" (2006) where he argued that instantaneous decisions drawing on intuition and creativity are sometimes better than those based on lengthy analysis. Research studying "intuitive" decisions has attempted to explain this by considering the mental simulation and pattern recognition processes associated with the Naturalistic Decision Making processes of experts (Akinci and Sadler-Smith 2009) (see the next section for more on NDM). Technology developments that allow neuroscientists to watch the brain in action as it deliberates and decides are being used to understand how some of these apparently instantaneous decision processes work. The part played by the emotion-driven primitive structures of our brains in decision making is the subject of extensive current research (Morse 2006).

The organisational environment provides conditions which shape emotional responses and affect how managers make decisions. Turbulent, dynamic, rapidly changing environments place particular pressures on managers and mean that the psychological traps that everyone experiences in every decision situation potentially have an even greater effect. Structural capital investments in processes that support collective reflection and human capital investments in the development activities that encourage individuals to become reflective practitioners can seek to mitigate this, but the greater the complexity and pressure, the more difficult this will be. In the next section, the implications of various specific organizational contexts for decision making will be considered in more detail.

2.2 The context for decision making

Snowden and Boone (2007) provide a useful framework (see Table 2) that categorises decision making contexts according to the extent of the link between cause and effect.

Table 2: Categorising decision making contexts

Decision making context	Characteristic	Decision making approach in this domain
Simple	Clear cause and effect relationships are evident to all and right answers exist.	Best practice
Complicated	Cause and effect relationships can be discovered, though they are not immediately apparent. Expert diagnosis is required and more than one right answer is possible.	Expertise
Complex	There are no right answers, but emergent and instructive patterns can be seen in retrospect. Efforts need to be made to probe the situation and sense what is happening to find the patterns of relationships.	Emergence
Chaotic	The relationships between cause and effect are impossible to determine because they shift constantly and no manageable patterns exist. Acting to establish order is needed through directive leadership.	Rapid response

Considerable bodies of research examine decision making in situations that fall broadly within these contexts. Some of the trends will be identified in relation to the first three. The chaotic context will not be considered here because of Snowden and Boone's recommend directive action "*to transform the situation from chaos to complexity, where the identification of emerging patterns can both help*

prevent future crises and discern new opportunities" (Snowden and Boone 2007, p74). Insight into what such action involves will be provided through consideration of Naturalistic Decision Making (NDM) and then through looking at strategic decision making in highly turbulent business environments.

2.2.1 Simple decision making contexts

Simple decisions are not necessarily easy decisions, it is just that, with effort, a direct relationship can be found between taking an action and a particular effect; it is here that structural capital to support decision making can be most readily formulated. However, ensuring that the systems and processes are used effectively is not necessarily straightforward as cognitive and emotional biases come into play so appropriate human capital investments need to be made alongside the structural capital development. As an example of a process based approach to decision making, new product development programmes typically include key review points to systematise the investment decisions involved in developing new products and services. However, research has shown that there is often a relatively low level of proficiency in applying the decision criteria effectively. Risk aversion often prevents radical projects from progressing, while reviews of incremental developments are often "*too liberal, allowing weak projects to continue for too long and resulting in wasted resources and missed opportunities."* (Schmidt et al. 2009, p533).

Technology advance in the 1960s and 1970s led to decision support systems that aim to improve consistency in this simple context (Buchanan and O'Connell 2006). For example, decision tree type methods which systematically explore the implications of alternatives can be converted into readily accessible software applications. Artificial intelligence systems focus on well-defined problems and have been particularly effective in operational environments (Yim et al. 2004). Within many organizations, different kinds of knowledge maps are used to structure systematically explicit knowledge (Mansingh et al. 2009) to better inform those making decisions. This kind of knowledge is particularly useful for situations where people rely on explicit knowledge for operational and task based decisions (Yim et al. 2004). Clearly, as with any technology solution to a knowledge-related problem, the way it is used determines the benefit it offers. Empirical research into the human motivations to use KM decision-support systems (He and Wei 2009) showed that people contribute knowledge to the systems due to social relationships, enjoyment of helping others, management support and the cost of doing so. They seek information from the systems based on perceived utility, social relationships and the effort involved. Again, the need to match human capital development with structural capital technology investments is apparent.

In simple decision contexts, the outcome of actions following a decision choice can be foreseen. However, whether or not that choice is made also depends on whether the outcome is valued by the decision makers and their key stakeholders. Where there is ambiguity about the value of the outcome, political negotiation needs to be incorporated into the decision making process (see for example Choo and Johnston 2004). Improvement in decision making capability in the organization needs to include structural capital investments in the learning processes that openly consider whether the appropriate perspectives were properly considered.

2.2.2 Complicated decision making contexts

In Snowden and Boone's "domain of experts" where complicated decisions are being made and more than one right answer is possible, research has tended to focus on the individual as decision maker. One body of research, "Naturalistic Decision Making" (NDM), revolves round the extremes of expert-based decision-making: "*The focus of NDM research is on expert practitioners trying to figure out what to do under difficult circumstances. The need to understand decision making in the context of time pressure, uncertainty, ill-defined goals and high personal stakes was a major impetus for the emergence of NDM*" (Ross et al. 2006, p403). NDM research has provided insights into how individuals and groups use pattern matching, story telling and argumentation for sensemaking, situation awareness and decision making (Lipshitz et al. 2006), all tools that KM practitioners will be familiar with. The NDM field is developing to consider some of the changes to the organizational context mentioned earlier. For example, as "*organizations are evolving to become "smaller-sized communities of practice where people work primarily as collaborators rather than as experts*" NDM approaches need to explore distributed cognition, rather than the cognitive processes of a single expert acting under pressure (Gore et al. 2006, p936).

The judgement of experts has a particular role to play when the value of the outcome of a decision is widely recognised, but the path to achieve it is not clear (Choo and Johnston 2004). In general, the value placed on expertise depends on that organization's view of what constitutes knowledge and "truth" (Mitroff 2008). Experts aren't always right (Drior 2005, Drior and Charlton 2006), but when working with familiar situations have a higher success rate and are much faster than novices or merely competent colleagues (Ericsson 2006). However, there is a suggestion that placing too high a value on the voice of experts in the sensemaking stage of decision making may risk the decision being framed incorrectly (Gore et al. 2006, p931). It is important to recognise the situations when a wider range of perspectives need to be incorporated in order to make sure that the "right problem" is being solved (Mitroff 2008).

As expertise is dynamic, experts need to keep their knowledge base up to date and continue to refine their thinking about how to apply knowledge for impact. Being an effective reflective practitioner is an important characteristic of becoming an expert. This enables the expert to seek out opportunities for deliberate practice to improve their level of expertise, benefit from exposure to new experiences, and build mental models that incorporate new knowledge (Klein 1997). Situating this reflection within the context of interactions with another expert guide in a collaborative environment can be particularly effective (van Winkelen et al. 2009). The risks created by over-confident experts who do not adopt such an open-minded and reflective approach are becoming increasingly evident, producing calls for decision makers to remain sceptical and challenging when they use expert judgments to support decisions (Cassidy and Buede 2009). Human capital investments therefore include both providing the means to identify experts and ways of developing their thinking processes.

Experts can use technology systems that codify and structure explicit knowledge as a "scaffold" to support their decision making (Pech and Durden 2004). Some companies even try to replace human experts with technology based structural capital investments to extend the reach of their knowledge. Knowledge based expert systems can be effective for operational and tactical decisions, capturing the structure of a knowledge domain by codifying human expertise and integrating it with other computer systems such as forecasting and reporting systems (Yim et al. 2004).

2.2.3 Complex decision making contexts

Complexity theory is generating insights into new approaches to management practice. In this "domain of emergence," Snowden and Boone's (2007) emphasis on stepping back and looking for emergent patterns is similar to Stacey's (2001) call for increased attention to reflection in action. Mitroff (2008, p19) argues that we have to "*assume that complex problems are managed, not ever fully solved*". Organizations also need ways to ensure that the "right problem" is explored. This means considering multiple perspectives, areas of disagreement and drawing on "soft" concepts such as ethics, values and aesthetics as well as "hard" factual information, rather than simply seeking expert consensus or a single theoretical "truth".

The public sector provides some of the most complex environments for decision making because social policy problems, often labelled "wicked", are unbounded in time, scope and resources. They are inherently complex because they involve unpredictable interdependencies. Essentially, they are insoluble. Stakeholders profoundly disagree about what the problems are, as well as the improvements that can be made (Rittel and Webber 1973). Structural capital investments in new collaboration technologies can help support decision making by facilitating multi-participant issue articulation, simultaneous evaluation of the pros and cons of each perspective, access to relevant codified knowledge, and preference assessment (Karacapilidis et al. 2005). Relationship capital investments create the collaborative links with diverse external stakeholders.

In a business context, strategic decisions fall predominantly within this complex domain. Often they involve many changing variables (Harrison 1996) and are made at higher management levels (Cooke and Slack 1984, Yim et al. 2004). In the specific case of rapidly changing, highly competitive markets, certain approaches to strategic decision making need to be adopted. In these situations, it has been proposed that the organisational context needs to be shaped through approaches that build the capacity for collective sensemaking, challenge cognitive biases, manage political differences regarding what is valued and experiment to find patterns in the situation (Eisenhardt 1999). Human capital investments to develop the capacity of individual decision makers need to be supported by structural capital investments in processes that support collective learning about how to make decisions in these contexts.

An extensive empirical study (Nicolas 2004) has been carried out into of how knowledge management strategies support strategic decision making. This related the pattern of transformations between tacit and explicit knowledge at each stage of decision making to different knowledge management strategies. It was found that a KM strategy based on the codification of explicit knowledge (often through technology) helps in the intelligence phase and then again at the end of the process where "*codified knowledge helps to legitimise the strategic choice*" (Nicolas 2004, p27) produced by negotiating different valued outcomes. A KM strategy based on knowledge being developed and held by individuals (personalisation) and shared through dialogue, personal contact and shared experience, most effectively supports the intelligence phase when dialogue is needed to share experiences and emotional intelligence required to develop collective understanding of the issue. A KM strategy based on fostering knowledge communities that exchange and pool knowledge (socialisation) contributes most to the conception phase by enabling the rapid location of knowledge across the organization and creatively generating alternative solutions. This study demonstrates the synergistic interplay of human, structural and relational capital in strategic decision making.

3. Proposing an IC-based conceptual framework

Decision making is a knowledge intensive activity. Knowledge is both raw materials, work in process and deliverable (Holsapple 2001). The effective use of technology, the use of experts and an integrated approach to internal and external collaboration are present in different ways in the three contexts that we have explored. Organizational decision making becomes a dynamic capability when individual decision makers have the capacity to learn from their decisions and the organization has the collective capacity adaptively to improve its decision making processes. Effectiveness in these five areas would support decision making in simple, complicated and complex contexts, through the recognised phases of decision making. This leads to five target areas for intellectual capital investments, summarised in Table 3, that when implemented in an integrated and coherent way, might be expected to support organizational decision making capability.

Table 3: KM Factors that support organizational decision making as a dynamic capability

Intellectual Capital Component	IC investment area	Most significant contributions
Human Capital	Identifying experts and developing expertise.	Decision making in complicated situations. Sensemaking and identifying options.
	Supporting reflective practice.	Managing cognitive bias, increasing range and depth of experience, increasing debate, challenge and openness. Developing expertise. Reflection on practice and self awareness to develop strategic decision making skills.
Structural Capital	Using technology to structure, integrate and provide access to explicit knowledge resources.	Access to current and well structured explicit knowledge to provide input for simple decision making. Support expert decision making. Support data collection and selection phases of complex decision making.
	Decision review process.	Recognising different kinds of decision making situations. Developing an appropriate repertoire of decision making modes.
Relational Capital	Adopting an integrated approach to internal and external collaboration.	Gathering intelligence. Accessing multiple perspectives to formulate the decision to be made in complex contexts. Making connections to create knowledge to generate new options.

This is not an exhaustive list of factors, but they connect intellectual capital investments into a coherent approach which address the major requirements of effective organizational decision making. This literature review suggests that these five factors make important contributions to developing organizational decision making capability. In so doing, they provide a framework to help KM practitioners orient their thinking to supporting an activity that plays a central role in organisational performance. Current empirical research is being carried out to understand the application of this framework in practice.

Acknowledgements

This work was carried out in conjunction with members of the Henley Knowledge Management Forum based at the Henley Business School of the University of Reading.

References

Akinci, C. and Sadler-Smith, E. (2009) ""Hit or miss?" The role of intuition in decision making", *British Academy of Management.* University of Brighton,

Allee, V. (2000) "Reconfiguring the value network", *Journal of Business Strategy,* Vol. 21, No. 4**,** pp. 36- 40.

Argote, L. and Greve, H. R. (2007) "A behavioral theory of the firm - 40 years and counting: introduction and impact", *Organization Science,* Vol. 18, No. 3**,** pp. 337-349.

Barney, J. (1991) "Firm resources and sustained competitive advantage", *Journal of Management,* Vol. 17, No. 1**,** pp. 99-120.

Baum, J. R. and Wally, S. (2003) "Strategic decision speed and firm performance", *Strategic Management Journal,* Vol. 24, No. 11**,** pp. 1107-1129.

Biyalogorsky, E., Boulding, W. and Staelin, R. (2006) "Stuck in the Past: Why Managers Persist with New Product Failures." *Journal of Marketing,* Vol. 70, No. 2**,** pp. 108-121.

Buchanan, L. and O'Connell, A. (2006) "A brief history of decision making", *Harvard Business Review,* Vol. 84, No. 1**,** pp. 32-41.

Campbell, A., Whitehead, J. and Finkelstein, S. (2009) "Why good leaders make bad decisions", *Harvard Business Review,* Vol. 87, No. 2**,** pp. 60-66.

Cassidy, M., F. and Buede, D. (2009) "Does the accuracy of expert judgement comply with common sense: caveat emptor", *Management Decision,* Vol. 47, No. 3**,** pp. 454-469.

Choo, C. W. and Johnston, R. (2004) "Innovation in the knowing organization: a case study of an e-commerce initiative", *Journal of Knowledge Management,* Vol. 8, No. 6**,** pp. 77-92.

Cooke, S. and Slack, N. (1984) *Making management decisions,* Prentice-Hall, Englewood cliffs, NJ.

Cyert, R. M. and March, J. G. (1963) *A Behavioral Theory of the Firm,* Prentice Hall, Englewood Cliffs, NJ.

Drior, I. (2005) "Perception is far from perfection: the role of the brain and mind in constructing realities", *Behavioral and Brain Science,* Vol. 28, No. 6**,** pp.

Drior, I. and Charlton, D. (2006) "Why experts make errors", *Journal of Forensic Identification,* Vol. 56, No. 4**,** pp.

Eisenhardt, K. M. (1999) "Strategy as Strategic Decision Making." *MIT Sloan Management Review,* Vol. 40, No. 3**,** pp. 65-72.

Ericsson, K. A. (2006) "The influence of experience and deliberate practice on the development of superior expert performance", Ericsson, K. A., Charness, N., Feltovich, P. And Hoffman, R. (Eds.) *The Cambridge Handbook of Expertise and Expert Performance.* Cambridge, Cambridge University Press

Gladwell, M. (2006) *The Power of Thinking Without Thinking,* Penguin Books Ltd,

Gore, J., Banks, A., Millward, L. and Kyriakidou, O. (2006) "Naturalistic decision making and organizations: reviewing pragmatic science", *Organization Studies,* Vol. 27, No. 7**,** pp. 925-942.

Hammond, J. S., Keeney, R. L. and Raiffa, H. (2006) "The hidden traps in decision making", *Harvard Business Review,* Vol. 84, No. 1**,** pp. 118-126.

Harrison, E. F. (1996) "A process perspective on strategic decision making", *Management Decision,* Vol. 34, No. 1**,** pp. 46-53.

He, W. and Wei, K.-K. (2009) "What drives continued knowledge sharing? An investigation of knowledge-contribution and -seeking beliefs", *Decision Support Systems,* Vol. 46, No. 826-838.

Holsapple, C. W. (2001) "Knowledge management support of decision making", *Decision Support Systems,* Vol. 31, No. 1-3.

Karacapilidis, N., Loukis, E. and Dimopoulos, S. (2005) "Computer-supported G2G collaboration for public policy and decision-making", *Journal of Enterprise Information Management,* Vol. 18, No. 5**,** pp. 602-624.

Klein, G. (1997) "Developing expertise in decision making", *Thinking and Reasoning,* Vol. 3, No. 4**,** pp. 337-352.

Lipshitz, R., Klein, G. and Carroll, J. S. (2006) "Introduction to the special issue. Naturalistic decision making and organizational decision making: exploring the intersections", *Organization Studies,* Vol. 27, No. 7**,** pp. 917-923.

Maitlis, S. and Ozcelik, H. (2004) "Toxic decision processes: a study of emotion and organizational decision making", *Organization Science,* Vol. 15, No. 4**,** pp. 375-393.

Mansingh, G., Osei-Bryson, K.-M. and Riechgelt, H. (2009) "Building ontology-based knowledge maps to assist knowledge process outsourcing decisions", *Knowledge Management Research and Practice,* Vol. 7, No. 37-51.

McKenzie, J. and van Winkelen, C. (2008) "Knowledge management (KM) for a changing world: callenges for third generation knowledge practice", *International Journal of Knowledge, Culture and Change Management* Vol. 8, No. 8.

McKenzie, J., Woolf, N., van Winkelen, C. and Morgan, C. (2009) "Cognition in strategic decision making: a model of non-conventional thinking capacities for complex situations", *Management Decision,* Vol. 47, No. 2**,** pp. 209-232.

Menon, T. and Pfeffer, J. (2003) "Valuing internal vs external knowledge: explaining the preference for outsiders", *Management Science,* Vol. 49, No. 4**,** pp. 497-513.

Mitroff, I. I. (2008) "Knowing: how we know is as important as what we know", *Journal of Business Strategy,* Vol. 29, No. 3**,** pp. 13-22.

Morse, G. (2006) "Decisions and desire", *Harvard Business Review,* Vol. 84, No. 1**,** pp. 42-51.

Nicolas, R. (2004) "Knowledge management impacts on decision making process", *Journal of Knowledge Management,* Vol. 8, No. 1**,** pp. 20-31.

Pech, R. J. and Durden, G. (2004) "Where decision-makers went wrong: from capitalism to cannibalism", *Corporate Governance* Vol. 4, No. 1**,** pp. 65-75.
Prahalad, C. and Hamel, G. (1990) "The core competence of the corporation", *Harvard Business Review,* Vol. 3, No. 79-91.
Rittel, H. W. J. and Webber, M. M. (1973) "Dilemmas in a general theory of planning", *Policy Sciences,* Vol. 4, No. 2**,** pp. 155-169.
Ross, K. G., Shafer, J. L. and Klein, G. (2006) "Professional judgements and "naturalistic decision making"", Ericsson, K. A., Charness, N., Feltovich, P. J. and Hoffman, R. R. (Eds.) *The Cambridge Handbook of Expertise and Expert Performance.* New York, Cambridge University Press
Schmidt, J. B., Sarangee, K. R. and Montoya, M. M. (2009) "Exploring new product development project review practices", *Journal of Product Innovation Management,* Vol. 26, No. 520-535.
Simon, H. A. (1960) *The New Science of Management Decision,* Harper Brothers, New York.
Snowden, D. J. and Boone, M. E. (2007) "A leader's framework for decision making", *Harvard Business Review,* Vol. 85, No. 11**,** pp. 69-76.
Stacey, R. (2001) *Complex Responsive Processes in Organizations: Learning and Knowledge Creation,* Routledge, London.
Stalk, G., Evans, P. and Shulman, L. (1992) "Competing on capabilities", *Harvard Business Review,* Vol., No. 57-69.
Sveiby, K.-E. (2002) "Creating Knowledge Focused Strategies: Good and Bad Practices", *Henley KM Forum 2nd Annual Conference.* Henley Management College, UK,
Tetlock, P. E. (1991) "An alternative metaphor in the study of judgement and choice: people as politicians", *Theory and Psychology,* Vol. 1, No. 4**,** pp. 451-475.
van Winkelen, C., McDermott, R. and Grimwood, S. (2009) "Knowledge management's role in making visible the thinking processes of experts", *KM Forum Meeting,* 4th June, Henley Business School, UK,
Yates, J. F. and Tschirhart, M. D. (2006) "Decision-making expertise", Ericsson, K. A., Charness, N., Feltovich, P. J. and Hoffman, R. R. (Eds.) *The Cambridge Handbook of Expertise and Expert Performance.* New York, Cambridge University Press
Yim, N.-H., Kim, S.-H., Kim, H.-W. and Kwahk, K.-Y. (2004) "Knowledge based decision making on higher level strategic concerns: system dynamics approach", *Expert Systems with Applications,* Vol. 27, No. 143-158.

