

Weak signal filters in Vision Building Processes

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Abstract

This paper aims at describing and analyzing weak signals processing filters by integrating three different theoretical frameworks: the complexity theory, the sense making theory, and the decision making theory. The theoretical propositions are tested in a case study that describes the information filter structure of two different vision building processes in the context of a globally leading ICT company. We identify causal relationships between the shape of the information filter and the shape of the outcome of the vision process. Thus, this paper contributes to the existing theory on organizational sense-making by developing a coherent model of information filtering phenomena during a vision building process.

Introduction

In uncertain and unpredictable environments, companies need to capture and process weak signals that may herald major shifts in the marketplace. Pointers for capturing and processing such weak signals can be found in the complexity theory. According to this theory, the complexity of a subsystem, e.g. an organization, has to be in line with the complexity of the system, e.g. an organization's business environment, in order for survival to be enhanced. To achieve and sustain a competitive advantage, companies in turbulent environments need to scan the business environment in order to pick up early warning signals and to identify early opportunities. To steer through turbulence and uncertainty, companies need to establish and sustain a dynamic vision that captures the dynamics of their operating environment. Faced with an avalanche of often conflicting signals, companies need to develop and employ subtle information filters (Ansoff, 1979; Henderson *et al.*, 1990) that determine, which weak signals are taken into more intensive consideration, which signals are filtered out, and which issues eventually find their way into the vision statement of an organization. Here, we follow Godet's (1994:59) definition of weak signals as "a factor of change hardly perceptible at present, but which will constitute a strong trend in the future".

While the importance of weak signal processing and filtering processes for the shaping of organizational cognition has been widely recognized, the studies of actual vision-building processes have been scarce. Weak signal filtering is a subtle process that is difficult to observe and analyze, because information pertaining to weak signals is very seldom coded during the filtering process. A vision process is also a time- and resource-consuming process that is not easily accessible to external researchers because of the sensitivities involved. Therefore, to date, most studies focusing on information filtering have had to rely on laboratory experiments that only simulate the information processes taking place in real-life organizations.

In this paper, we seek to contribute to the literature on organizational cognition by analyzing real-life vision processes in company contexts as the processes unfold. Our aim is to understand the structure of the information filters that filter weak signals during corporate

vision building processes, and to describe typical features of the identified filtering mechanisms during real-life operation. Our empirical focus is on two different vision building processes: one is a hierarchical, management-driven process, and the other represents a lean, bottom-up process that commands wide participation from the organization. The focus of our study is illustrated in Figure 1 below.

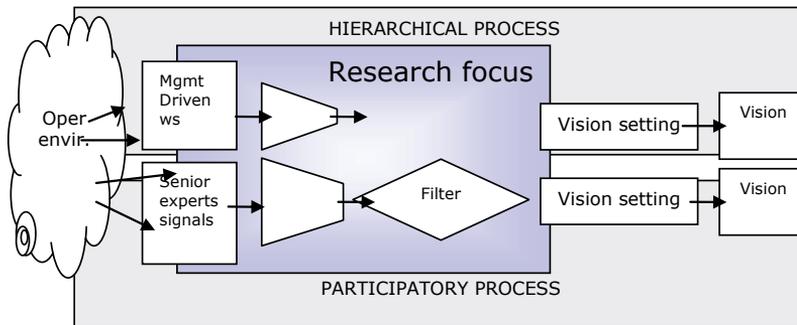


Figure 1 *Focus of the study*

By so doing, our paper seeks to make several distinctive contributions to the literature on organizational cognition. First, this is one of only a handful of studies to study vision processes in real-life contexts as the process unfolds. Second, this study employs actual codified data pertaining to weak signals, as coded during the vision process. Third, we provide a rare glimpse on organizational information filters in operation. Fourth, employing this rich data, we build a coherent model of the shaping of organizational cognition in turbulent environments.

Theoretical framework

Information filtering as a phenomenon has been mentioned within literature concerning the complexity theory, the sense making theory and decision making and foresight theories (Anderson 1999, Weick 1995, Ansoff 1979). However, there does not seem to be a comprehensive analysis of the filtering processes and mechanisms that operate within the forecasting and vision building processes of organizations operating in turbulent environments.

This paper integrates three different theories in order to enhance the understanding of information filtering mechanisms: the complex adaptive systems theory, the sense making theory, and the strategic decision making theory. First, in a changing environment, an organization needs to continuously monitor its operating environment. When we consider an organization to be a subsystem of a complex, turbulent market system, the complex adaptive systems theory will provide us with some information about **requirements** for information filtering. Secondly, an organization has a **perception**, a socially constructed mental model about the market that is created in a sense making process. Also, the vision building process of an organization, as part of its strategy building process, has **set objectives and defined processes** for forecasting.

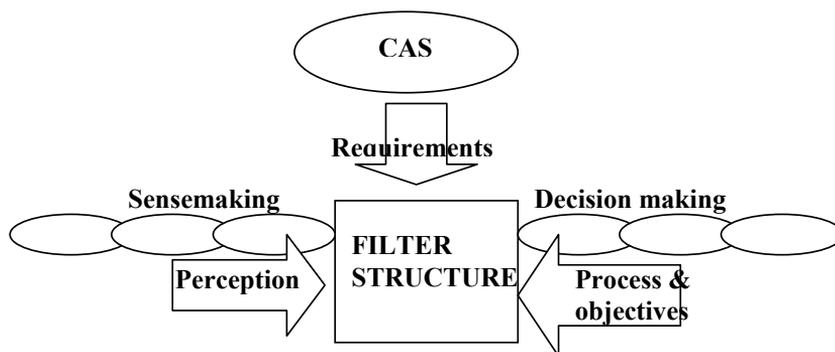


Figure 2 Theoretical lay out

CAS

The complex adaptive systems (CAS) theory is applicable in complex and unpredictable contexts where changes are non-linear and the system is constantly out of equilibrium (Anderson 1999, Anderson & McDaniel 1999). An organization operating in such an environment needs to scan and filter complex, often conflicting sets of information. The nature of this obligatory interaction is to pick up data and signals from the operating environment, identify patterns and regularities, and compress the information into internal models that reflect the complexity of the external environment. The complex adaptive systems literature (Anderson 1999, McDaniel & Walls 1997, Lissack 1999) calls these models schemata. As the operating units (agents) base their actions on such schemata, the cognitive structures determine the actions that the agent takes. (Anderson 1999).

The complex adaptive systems theory sets some requirements for the information filtering process. Importantly, there must be a dynamic fit with the complexity of the macro system and the subsystem. A potential way to manage the complexity of the subsystem is through participation in the scanning process, fast feedback loops, and deep interaction processes with the operating environment (Anderson&McDaniel 1999).

Sense making

Sense making includes both explicit and implicit mental processes of scanning, framing, interpreting, and constructing a conception of the situation at hand. Preceding decision making, sense making plays a significant role in framing the scope of forthcoming decisions. (Woodside 2001). As cognitive scientists suggest, the way individuals make sense of, and act within, their environments is tied with their cognitive frameworks or mental models (Abelson 1976, Fiske & Taylor 1991, Bogner & Barr 2000).

The sense making theory asserts that understanding of a situation of a person, a group, or an organization, rather than the objective properties of the situation, shape the way a person, a group or an organization acts in the situation. (Czarniawska 1997). The sense making theory challenges many existing theories who claim that organizational behavior is determined by rational choices based upon objective visions of the world. (Hopkinson 2001).

In a rapidly changing environment the biggest competitive threat is the steady pace of competence-destroying change that occurs, and the inability of management to foresee these changes. (D'Aveni 1994, Thomas 1996, Brown & Eisenhardt 1998). Weak signals are also a perfect example of ill-defined problems, when managers are trying to make sense of things that are of no significant importance now, but possible windows for significant opportunities in the future. When facing such challenges, managers impose meanings and interpretations that are coherent with their existing mental models dealing with information processing and decision making preferences. (Rosa 2001).

Decision making

In this study we apply an interpretative approach to the decision making process. In the interpretative perspective, strategy is merely a shared cognitive scheme (Hendry 2000), and

the decision making process is considered to be a socially interactive sense making process. In this study we follow Chia and consider decisions to be social representations of the organizational reality (Chia 1994, Berger-Luckmann 1995).

Strategic decisions represent a response to managers' needs to structure their perceived environments (Hendry 2000, Weick 1995, Laroche 1995) The natural first step in this process is vision building. A shared vision provides a common framework by which to assess available information and focus on relevant issues. This is elementary for the efficiency of the organization, the shared construction of reality decreases opportunism and increases information sharing and alignment. (Luhman 1995, Dyer-Singh 1998). One of the basic assumptions of the traditional decision making theory is that a manager makes optimal choices in a highly specified and clearly defined environment (March and Simon 1958, Ansoff 1979, Mintzberg 1990) In the complex systems reality this is not possible, as there is no comprehensive information on the whole set of alternatives, the consequences are not identifiable and utility functions or preference ordering is difficult to define in a sustainable way (Kuusi 2000). Thus, an ongoing flow of information to the vision process is required.

If only one agent is under consideration the aim to gain competitive advantage requires also weak signals collecting and refinement to proactive operations. (Juvenel 1967:17, Bell 1987). Weak signals collecting and forecast facilitate decision making by explicating the decisions which management is already aware of and makes management face requirements for novel decisions (de Juvenel 1967). The nature of the strategic decision making process is to define objectives for the vision building process and to choose the way it is to be run. The choice of objectives, methods (processes) and quality of participants have several implications on the structure of the filter in the process.

Filters in the vision building process

As the above discussion suggests, information filters may influence decision processes in multiple ways. For the purposes of our model development, we divide these influences into two dimensions: scope and process filters. Scope filters represent cognitive filters that influence the focus of observation. Scope filters determine, what kind of objectives are given to the vision process, what issues are considered, and what kind of information is therefore processed. Process filters operate through the vision process. Thus, they are influenced by the

type of process chosen (e.g., top-down or bottom-up), what kind of participation is solicited from organizational stakeholders, and what are the methods chosen to process the inputs received by these. Scope filters, therefore, determine the scope of observation whereas process filters determine what signals pass through the vision process.

Both types of filters shape the outcomes of organizational vision processes, as explicated in the following propositions. These propositions also make assumptions on the shape (width and depth) of the filter and their implications.

Scope Proposition 1A

The diversity of participants and the variety of selection criteria increase the width of information filters and result in a large variety of weak signals as output.

According to the complexity theory, wide participation increases the complexity of the subsystem (McDaniell 1997). Wide participation also increases the potential of diversity of mental models, thereby increasing the diversity of weak signals identified as inputs to the information process. Ceteris paribus, this should result in a larger variety of weak signals captured as process outputs (Weick 1995, Sharma 2000)

Scope Proposition 1B

Specialized expertise and a multi-step argumentation process increase the depth of the information filter and promote deeper insight of new features of the operating environment as output.

The basic mechanism for an agent to adapt to the environment is by processing information from the environment. Information is processed by identifying patterns and fitting new information into extant schemata (Anderson, 1999), and by seeking retrospective explanations (Weick 1995, Rosa 2001 Dutton & Jackson 1987, Sharma 2000). The deep argumentation process run by experts is considered to be a necessity for developing plausible interpretations and new insight. (Kuusi 2000). The deeper the expertise associated with the process, the deeper the new insight should be arising from the process.

Process Proposition 2A

Late decision making increases filter width and helps solicit a large diversity of input into the vision process.

The basic feature of an independent subsystem agent is to aim for local optima. According to the complex systems theory this increases flexibility. The more independent the agents are, the higher the level of complexity is. The argumentation process is also a process of socialization (Weick 1995). If decisions are made at the very early phase of the process, the cultural perception filter (Ansoff 1979) and the shared rules (Levitt & March 1988, Holland 1998), the sameness of criteria on the cognitive map of decision maker rule the outcome (Laztlo 1993).

Methodology

Because our interest was in model and grounded theory development, we chose the case method as our research strategy. Our choice of the case method was further motivated by our interest in highly complex processes that take some time to unfold: this is a type of problem to which the case method is ideally suited (Yin, 1991). The study starts from the initial framework that consists of three main theories relevant to the chosen subject: the CAS, sense making theory and decision making theory. In the theory-building process the dialogue between the empirical data, earlier studies, and the emerging insights from the data are essential. Therefore the process must be, and it has been, both iterative and communicative. (Miles & Huberman 1984, Eisenhardt 1989, Kvale 1989, Forssén 2002). Because of our interest in theory development, we chose to ground our model development on actual case data complemented with a deep review of received theories on organizational cognition and sense-making (Eisenhardt, 1989).

Triangulation was used to enhance the validity and reliability of emerging theoretical generalizations. This study involved a large number of people, who came from all levels of the case organization. The data collection was based on interviews, questionnaires, process documentation, and clinical observation. Also, all available documents concerning the vision building process were used, and the data was continuously iterated between the emerging

concepts, constructs, and discussions about them and their relations with the existing theories. (Eisenhardt 1989, Miles & Huberman 1994, Yin 1994, Strauss & Corbin 1998).

Results

The two cases studied came from the same unit of the same company. We studied the vision processes of the unit in years 2000 and 2001, respectively. In year 2000, the process was organized as a management -driven exercise, and it therefore represented an example of a top-down vision process in the study. For 2001, the process was changed, with emphasis laid on unit-wide participation in the process. The study of two different processes within the same organizational context was beneficial, since we were able thereby to reduce variance on external conditions and focus on changes caused by variation along dimensions of theoretical interest.

1) Description of the vision process in 2000

Traditionally the vision building process of the case organization has been management (unit, group) driven. All groups have run their own vision meetings (1-2 meetings, with comprehensive representation of the potential staff). The group leaders presented their propositions to the unit's vision task force that consisted of group leaders and some opinion leaders. The manager of the unit crystallized the ideas on a couple of overheads. In this study these group propositions constitute the empirical material that was investigated.

2) Description of the vision process in 2001

The vision process in 2001 was different in two major regards. The potential issues (weak signals), 273 altogether, were collected from 30 senior scientists into a database. This database was reviewed by three group leaders and the unit manager, who chose altogether 52 potential weak signals to be evaluated on a cognitive map drawn with help from all levels of the unit. Out of 120 researchers, 91 participated in the evaluation phase. The analysis report indicated the signals that were considered to be most relevant, signals that were potential sources of future competitiveness, and signals that were considered to be weak, emerging, or dissipating. The report was discussed in a workshop (2 deputy directors, one unit manager, one senior scientist and one guru expert, one new member of the organization). The agenda of

this workshop came directly from the evaluation report: the 10 most important and potential issues were discussed. Also at this time, conclusions were reported using transparencies. The objective of the process was to act as a catalyst for discussion and as an input for the formal strategy process. The vision building process therefore represented an application of the Delphi method.

Description of the filters

	SCOPE				PROCESS	
Filter Dimension	Observation Filter		Cognitive Filter		Power Filter	
	2000	2001	2000	2001	2000	2001
Width	Participants: 50% or more expertise important probability and credibility as observation filter -	Participants: 30% senior experts Expertise important 273 issues Filtering very narrow!	Probability causes short term requirements, argumentation essential, own secure environment App. 20 issues as output	Importance to the company, disruptions, novel issues, snapshots tests 57 issues to be evaluated Raw material to the vision task force	Managers (group, unit) and opinion leaders	Polarization, managers as filterers and full democracy in evaluation
Depth	Strong narrow expertise in the field under investigation	Expertise is important, but not so narrow	Strong multistage argumentation process. Probability as an argument very strong	Argumentation light at the beginning, intuition dominates in the middle and strong argumentation in the end of the	Decision making strong at the beginning and at the end	Decision making strong in filtering phase, wide at the evaluation phase

Table 1: Summary of empiric results

The major differences between these two processes can be found within argumentation and timing of decision making. The filter of 2000 featured a deep argumentation process which is personalized by the group/persons that present them. So the aim for proper argumentation and high predictability is natural. The anonymous nature of the process of 2001 creates prerequisites for an “idea testing “ type process. The level of participation was about the same in both of the processes, only the phase of participation and the task were different.

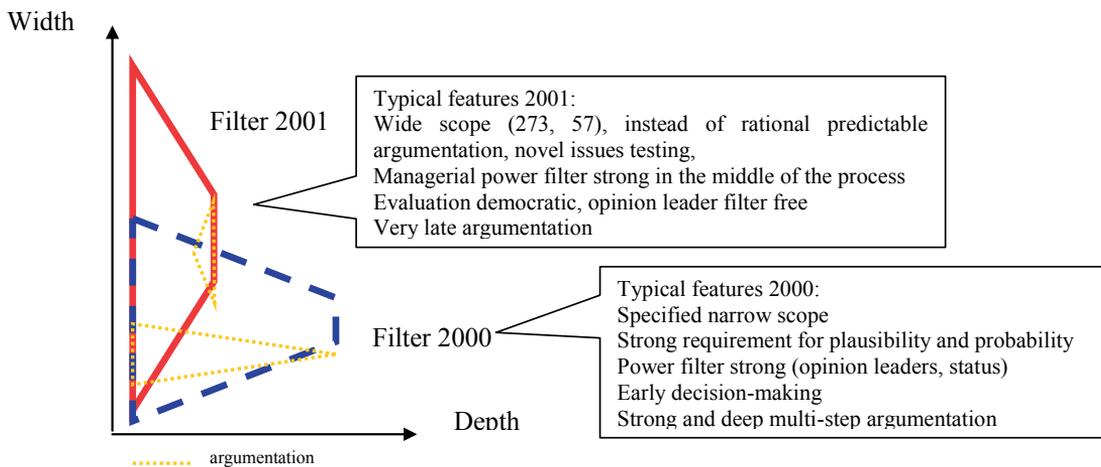


Figure 3: The weak signals filter shape in the cases

Description of the outcome of the process

The themes of the 2000 process are very aggregate and extremely technology driven. The Ansoffian framework does not function properly here because of the aggregate nature of the expressions, but the basic nature of these issues are very predictable. The time scope was 2-4 years. The sources of potential vision building issues are technological even if the changes in demand or market was mentioned only in a few cases. The major difference in the material of the 2001 process as compared to the material of the 2000 process was the concrete nature of issues and a wide variety of themes and sources of potential issues. There is a wide diversity of signal sources (6-7 sources, technology source in 8/20 cases). The predictability of the material is lower and disputably higher than in a traditional case. The time scope is 2-5 years. This has produced raw material for a further argumentation process.

Conclusions

The aim of this study was to describe the filter that filters the external signals into the vision building process of an organization and to create some understanding to the causality of the shape of the filter and to the nature of the outcome of the process.

The result of the case study was that a deep, narrow filter produces well argumentated, very predictable one-scope aggregate level output. A flat and wide filter produces a wide diversity of concrete issues emerging from many different sources.

Scope Proposition 1A

The diversity of participants and the variety of selection criteria increase the width of information filters and result in a large variety of weak signals as output.

Process Proposition 2A

Late decision making increases filter width and helps solicit a large diversity of input into the vision process.

These results provide support to proposition 2A and partly to proposition 1A. Late decision making really shapes the filter wide and thus implicates a large diversity of input into the vision building process (2A) as was the case in the 2001 vision building process. In proposition 1A the participation of processes was also considered. In this respect the empirics did not give us any evidence; in both of the processes the participation structure of phases were different, but could be considered to be almost equally wide. But instead, it was evident that the selecting criteria mentioned in proposition 1A really indicated the diversity of the outcome. In the 2001 process the variety of the source of difference comes from the anonymous nature of the process (Turoff 1975, Hiltz and Turoff 1995). In the web-aided process the input creators and evaluators were anonymous and that changed the mental model of the participants. The phenomenon could be featured as a kind of an experimental atmosphere. "I wanted to include some crazy ideas, even if I do not agree with some of them... in order to find out what others think about them". This phenomenon is typical of independent agents of the complexity theory.

Scope Proposition 1B

Specialized expertise and a multi-step argumentation process increase the depth of the information filter and promote deeper insight of new features of the operating environment as output.

Proposition 1B stated that the strong expertise and multi-step argumentation process shapes the filter deep. This implicates new insight on new features of the operating environment as output. The cases investigated did not support this proposition at all. The outcome of the process 2000 with deep filter, early decision making and focusing (Nutt 1998) did produce aggregate level predictions for the future. These predictions were very focused but did not present novel insight for the business. More or less the internal need for credibility inhibited their explication of novel, out of current paradigm ideas (Kuusi 2000)

What are the implications of the result of this study for the vision building process management? The objectives of the process set the requirements for the shape of filter (see more about Ansoff's managerial capability filter and managers' perception filter in Ansoff 1979). If the ambition is to enact the market, that is: the representation we create about the operating environment, should operate as a source of systematic action (de Juvenel 1967, Kuusi 2000). This creates competitive advantage. (Kauffman 1995, Osborne et al. 2001, see also Godet 1994). In this process the visioning should bring novel insight and challenge the current mental model (Jacobsson 1997). In order to fulfill these requirements, the filter should be flat and wide. This requirement is essential especially when the operating environment is complex and turbulent. In order to create a fit with the filter and the complexity of the environment, the filter should be wide (Ansoff, 1979). If the operating environment is predictable and /or the resources in use are scarce, the filter should be deep and the conclusions well focused and argumentated (March and Simon 1958, Ansoff 1979, Kuusi 2000. Especially in situations where the basic strategy is reactive and the reaction time is short, well-argumentated strong and shared cognitions (Weick 1995, Nahapiet&Goshal 1998, Dyer& Singh 1998,) create focused action.

Discussion

There are some potential sources of bias in this study. As there was only one case organization under investigation, it does not produce the power for generalization. Due to the requirements of top confidentiality narrative analysis was limited. The results of this study are based on a comparison of two vision building processes from two consecutive years. The retrospective nature of the data collected on process 2000 may cause some bias. Also the different objective settings of these processes may have had some impact on the nature of the outcome.

We have used mental models as the research object, even if we know that there is a linkage between the mental model and strategic behavior (Hodginson 1997). To be efficient, this research should in an ideal case have covered also the strategy formation and the evaluation of the performance measures when implementation is completed. Vision building is a thinking process: if an organization is defined as merely an actor, the actions should be more profound to have the right focus for research (Mintzberg and Waters 1990, Hendry 2000).

There are plenty of issues worth further investigation: according to the results presented in this paper, the role of argumentation is essential. In this respect it would be interesting to study/examine the argumentation process and the nature of argumentation more thoroughly (Eliansson 1996) in the context of complex environments. According to the complexity theory one of the major means for managing the complexity of a subsystem is participation in decision making. This aspect was not possible to be covered in this study. It could be interesting to run a proper analysis on the influence of structure and the number of participants. Especially as we know that the role of corporate culture and identity of participants has a prominent impact on cognitive models (Weick 1995, Ansoff 1979).

REFERENCES

- Abelson, R. (1976) "Script processing in attitude formation and decision making", In: *Cognition and Social Behavior*, Eds. Carroll, J. S. & Payne, J. W. Erlbaum, Hillsdale, NJ.
- Anderson, P (1999) Complexity Theory and Organization Science, *Organization Science*, VOL 10, No.3, May-June 1999 pp 216-232
- Anderson R.A. & McDaniel R.R (1999) RN Participation in Organizational Decision Making and Improvements in Resident Outcomes, *Health Care Management Review* 1999
- Ansoff H. I (1979) Strategic Management Macmillan, London
- Bell W. (1997) Foundations on Future Studies, Transactions Publishers, New Jersey
- Berger P.R. & Luckmann T (1995) Todellisuuden sosiaalinen rakentuminen, Gaudeamus, Helsinki
- Bogner, W. C. & Barr, P. S. (2000) "Making Sense in Hypercompetitive Environments: A Cognitive Explanation of High Velocity Competition", *Organization Science*, Vol. 11, No. 2, March-April 2000, 212-226.
- Brown, S. & Eisenhardt, K. (1998) *Competing on the Edge: Strategy as Structured Chaos*. Harvard Business School Press. Boston.
- Cosse, T. J. & Swan, J. E. (1983) "Strategic marketing planning by product managers: Room for improvement", *Journal of Marketing*, 47: 92-102.
- Czarniawska, B. (1997) *Narrating the organization: Dramas of institutional identity*. London. University of Chicago Press.
- De Juvenel B (1967): The Art of Conjecture, Baic Books, New York
- Dutton J. E., Jackson S. E (1987) Categorizing strategic Issues: Links to organizational action, *Academy of Management Review* 12: 76-90
- Dyer J. & Singh H. (1998) The relational view: Cooperative strategy and sources of interorganizational competitive strategy. *Academy of Management Review*, 23(4), pp 660-679
- Chia R (1994) The concept of decision: a deconstructive analysis, *Journal of Management Studies* 31, pp781-806
- D'Aveni, R. (1994) *Hypercompetition: Managing the Dynamics of Strategic Maneuvering*. Free Press. New York
- Day, G. S. & Nedungadi, P. (1994) "Managerial representations of competitive advantage", *Journal of Marketing*, 58: 459-472.
- Eisenhardt KM. 1989. Building Theories from Case-Study Research. *Academy of Management Review* 14(4): 532-550
- Eliansson Gunnar 1996 Firm objectives, controls and organization Kluwer Academic Public Dordrecht
- Fiske, S. & Taylor, S. (1991) *Social Cognition*. McGraw-Hill. New York
- Godet Michel (1994): From anticipation to action, A handbook of strategic prospective, Unesco publishing
- Hamel G. and Parhalad CK (1989) Strategic Intent *Harward Business Review* 67(3)
- Henderson RM, Clark KB. 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly* 35(1): 9-20
- Hiltz, S.R. & Turoff M. (1994): The Network Nation, The MIT Press, Massachusetts
- Hendry, John (2000) Strategic decision making, discourse and strategy as social practice *Journal of Management Studies* 37:7 November 2000

- Hodgkinson GP (1997) The cognitive analysis of competitive structures: a review and critique. *Human Relations* 50(6): 625-654
- Holland J. H. (1995) Hidden order: How adaptation builds complexity, New York: Addison_Wesley
- Jacobsson <http://lpsl.coe.uga.edu/jacobson/ctcs/Resources/complexity.html>
- Hopkinson, G. C. (2001) "Influence in Marketing Channels: A Sense-Making Investigation", *Psychology & Marketing*, Vol. 18 (5): 423-444.
- Kauffman X (1995) PUUTTUU
- Kuusi O. (2000) Expertise in the Future use of Generic Technologies, Government Institute for Economic Research, Helsinki
- Laroche, H (1995) From decision to action in organizations decision-making as social representation *Organization Science* 6:62-75
- Laztlo E., Masuli I., Artigiani R & Csanyi V. (1993) The evolution of cognitive maps Gordon and Breach Frankfurt
- Levitt B & March J (1988) Organizational Learning, *Annual Reviews Sociol.* 13, pp 319-340
- Lissack M.R. (1999) Complexity: The Science, its Vocabulary, and its Relation to Organizations, *Emergence 1999, Vol 1, Issue 1, pp 110-126*
- Luhman, N (1995) Social Systems, Stanford, Stanford University Press
- March J.G. & Simon H.J. (1958) Organizations, John Wiley&Sons, New York
- McDaniel R & Walls M.E. (1997) Diversity as a Management Strategy for Organizations: A View Thorough the Lenses of Chaos and Quantum Theories, *Journal of Management Inquiry, Vol 2, No. 1, February 1997*
- Mintzber & Waters (1990)
- Nahapiet J. & Goshal S (1998) Social Capital, Intellectual Capital, and the Organizational Advantage, *Academy of Management Review, 23(2), pp. 2424-266*
- Nutt P.C. (1998) Framing Strategic Decisions, *Organization Science, 9(2), pp 195-216*
- Osborne J.D. , Stubbart C I and Ramaprasad A (2001) Strategic Groups and Competitive Enactment: A study of dynamic relationships between mental modes and performance, *Strategic Management Journal, vol 22: 435-454*
- Rosa, J. A. (2001) "Embodied-Concept Use in Sense Making by Marketing Managers", *Psychology & Marketing*, Vol. 18 (5): 445-474.
- Sharman Sanjay (2000) Managerial Interpretation and Organizational Context as Predictors of Corporate Choice of Environmental Strategy *Academy of Management Journal 2000 Vol. 43, No. 4, pp 681-697*
- Turoff M, (1975) The Policy Delphi in H.A. Lindstone and M. Turoff (eds.)
- Thomas, L. G. (1996) "The two faces of competition: Dynamic resourcefulness and hypercompetitive shift", *Organizational Science, 7, 221-242.*
- Weick, K. E. (1995) *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Woodside, A. G. (2001) "Editorial: Sense Making in Marketing Organizations and Consumer Psychology: Theory and Practice", *Psychology & Marketing*, Vol. 18 (5): 415-421.
- Yin. 1991. *Case Study Method*