

Strategic Decision-Making in Turbulent Settings: Creating Sustainable Strategic Momentum

Henk A. Akkermans and Joan E. van Aken

h.a.akkermans@tm.tue.nl and j.e.v.aken@tm.tue.nl

Eindhoven University of Technology
Eindhoven, The Netherlands

Abstract

In this article we suggest that the result of a strategic decision-making (SDM) process is not only an initial decision, but, more importantly, also *strategic momentum*. With this concept we mean a combination of *insights* gained in the issue at hand and the *collective commitment* created to act on the decision and to use those insights to subsequently adapt the actions where necessary. The more turbulent the context of the SDM process, the less relevant the initial decision becomes and the more relevant the strategic momentum that results from that process. We hypothesise that the higher the quality of the SDM process, the stronger the resulting strategic momentum will be and that SDM process quality is driven by rational, political and cultural behaviour.

We have developed this perspective on SDM on the basis of existing literature and have explored it in a detailed evaluation of six SDM-cases in European multinational firms. This evaluation has confirmed in many respects the relation between high process quality and strong strategic momentum. For instance, we have found a strong correlation between the level of rationality in the decision making process and the levels of insight and collective commitment achieved. We also have found that cultural behaviour stressing open communication coincides with high levels of collective commitment. For some other causal relations our data set is too limited in range or simply inconclusive, such as for the impact of political behaviour on strategic momentum.

A surprising finding from our evaluation concerns the sustainability of strong strategic momentum. In a second wave of evaluation interviews, some four to six years later, we found high levels of strategic momentum still to exist with the original participants in the SDM process. Opportunities for further research as well as limitations to the findings presented are discussed.

“Those who triumph,
Compute at their headquarters
A great numbers of factors
Prior to a challenge.”

Sun Tzu, in *The art of War*.
Originally around 660 B.C. (Wing 1989, p.27)

“It is therefore natural that in a business such as war, which
in its plan – built upon general circumstances – is so often
thwarted by unexpected and singular incidents, more must
generally be left to talent; and less use can be made of a
theoretical guide than in any other.”

Carl von Clausewitz, in *On War*.
Originally 1832: (von Clausewitz 1997, p.90)

INTRODUCTION

Strategic Decision-Making (SDM), by which in this article we mean decision-making regarding major organisational issues, has for quite some time been an important subject in both the fields of organisation theory (Hatch, 1997) and strategic management (Rumelt, Schendel and Teece, 1994; Papadakis and Barwise, 1998). SDM, therefore, has been extensively researched over the years (see, e.g., Rajagopalan, Rasheed and Datta, 1993, Eisenhardt and Zbaracki, 1992, Swenk, 1995). This interest in SDM has been largely based on the received wisdom that sound strategic decision-making is likely to lead to desirable organisational outcomes.

Not surprisingly, quite some research has been dedicated to a better understanding of the relation between “sound SDM” and “desirable outcomes”. In general, research in this area has attempted to establish links between four basic factors: content, process, context and outcome (Bell, Bromily and Bryson, 1998). A strategic decision is made with regard to a certain major issue (*content*), during a particular *process* and resulting in a certain *outcome*, while being influenced by its *context*, by which is meant both the organisational environment of the decision-making process and the environment of the organisation in which it takes place. Empirical research into the relations between SDM-processes and SDM-outcomes has flourished during the past decade (e.g., Woolridge and Floyd, 1990; Korsgaard, Schweiger and Sapienza, 1995; Montgomery, Wernerfelt and Balakrishnan, 1989; Dean and Sharfman, 1993a, 1993b, 1996 and Nutt, 1993a, 1993b).

Unfortunately, most of this research on the process-outcome relation is based on what we call a *choice-focus*, i.e., SDM-outcomes are defined in terms of the actual choice made and the contribution of this choice to business objectives. However, in turbulent settings such a choice tends to be unstable, as it is often, as reality unfolds, adapted to this unfolding reality (see e.g. Eisenhardt and Bourgeois, 1988, and Brown and Eisenhardt, 1998). In such settings, a SDM research model is better based on a *change focus*. Here, SDM-outcomes are not defined in terms of a specific choice but rather on the resulting ability of the organisation to deal with the issue at hand and thus the ability to change the organisational activities in the right direction.

We see as the outcome of a sound SDM-process an initial decision plus *strategic momentum*, defined as the combination of *insights* in the issue at hand and the *collective commitment* to act on the decision taken and to use those insights to adapt the actions where necessary. With respect to the SDM-process, we distinguish *rational*, *political* and *cultural* behaviour as drivers of SDM process quality, in line with Tichy’s well-known TPC-model (Tichy, 1983). This model has originally been developed to deal with issues of strategic organisational change but can also be used for analysing SDM-process quality on the basis of a change-focus as we have done.

We have used our research model in six explorative case studies of strategic decision-making processes and outcomes within a context of turbulence. In our case analyses, we have measured the impact of the three drivers of SDM-process quality on the resulting strategic momentum. We have found that strategic momentum can indeed be a sustainable outcome of an SDM-process. That is, we have found that high-quality SDM processes tend to lead to a sustained organisational ability to deal with the strategic issue in question for several years onwards. To

establish this we have conducted two waves of evaluation interviews, one shortly after the decision-making process and one four to six years later.

RESEARCH ON STRATEGIC DECISION-MAKING

In this article we mean by SDM: decision-making regarding major issues, or, in the words of Mintzberg, Raisinghani and Théoret (1976, p. 246) regarding issues that are “important, in terms of the actions taken, the resources committed, or the precedents set”. Pennings portrays such decisions as “significant, unstructured, complex, collective and consequential” (Pennings, 1985, p. 6). The classic approach to SDM, to which authors can be grouped such as Ansoff (1965), Andrews (1971), Miles and Snow (1978) and Porter (1980), focused on the *content* of the strategic decision. It stressed the use of rational decision-making processes and developed a series of powerful analytical tools like SWOT-analysis, the Boston Consulting Group’s growth/share matrix, industry analysis and sophisticated quantitative modelling to evaluate – mostly in financial terms – decision alternatives. In this approach, the decision-making process was seen as a linear sequence of steps, leading from problem recognition to the final choice. Hence the term “linear model” by Chaffee (1985). This classical approach had clear normative ambitions: sound rational strategic decision-making should lead to the desired long-term business results.

Subsequent empirical and more descriptive research has greatly enriched our understanding of actual strategic decision-making (see, e.g. Rajagopalan, Rasheed and Datta, 1993, or Papadakis and Barwise, 1998). In the context of the present article, we will focus our review of the literature on the following five clusters of findings from this body of research:

1. SDM-processes are not only rational, but also political and cultural in nature.
2. SDM content and context also drive the nature of the decision process and their outcomes.
3. A *change*, rather than a *choice* focus, seems appropriate in turbulent settings.
4. SDM is not a mechanistic linear process, but an organic one with many feedback loops.
5. Causal linkages between SDM processes and outcomes are complex.

1. SDM-processes are not only rational, but also political and cultural in nature

We have learned that SDM-processes often prove to be rational only to a certain extent. They can range on a continuous scale from purely rational to “very boundedly rational” (see e.g. Harrison and Philips, 1991). At the rational end of this scale, actors have known objectives, gather comprehensively the necessary information, develop alternative actions, choose rationally and implement. At the other end, they may perform similar actions but do so much less thoroughly. At this end, they even may consciously use irrationality in order to control subsequent action (due to differences between what can be said and what can be done, Brunsson, 1993). The degree of rationality is seen by some authors as contingent on context (see e.g. Mintzberg and Waters, 1982; Fredrickson, 1984; Dean and Sharfman, 1993b).

We now know that SDM-processes dealing with major issues for the organisation tend to be influenced by political processes: (groups of) actors defend their sub-interests by using their formal or informal power (see e.g. Pettigrew, 1973, Quinn, 1980; Pfeffer, 1981 and 1992; Eisenhardt and Bourgeois, 1988). Where political processes are important, the resulting choices or actions may seem irrational in view of overall organisational objectives. Their rationality stems from conflicting sub-interests. Interestingly, Dean and Sharfman (1993a) found the political processes to be independent from the rational ones: processes that scored high on politics could also have strong rational elements.

We also know that SDM-processes occur within an organisational context, which causes not only political behaviour, as discussed above, but also what may be called “cultural behaviour”, i.e. behaviour under the influence of the “programming of the mind” of people as a result of their social environment (Hofstede, 1991). Furthermore, this context leads to behaviour that takes into consideration the social and cultural aspects of achieving things with and through other members of the own social group. This cultural behaviour is driven by various socialisation processes within the organisation at large (Tichy, 1983; Guth and MacMillan, 1986; Woolridge and Floyd, 1990; Mintzberg, 1990). Moreover, SDM-outcomes can also be strongly influenced by specific modes of cultural behaviour at the group and interpersonal level. Examples of this are group think (Janis, 1982), cognitive bias (Das, 1999), interpersonal conflict (Amason, 1996, Eisenhardt, Kahwajy and Bourgeois, 1997), perceived procedural fairness (Korsgaard, Schweiger and Sapienza, 1995), differences in structuring of SDM group processes (McGrath, 1984; Schweiger, Sandberg and Rechner, 1989), and the degree of participation in the SDM-process (Wooldridge and Floyd, 1990).

2. SDM content and context also drive the nature of the decision process and their outcomes

Empirical research has shown that SDM content and context can have an impact on the character of the decision-making process. Hickson et al. (1986) define three modes of decision-making on the basis of differences in content. The impact of context on both SDM process and outcome have also been noted by Dutton, Fahey and Narayanan (1983), Hitt and Tyler, (1991), Bryson and Bromily (1993), Rajagopalan et al. (1993), Nutt (1993a and 1993b), Sharfman and Dean (1998) and Papadakis et al. (1998). Nutt (2000) has researched the influence of context on strategies to uncover alternatives.

In the context of the present article, of specific interest is the focus on turbulent environments, or high-velocity environments, as Bourgeois and Eisenhardt (1988) labelled them. Turbulence as a concept was introduced in a classical article by Emery and Trist (1965), who defined turbulence in an organisation’s environment as the combination of complexity and rate of change. A high rate of change in a non-complex context may not pose severe problems, but in a complex setting it usually does. In such turbulent contexts, decisions need continually be adapted as that situation evolves over time.

The interest in turbulent contexts has been reinforced lately by the recent literature on complex adaptive systems (Waldropp, 1992, Kaufmann 1995, Axelrod, 1997, Holland, 1998). It has been argued that companies operating in these kinds of settings need to be able to constantly manoeuvre along “the edge of chaos” (Brown and Eisenhardt 1998, Stacey, 1995) and improvise as they move forward in an ever-changing environment (Eisenhardt, 1998). Clearly, this strongly influences the nature of the decision-making process and the kinds of organisational outcomes that can be expected.

3. A change, rather than a choice focus, seems appropriate in turbulent settings

If one wants to study the impact of SDM process quality on SDM-outcomes one has to define what is meant by outcome. Often, the actual decision itself is regarded as the primary outcome of any SDM-process and the value of that decision is judged on the basis of its contribution to long term business objectives. In this SDM-research tradition, the actual choice is “the high point of the decision-making process” (Harrison, 1987, p53). We may call this approach research on the basis of a *choice-focus*.

However, a decision as a clear choice made at a specific point in time may well be an elusive phenomenon in actual organisational life. As early as in 1962, Folsom remarked that it “is often hard to pinpoint the exact stage at which a decision is reached. More often than not, the

decision comes naturally during discussions, when the consensus seem to be reached among those whose judgement and opinion the executive seeks” (Folsom 1962, p.84). More importantly, organisational decision-making is often conducted in a turbulent setting, resulting in an inherent instability of any decision taken: when circumstances change one may want to reconsider decisions, already made and to start a new round of decision-making.

Mintzberg and Waters (1990) have forcefully made the same point: the concept of decision itself is problematic. Even when not regarded as a choice but as a commitment to act (Mintzberg et al. 1976), a decision leaves few traces in the organisation: its timing and organisational locus tend to be diffuse, the connection between decision (if located) and action is problematic and action without decision is possible. So, argue Mintzberg and Waters, the concept of decision can “get in the way” of understanding organisational behaviour (1990, p.5).

An interesting approach to handle decision-making in turbulent settings has been developed by Sharfman and Dean (1997). While sticking to their choice-focus, they regard flexibility in decision-making as the answer to turbulence. This means flexibility (in their model through openness to new information and through recursion in the SDM-process) *before* a decision is made.

Another solution to these problems of turbulence – and the one used in our model - is to abandon the choice-focus and to adopt a change-focus (Pettigrew, 1990), which means essentially adaptations *after* an initial decision has been made. This approach is close to Chaffee’s (1985) adaptive model of decision-making. Such an emphasis on change can already be found in earlier SDM-research, in which the formulation-implementation dichotomy is rejected (Mintzberg and Quinn, 1992). Instead, it is asserted that it is rarely the case that a single decision, taken at a specific point in time, leads to improved long-term business performance. Rather, such performance improvements are achieved through a series of states, where in each subsequent state there is renewed decision-making, which means additional analyses, leading to implementation activities, new experiences and, again, to renewed decision-making. Such insights have led to conceptualisations such as “muddling through” (Lindblom, 1959) or “logical incrementalism” (Quinn, 1980, 1989).

In a more general sense, this research tradition is related to the concept of organisational learning (Argyris and Schön, 1978; de Geus, 1988; Senge 1990): subsequent states can be reached by the organisation because of what has been learnt in previous states. Here the contributions by Stacey (1995) also deserve mention, who holds – following complexity theory - that in settings far-from-equilibrium, organisations are confronted with severe cognitive limitations in finding the “best” solution and hence tend to use more heuristic and learning procedures to find solutions, often involving initial small-scale experimenting.

4. SDM is not a mechanistic linear process, but an organic one, with many feedback loops

Not just in turbulent settings, but in most real-life contexts, the classical linear model is unlikely to be detected in SDM-processes. Rather, such real-life processes are better described as series of process steps with feedback and feed-forward loops (Witte, 1972; Mintzberg, Raisinghani and Théoret, 1976). Or, they may be even further removed from the linear sequence by taking the character of an organised anarchy, such as in the garbage-can model of Cohen, March and Olsen, 1972 (see also March and Weissinger-Baylou, 1986; Magjuka, 1988; Lewitt and Nass, 1989).

Chaffee has attempted to develop a synthesis of various SDM-process models on the basis of Bouldings (1956) nine-level systems hierarchy. She distinguishes three process models. Firstly, the linear model, focusing on a specific choice at the end of a linear sequence of steps, belonging to Boulding’s machine-level. Secondly, the adaptive model of decision-making processes leading to continuous adaptation to a changing environment. This belongs to the biological level. And, thirdly, the interpretative model, in which the organisation is seen as based

on social contracts among stakeholders, reality is socially constructed and SDM-processes are used to legitimise action. This model would belong to Boulding's cultural level.

5. Causal relations between SDM process and outcomes are complex

Most of the empirical research that has attempted to arrive at a better understanding of the causal linkages between SDM process and its outcomes has focused on specific aspects. For instance, Woolridge and Floyd (1990) showed that involvement of middle management in SDM increases their commitment with the resulting decisions. Amason (1996) revealed that conflict during the SDM process can improve decision quality, since it can eventually lead to better understanding as well as, eventually, to more consensus and acceptance. Korsgaard, Schweiger and Sapienza (1995) demonstrated that perceived procedural fairness could lead to more consensus and commitment.

Research linking SDM-process with overall outcomes is scarce. A very early example is Trull (1966), who concluded on the basis of 100 case-studies that total decision success (defined as "primarily economic attainment"; Trull, 1996, p B-272) equals Decision Quality plus Implementation, both concepts operationalised through a number of indicators. More recent is the work by Nutt and by Dean and Sharfman. Nutt analysed for 163 decision-cases the process tactics that managers use to take decisions and linked the four types of tactics he distinguishes with decision success, which he operationalises by decision adoption, merit and duration (Nutt, 1993a, 1993b). Dean and Sharfman concluded on the basis of an analysis of 61 decisions that SDM-process quality does indeed influence decision effectiveness (Dean and Sharfman, 1996). They also found that the degree of rationality in that process depends on context (competitive threat, perceived external control and uncertainty (Dean and Sharfman, 1993b) and that rational and political sub-processes in SDM need not interfere with one another (Dean and Sharfman, 1993a).

RESEARCH MODEL AND RESEARCH QUESTIONS

In this section we operationalise our research model. Figure 1 summarises it graphically. We will explain its components one by one.

Strategic momentum: insight and collective commitment

The concept of decision

As we are interested in SDM in turbulent settings we do not employ a choice focus but a change focus. We still use "decision" as a concept, as it doesn't need to get in the way of understanding, as we will see, and as it is still a very powerful concept. Not only do organisations make strategic choices like diversification, the establishment or closure of facilities or mergers and acquisitions (even if place and timing of such choices are diffuse), but strategic decisions are also empirical realities in the sense that they figure prominently in most real life strategic discourses (see Hendry, 2000, on the importance of the concept of "decision" in such discourses).

We see, however, an organisational decision not only as a "commitment to act" (as Mintzberg et al, 1976, do), but as a *design and a commitment to act*. We agree with Mintzberg et al. that organisational commitment is a defining property of an organisational decision, but at the same time it is also a design of action, i.e. an explicit or implicit statement of the what, when, why and

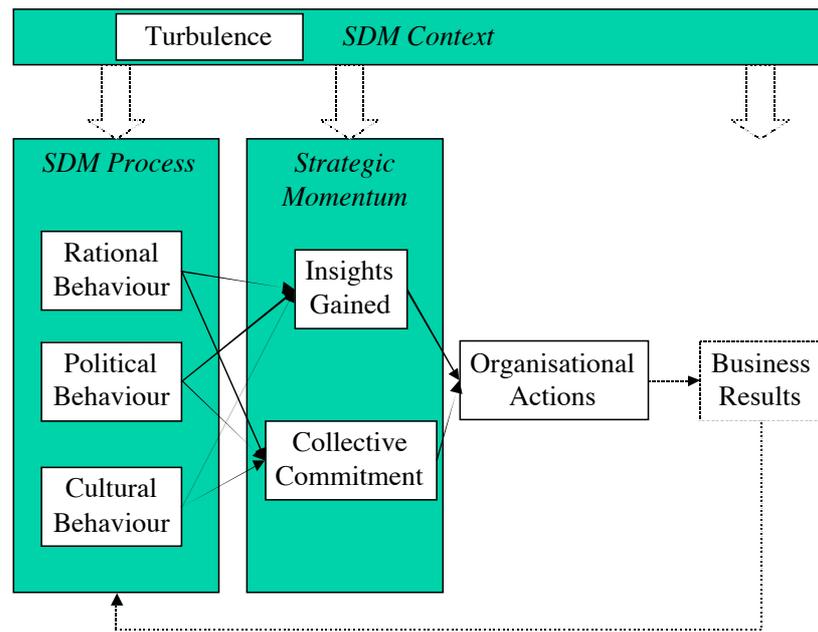


Figure 1: The research model: Rational, political and cultural behaviour lead to strategic momentum, which is a combination of insights gained and collective commitment.

by whom of the intended action. This is not to reify the concept of organisational decision. SDM is a process of organisational actors, usually key actors in the organisation. An *organisational decision*, then, is a *design for action to which a significant number of key actors is committed*. Using a change focus and these two defining properties of an organisational decision we define as the outcome of a SDM-process an initial decision *plus* the resulting strategic momentum, i.e. the combination of the insights developed in the strategic issue at hand and the commitment of key actors to act on that decision and to use those insights to adapt the necessary actions where necessary. Strategic momentum is a term already used by Miller and Friesen (1980; 1982), but these authors see it as an inherent property of the organisation as a whole, entrepreneurial firms having more of it than conservative ones. In this article, we see it as something that can be developed through a high-quality SDM-process. Strategic momentum gives the organisation the ability to deal with that strategic issue, also as reality unfolds in somewhat different ways than anticipated.

TABLE 1
Constructs and Indicators for SDM Process and Outcome

SDM Stage	Turbulence	SDM Process Aspects			Strategic Momentum		Business effects
<i>Stage Aspect</i>		<i>Rational behaviour</i>	<i>Political Behaviour</i>	<i>Cultural Behaviour</i>	<i>Insight</i>	<i>Collective Commitment</i>	
Aspect indicators	Problem complexity Problem urgency	Completeness Thoroughness Focus	Perceived political sensitivity Willingness to cooperate	Involvement Openness of communication	Problem insight Appreciation of problem solving method	Commitment Ownership Consensus	Decision implementation

In our research model, the desired outcome of an SDM process in a turbulent setting is a group of people who have learned a great deal about the issue at stake and feel committed to translate these insights into actions whenever the time is right for doing so. This is what we have labelled “strategic momentum”. This construct is a combination of two separate, yet indirectly related indicators: the level of insights gained, without which no sensible decisions can be taken, and the level of collective commitment, without which sensible decisions may not get implemented.

Insight

Argyris’ and Schön’s (1978) distinction between “single and double loop” learning has only gained in relevance in the past twenty years. For, increasingly, the challenge for management teams is not so much to tackle similar issues over time, but rather to rethink again and again their way of tackling issues, their problem-solving method. Therefore, the two indicators used in our research model are single and double loop learning. We have operationalised these as (1) problem insight and (2) appreciation of problem solving method. The former refers to the degree in which participants felt they acquired new insights regarding the issue at stake. The second concerns the degree in which they have acquired a better appreciation of the systems thinking-based approach (Senge 1990, Sterman and Morecroft 1994, Vennix 1996) that was used to facilitate the SDM processes investigated here with which all stakeholders were unfamiliar beforehand.

Collective commitment

Apart from the cognitive process of obtaining a thorough understanding of the issue at stake, the emotions of stakeholders need to be engaged as well. This is where the concept collective commitment comes in. We distinguish three related indicators for this concept: (1) commitment, (2) consensus and (3) ownership.

(1). Commitment. The construct commitment has been investigated frequently in SDM research (c.f. Amason 1996, Korsgaard et al. 1995, Woolridge and Floyd 1990). This indicator stands for the degree in which stakeholders feel determined to translate the insights gained from the SDM process into informed actions. This is more than just paying lip service: as the popular saying goes, in baking a ham omelette, the chicken is involved but the pig is genuinely committed.

(2). Consensus. Next to individual commitment there also has to be consensus amongst the key stakeholders regarding the above-mentioned insights and how these should be translated into action. Like commitment, consensus is also frequently investigated in empirical SDM research, starting with Bourgeois (1980), progressing with Woolridge and Floyd (1990) and continuing up to the present day with Amason (1996) and Schwenk (1998).

(3). Ownership. Our third indicator for collective commitment is ownership, by which we mean the degree in which participants feel the insights are an intellectual outcome from a process in which they themselves participated actively. Authors from diverse fields, such as Ackoff (1979), Schein (1969), De Geus (1988, 1997) and Senge (1990) have stressed the importance of this indicator for group commitment.

Drivers of process quality: rational, political and cultural behaviour

On the basis of our literature review, we assume that SDM-process quality is driven by rational, political and cultural behaviour. More precisely, we hypothesise that one will consistently obtain the above defined desired outcomes of an SDM-process if the actors behave rationally, abstain from political behaviour and “act culturally”, i.e. take in their behaviour into consideration the social and cultural aspects of achieving things with and through other members of the own social group. This hypothesis is in line with our change focus and follows Tichy’s (1983) TPC-model

in which strategic organisational change is driven by technical (i.e. rational), political and cultural interventions.

Rational behaviour

Here we followed closely the operationalisations of Dean and Sharfman (1993a, 199b, 1996). To assess the importance of this sub-process, we used three indicators: (1) completeness (the degree in which all the relevant data were considered), (2) thoroughness (the degree in which all the required analyses were conducted) and (3) focus (the degree in which discussions were felt to be centred around the key issues).

Political Behaviour

Here we again stayed close to Dean and Sharfman (1993a, 199b, 1996), who pioneered empirical research on the interplay of rationality and politics in SDM. We used two indicators to measure the degree in which political behaviour was important. The first is the degree in which participants saw (discussing) the issue as threatening to their own position in the company (political sensitivity), the second one is the inverse of the degree in which discussions were felt to be open, inhibited by ulterior motives (open communication). This view is consistent with the broader recent SDM literature such as Eisenhardt, Kahwajy and Bourgeois (1997).

Cultural behaviour

By this we mean the degree in which stakeholders are (1) willing to participate actively in the SDM process (willingness to co-operate) and the degree in which (2) they actually are involved in the discussions (involvement). We based these indicators on Woolridge and Floyd (1990) and Rajagopalan et al. (1998) who both stress the need for involvement of the key players. Both Amason (1996) and Eisenhardt et al. (1997) have pointed at the positive effects of cognitive conflicts, or, having a good and open debate, on performance.

Antecedents and results of SDM: turbulence and business results

Turbulence

Following the classical article of Emery and Trist (1965), we define turbulence in an organisation's environment as the combination of complexity and rate of change. In our research model, we have operationalised these in two factors; (1) problem complexity (how complex was the strategic issue perceived) and (2) problem urgency (how urgently was a solution to the issue needed in the organisation).

Business results

We have operationalised this variable similar to Dean and Sharfman's (1993a, 199b, 1996) and Woolridge and Floyd's (1990) questions regarding decision effectiveness. Dean and Sharfman asked managers to rank a number of pre-defined issues to address by the SDM process in terms of their importance and the quality of their implementation after the SDM process. In our research, we have simply asked respondents to what extent decisions made during the SDM process have been implemented in the organisation. We have labelled this indicator decision implementation.

Multiple causal linkages and feedback between stages

The process that Figure 1 describes is not one-off, but rather an ongoing process with multiple feedback loops. In this ongoing process, experiences with the results of actions are fed back into the SDM-process, possibly resulting in a new round of decision-making. This may then affect again the strategic momentum that was created at the previous round. It is the strategic momentum surviving from the previous round of decision-making that is adjusted by this new SDM round. This also implies that the *sustainability* of the strategic momentum is a key issue. If strategic momentum dies out soon, it will be of little value to the organisation.

Research questions

On the basis of the research model of Figure 3 we can define the following three research questions:

- Q1. *What is the relation between strategic momentum and subsequent organisational actions?*
- Q2. *What are the relations between the three drivers of SDM-process quality and the resulting strategic momentum?*
- Q3. *To what extent is strategic momentum sustainable and how does that sustainability depend on the quality of the SDM-process that generated it?*

RESEARCH METHODOLOGY

Research design

Multiple case studies for theory building.

The research reported here has been aimed at generating new theory on the basis of existing theoretical constructs. As we noted in the literature review, our specific research aim has been a novel one. For, although the topic of SDM and its impact on organisational performance has been extensively researched, there is very little empirical research from a change perspective that attempts to arrive at an integrated view of the SDM process. Even more so, the impact that turbulent settings have on this process and its outcomes is a new research angle for empirical SDM research.

For theory building, employing a research design of multiple case studies would appear to be a logical choice from a methodological perspective. As has been noted repeatedly, case studies “provide the intimate connection with empirical reality that permits the development of a testable, relevant and valid theory”. (Eisenhardt 1989, p.532). This is certainly true in the case of strategic decision-making by multiple stakeholders in turbulent settings; a complex and fast-unfolding phenomenon by any standard. It is therefore not surprising that the research design employed by Eisenhardt for her research into the turbulent world of the computer industry, i.e., using between 4 and 12 different cases of SDM that share some essential characteristics but differ clearly in others, has formed a template for our research design (Bourgeois and Eisenhardt, 1988, Eisenhardt and Bourgeois, 1988).

Action research for validity and relevance.

Being intimately connected with empirical reality is often problematic for an outside researcher in the case of strategic decision-making in turbulent settings. The issues involved are often sensitive, the content matter tends to be complicated, the stakeholders are many in number, often

time-pressed and not easily accessible and the SDM process progresses with unpredictable timing. Therefore, employing an action research design (Reason and Bradbury 2000) has definite advantages over a more “hands-off” approach. In this research project, the first author was actively involved as a consultant to the management of all the companies investigated.

Apart from the ability to observe events up close as they unfolded, this choice for an action research perspective also has other well-noted advantages. Firstly, it provides the ability to observe up close an organisation during a period of strong instability, while it is experiencing its periods of most drastic change, when normally often no outsiders would be allowed. As Kurt Lewin probably noted first: if you want to understand how something works, try to change it (Lewin 1997).

Secondly, it ensures the direction of the research to be of guaranteed managerial relevance, since company management is closely involved in the research effort as it progresses (Gill 1983). And thirdly, it indirectly generates the close relations and common understanding that enable researchers to revisit the company after they are no longer involved directly. It has been noted that this rapport with management is important during subsequent periods of change to observe and reflect with members of the organisation on ultimate causes and consequences of the changes observed (Miles and Huberman 1984). In the case of this research, it enabled access to the decision-makers involved, who by then were often scattered throughout their respective organisations, up to six years after the original decision-making process had taken place.

Overcoming reliability limitations of action research.

Precisely the same characteristics that make case study research in general, and action research in particular, so well-suited to study SDM processes also generate considerable problems in ensuring sufficient reliability. By reliability we mean the degree in which statements are based on a careful observation of reality, rather than on accidental circumstances regarding measurement instruments or the researchers’ own biases as people being personally involved (Yin 1989). For our research, we have taken several measures to ensure adequate levels of reliability. In general, these boil down to limiting personal biases by employing as many independent perspectives and sources of data as possible in an iterative process of data collection, analysis, reflection and synthesis. We will return to these further on.

Theory-driven case selection

In our selection of design, we followed the principle of theory-driven case sampling, as developed by Yin (1989) and Eisenhardt (1989). Here one varies in case selection at much as possible on the key constructs of interest while keeping variation in constructs of secondary importance as low as possible. In this research, our interest has been to learn more about the impact of SDM process quality on performance. For this purpose, at least two types of cases are needed: ones where this quality was perceived as low and ones where quality was high. As it turned out, we found more variation across this scale: one very unsuccessful case and two very successful ones, with the remaining three ranking at different points in between.

On the other hand, there are also variables that we wanted to remain constant across cases. One such variable was the degree of turbulence. In all cases studied, the SDM process was characterised by turbulence: in three cases the turbulence affected the industry as a whole, in the other three the turbulence was more generated by developments internal to the firm. One more was the type of methodical guidance for the decision-making process: the stages that were distinguished in it, the structure of the group sessions and the types of analyses made. In all cases studied, this guidance was provided by a systems thinking-based process facilitation approach of group model-building (Senge 1990, Sterman and Morecroft 1994, Vennix 1996) that

the second author had been trained in and had moulded into a proprietary consulting method (Akkermans 1995a, Akkermans and Vennix 1997).

Data collection

Multiple sources of data: project documents and interviews.

To ensure construct validity as well as reliability we have collected data from different sources and in different formats (Miles and Huberman 1984, Yin 1989, Eisenhardt 1989). During the SDM process itself, relevant documents were collected and research notes were taken (Miles and Huberman 1984). Workshops sessions were recorded, transcribed and fed back to informants to check for correctness and completeness. After the formal part of the decision-making process had ended, evaluation interviews were conducted with the key stakeholders involved regarding the indicators listed in Table 1. These interviews were conducted with 3 up to 8 informants per case, with interviews lasting between 1 and 2 hours. These interviews were not conducted by the authors but by independent investigators. They were conducted 0-2 years after the SDM process had taken place, in 1994.

Two waves of process evaluation to assess sustainability.

To assess our third research question regarding the sustainability of the strategic momentum, a second wave of evaluation interviews was conducted, again by independent interviewers. These interviews took place in 1998; some four to six years after the original SDM process had come to completion. The same people that were interviewed back in 1994 were approached once more. Most of the original interviewees could be traced back, sometimes in different organisational settings. Interview questions were targeted towards the same indicators as four years earlier.

Our interest in the present article is in establishing what remains of strategic momentum over time, not in how this momentum develops over the years. This is why we chose this considerable time gap between our observations. Of course, problems of recall and memory distortion are inevitable, certainly after such long time periods. Therefore, we only asked our respondents about their assessment of the SDM outcome variables, not on the contextual or process variables. Outcome variables persist up to the present day whereas questions about the SDM process refer by definition to a period a long time ago.

Data analysis

Qualitative data analysis

The data analysis in this research was considerable. In the first wave of data gathering, a total of 27 informants were used for post SDM-process interviews. This number was understandably lower in the second wave of data gathering in 1998, since many people had since then left their respective companies. Nevertheless, 10 separate interviews could be conducted to assess long-term SDM outcomes.

In the analysis of these interview data, we have following closely the recommendations provided in the classic textbook by Miles and Huberman (1984). We have aggregated data from the interview transcripts in a series of steps. A more detailed description of the elaborate data analytical process we went through is presented in Akkermans (1995a) and Akkermans and Vennix (1997). Here we will limit ourselves to outlining the main analytic steps. First, relevant scenes from each transcript have been coded according to the indicators from our research model. Then, for each interviews these scenes have been summarised in a data display table (Miles and Huberman 1984, p.21-22), one column for each of the indicators.

The summaries of these columns have then been clustered for all the transcripts available for this case and again a summary per indicators was made. Each summary contains both a short verbal description as well as a Likert-scale assessment for the value of that indicator, ranging from "--" to "++". This results in a table containing the summaries for each of the indicators belonging to an overall construct, e.g. collective commitment, for one case. These indicator assessments have then been summarised once more into a single appraisal for the construct as a whole. It is these scores that appear in Tables 2-4. One single plus or minus here typically refers to several dozens of statements made by project informants during their respective interviews.

Our presentation of the results of this data analysis in this article is in two ways. First there is the table format, as in tables 2-4. These give adequate assessments of the values for our constructs and indicators on a case by case basis. But, what these do not convey so well is the nature of the relationships between specific constructs across cases. And this is what we are looking for in our first two research questions. Therefore we have made use of *scatter plots*. Scatter plots are "figures that display data from all (cases) on two or more dimensions of interest that are related to one another. (...) Scatter plots are very useful when the analyst is trying out a hypothesis" (Miles and Huberman 1984, p.181-182). For this purpose, we have translated our Likert-scale assessments into a 5-point scale (-- being 1, ++ being 5) and have plotted case-by-case values for two variables of interest at a time.

Measures to ensure research reliability

We have taken a number of specific steps to ensure sufficient levels of research reliability, which is often problematic in qualitative, case-based research, and especially in action research. In general, these boil down to ensuring an explicit change of perspective between the initial action research mode of operation and the subsequent case analysis phase.

We have already pointed out that *independent evaluators* conducted post-SDM process interviews. These also conducted most of the codification and analysis of the transcripts of sessions and interviews. These interviews were conducted with *multiple members* of the organisation coming from different backgrounds, to provide as many independent different perspectives as possible.

We conducted a *member check* on our preliminary case analyses by feeding back preliminary case-by case reports to our interview respondents and soliciting their comments on our synthesis of findings (Miles and Huberman 1984, Flick 1998). Finally, we ensured *peer review* (Flick 1998) of our findings by discussing them back at the university with the second author's Ph.D. Thesis committee, in the context of which this research was conducted, and by publishing case-by-case findings in peer-reviewed academic journals (Akkermans 1993, Akkermans 1995b, Akkermans et. al. 1996).

SIX CASE-STUDIES OF STRATEGIC DECISION-MAKING

Similarities and dissimilarities between cases

In this research project six cases were evaluated. They share many common characteristics. Firstly, all cases concern commercial firms facing a strategic issue. In the majority of cases (Case 1, 3, 5 and 6) this issue was an operations issue, as that was one of the original content focus area of the research project. Secondly, in all cases the context was one of turbulence, be it primarily external turbulence, created by developments in the industry as a whole (cases 5 and 6), or internal turbulence, resulting from the growth crises the companies in question were going through (cases 1 and 3), or both (cases 2 and 4). This is summarised in Table 2.

TABLE 2
Context, Content and Source of Turbulence for SDM Cases Investigated

Case #	Industry context	Content of Issue	Source of Turbulence
1	Publishing (Newspaper distribution)	Operations strategy and redesign	<i>Internal:</i> Consolidation of operations after major acquisition
2	IT Services (Secondment)	Organisational structure and culture	<i>Internal:</i> Crowding out of local units after rapid growth <i>External:</i> Industry consolidation
3	Pharmaceutics (Biotech)	Operations strategy and design	<i>Internal:</i> Huge increase in demand for drug expected after successful clinical trials while establishing activities in Europe
4	IT Services	Corporate governance	<i>Internal:</i> Restructuring after merger and international expansion <i>External:</i> Industry consolidation
5	Retail banking	Retail strategy and network redesign	<i>External:</i> Industry consolidation; reallocation of retail instruments as a result of changing customer needs and technological advances
6	Semiconductors (IC manufacturing)	Supply chain strategy and redesign	<i>External:</i> Increasing cyclicity of customer demand over time

Thirdly, in all six cases a similar problem solving method was applied, group model-building on the basis of system dynamics modelling, which is an increasingly popular method of dealing with complex business issues with multiple stakeholders in a participatory yet analytically driven manner (cf. Senge 1990, Sterman and Morecroft 1994, Akkermans 1995a, Akkermans 1995b, Vennix 1997). Fourthly, the first author was involved in all these cases in his role as part-time consultant with a Dutch IT consulting firm. Finally, in all cases concerned the activities in question took place in Europe, with The Netherlands as their centre.

Despite these similarities in content and — at least intended — process, every case differed clearly from others in both contextual and outcome related aspects. For instance, some cases were very successful in terms of achieved state of strategic momentum achieved (Case 1, 5), whereas others were a clear failure (Case 4). In Case 1 several millions of direct savings were reported, in Case 3 the company almost went bankrupt just after the SDM process was completed. Other differences concern company size and industry sector: Cases 5 and 6 were with major Dutch multinationals in banking and high-tech electronics, Case 3 was with a small American biotech firm that was setting up operations in Europe. Finally, the issues at stake also differed in scale and scope. Overall, the issues covered in the later cases, 4-6, were more ambitious and far-reaching than those tackled in the first three cases.

We will now discuss each case briefly. In doing so, we will observe the following format. First we will point out the nature of the turbulence involved (see also Table 2) in light of the content and context of the SDM issue. Then we will consider the quality of the SDM process in terms of rationality, politics and culture. Finally, we discuss SDM outcomes in terms of strategic momentum achieved and organisational actions taken.

Case 1: Redesigning Operations in Newspaper Distribution

SDM Content and context

The company in question distributed international newspapers in the Netherlands. In itself, this was a fairly stable industry. Also, the content matter of this first case was a fairly straightforward one: the redesign of internal operations to accommodate the new demand levels. However, what made the context such a turbulent one is that the company had just merged with another one and that, as a result, its operational performance became so bad that bankruptcy seemed inevitable if things could not be turned around within a few months. So, the rate of change in this setting was very high indeed.

SDM Process

Regarding the SDM process, it should be noted that this was a relatively small company of a few hundred employees, part of a larger concern with a dominant entrepreneur-founder looking over the shoulders of the managers: this did lead to considerable political strife at the higher management level. This manifested itself at the very beginning of the SDM process, when two external consultants from different firms were brought in to support the operations manager, of whom the first author was one. Nevertheless, on the factory floor willingness to co-operate was very high; people could see that their jobs were on the line, so politics remained pretty much in the periphery of the SDM process.

Culturally and rationally speaking, the SDM process went well. A small team of four to five participants engaged in a series of group problem solving sessions, starting with problem conceptualisations and becoming gradually more and more oriented towards quantitative analyses based upon those conceptualisations. Despite the initial hesitations, overall communication was quite open and involvement was good.

SDM Outcomes

The SDM outcomes were even better. Not only were high levels of learning reported as well as strong commitment for the study findings, but in this case the recommendations resulted in considerable performance improvements and cost reductions as well (Akkermans 1993). By the time of the second wave of data gathering, which was some six years later in this first case, the original operations manager had moved up the ladder and the company was again in good shape, making sound profits and with most of the original recommendations implemented. In fact, the insights gained in the original setting were now implemented in other business units as well.

Case 2: Identifying Drivers of Management Behaviour in Professional Services

SDM Content and context

The organisation in question was a regional unit of a medium-size IT services company. In the highly decentralised and regionalised structure of this company, some eight managers of the business units in this region had, on the one hand, their own profit-and-loss responsibility. On the other hand, they had to collaborate, for instance in service development and when working for the same clients. This collaboration left quite something to be desired and this then was the issue at stake: why were business unit managers not co-operating more and what could be done to make this happen? The reasons that this very complex issue became an urgent one were both internal and external. Internally, the company had enjoyed rapid growth in the past, partly thanks to its decentralised structure that allowed for fast scaling of activity levels. But recently, the market had become saturated with regional business units and more and more units began to

compete for the same orders with the same customers, which caused considerable tension. Externally, with the large customers this company wished to focus upon a trend became discernible to look for one-stop shopping with their IT supplier base, which would require greater specialisation and collaboration between units of the IT supplier in question. In both cases, problem urgency, i.e., the rate of change, was considerable but not extreme: the company was still doing well and the market was still growing.

SDM Process

Perhaps partially a result of this relatively low problem urgency, the SDM process left some things to be desired. Five workshops were conducted with the group of managers that collectively had to run this region, headed by the regional manager. Although this was a peer group of people who knew each other well, with no top management present, and therefore with little political behaviour during meetings, involvement was certainly not optimal: not all participants showed up every time. Nevertheless, the group was quite successful in analysing why collaboration did not occur more often (Vennix, Akkermans and Rouwette 1996). Solutions to promote collaboration seemed to cut at the root of the decentralised way the company had been organised, which made coming up with good alternatives problematic. This explains why informants afterwards rated rational behaviour as medium.

SDM Outcomes

In line with the quality of the SDM process, SDM outcomes were assessed as medium also. Especially when asked six years later, collective commitment and insights from this project were felt to be low, although back in 1992 these had still received high marks (See Tables 3 and 4 below). The insights gained from the formal part of the SDM process were not implemented in the organisation and, in fact, the company in question has for many years afterwards been struggling with inter-BU collaboration.

Case 3: Designing a European Pharmaceuticals Distribution Network and Strategy

SDM Content and context

The content matter of case 3 posed some interesting design issues: how does one design a distribution network for a company that does not yet exist and a product that has unique requirements not found elsewhere? The context of this SDM situation was an American biotechnology start-up firm setting up operations in Europe. In itself, the pharmaceuticals industry was a fairly stable one, back in 1993. The turbulence in this case was generated internally: the company had developed a life-saving drug that has shown spectacular efficacy results in its clinical trials so far. The final round of clinical trials required by the Federal Drug Administration would soon be finalised. As soon as similarly positive results were obtained and publicised, the company could expect to be swamped with demands for its drug. So, problem urgency was very high indeed.

SDM Process

At the time the formal SDM process started, the entire European organisation consisted of a nucleus management team and a few dozen staff. It was with this nucleus that the SDM workshops were conducted.

This was a process where politics played only a minor part. If there were differences of opinion between the operations manager and the marketing manager or the general manager, these resulted in what Eisenhardt *et al.* label (1997) as “qualified consensus”. In practice, this meant that many of the logistics decisions were left to the operations manager, which resulted in

low involvement from the marketing and clinical side in the strategic deliberations. However, this did not stop the team from making a number of thorough quantitative analyses which were also confirmed by independent external studies, so rational behaviour in this case was pretty good (Akkermans 1995b).

SDM Outcomes

The SDM outcomes of this case appear paradoxical at first sight. On the one hand we find high levels of insights gained and strong collective commitment, even five years later. But, on the other hand, we find no implementation whatsoever. The reason for this was that, in the end, the clinical trials everyone had expected to be over soon turned out to contain negative results for the efficacy of the promising drug. As a result, the company had to cut back operations drastically, came near bankruptcy and was sold off to a competitor the next year, quite irrespective of its splendid European distribution strategy. If there is one clear example of which a choice focus can be problematic in turbulent environments, here is a point in case.

Case 4: Designing an Organisational Structure for Internationalisation of a professional Services Firm

Content and context

This case was with a different part of the same organisation in which Case 2 had taken place. However, the content-related and contextual differences with Case 2 were profound. Indeed, everything appeared to be different. Firstly, the company had doubled in size and vastly increased its international presence after merging with the former internal IT department of a major Dutch multinational manufacturing company. The organisational change implications of this recent merge were a source of turbulence in itself. The strategic issue to be investigated concerned another internal origin of turbulence. This concerned the question how to set up an effective international corporate governance structure.

Not surprisingly, this made the context for this case a highly political one. In the SDM workshops that were to be conducted, both country managers and central functional managers were to be present, all newly appointed. Both the founder-CEO was present as well as his newly appointed successor. Finally, turbulence was also external: this process took place at a time when the entire European IT industry was in a state of flux as one merger or acquisition after another pointed at a period of consolidation.

SDM Process

In retrospect, given the extreme political sensitivity of the issue and the low problem tangibility, it was not surprising that the SDM sessions resulted in a complete failure. Discussions went nowhere and a workshop planned for two days was broken off after the first day. Political behaviour was ubiquitous and, culturally speaking, no one really wanted to speak openly. Obviously, as a result, most of the analyses that were originally planned did not take place.

SDM Outcomes

Not surprisingly either, the outcomes from this SDM process were rated as strongly negative. Little was learned about the issue, and the analytical findings that were obtained and written down in a final report were not shared with participants so obviously there was no collective commitment regarding their implementation. The company has been struggling with its internationalisation for several years until it was taken over by a larger competitor.

Case 5: Evaluating Branch Office Network Effectiveness in Retail Banking

SDM Content and context

This fifth case was situated in the consumer banking industry. The strategic issue in this case concerned the alignment in size and composition of its branch office networks with size and distribution of its customer population. At the time, this usually implied closing or partially closing branch offices in less populated and affluent regions and removing specialised services from smaller branches. The turbulence in this case was therefore mainly external.

Interestingly, this was a complete reversal from the strategy followed a decade before. As its competitors had done, but more extensively than those, the bank in question had then invested heavily in establishing full-service branch offices throughout the country, only to find that changing customer preferences and technological progress had invalidated this policy. In 1994, the bank in question and its competitors were all in the process of cutting cost through rationalising their branch office networks.

The content matter was technically complex and not really tangible, but the organisational context was favourable. On average the political sensitivity of the issue was low; internal consultants specialising in this area as well as the branch office managers who participated in the effort were quite willing to co-operate. At the same time, problem urgency was high because the major cost-cutting exercise the company was undergoing the time spurred demand with local bank management teams for support for this type of strategic analysis.

SDM Process

In a series of some seven workshops, a group consisting of retail bank managers and internal consultants developed a sound analysis, codified in a well-documented and formalised model that could guide bank managers in making specific decisions regarding specific branch networks. The SDM process that was followed was exemplary. Although the issue was complex, all the required analyses were felt to have been made. Political behaviour remained very limited and cultural behaviour was strongly supportive and open.

SDM Outcomes

The outcomes of this SDM process have been very favourable indeed. In 1998, four years after the workshops, the model that was developed and in which all the relevant findings from the group were accumulated in computerised format was still operational and had been used several dozens of times. Collective commitment was still very high, as was participants' assessment of the level of insight gained through this process.

Case 6: Achieving Insight in Supply Chain Dynamics in the Semiconductor Industry

SDM Content and context

The content matter of this case is a notorious one in the high tech electronics industry: how to steer safely through the steep ups and downs of the business cycle. The company was a large European semiconductor manufacturer, with his home base in The Netherlands, itself part of a large electronics company. The issue at stake was how to achieve better insight into the drivers of business cycles, both in the short term and in the longer term, and derive recommendations for strategic supply chain design and co-ordination from those.

As such, the SDM context for this case was mixed. On the one hand, politics was not an issue: the group of participants consisted of logistics managers, many of whom had known each other for a long time and who met here in absence of their business managers. But, time was

increasingly pressing on this group precisely because of a steep upturn in the semiconductor business cycle and associated control problems for supply chain management. And yet, problem urgency could be formulated as modest because this particular project was never expected to solve the many pressing short-term supply chain control problems this company was facing.

SDM Process

This mixed picture in the context has seeped through in the SDM process and outcomes, it would seem. Communication in the group was very good, politics were non-existent and involvement was good. Yet the formal SDM process was abandoned after its first phase of problem conceptualisation because of the extreme time pressures the group was facing in their daily work. This made quite some of the analyses incomplete, resulting in only medium rational behaviour.

SDM Outcomes

This mixed picture also returns in our findings for SDM outcomes. Evaluation interviews conducted after the formal SDM process had ended show considerable learning effects at individual and group level as well as strong collective commitment to act upon those. But also, even four years later, very little implementation of the ideas generated in this effort had taken place. Indeed, the business is as hectic as it ever was, making it very difficult to sit back and really think about the fundamental nature of the business cycle. According to some authors, this persistent inability to reflect upon longer-term trends may well, according to some authors, be in itself an important explanation for the viciousness of that very same business cycle (c.f. Forrester 1961, Meadows 1970).

CROSS-CASE ANALYSIS

In this section we contrast our research model with the results from our cross-case analysis. First, we will establish that these were indeed six *turbulent* settings of strategic decision-making. Then, we will investigate the relation between the strength of the strategic momentum and the degree of implementation of decisions and will notice that this relation is problematic, as one could expect in a turbulent setting. Thirdly, we will look at the various ways in which SDM process aspects affect strategic momentum. And, finally, we assess the sustainability of strategic momentum over time.

Six turbulent settings of SDM

As becomes apparent from Table 2, these were all turbulent settings for strategic decision-making. Only case 1 was rated by our case informants as just “complex”, not “very complex”, but, in this case, the rate of change experienced was such that bankruptcy was just around the corners if dramatic changes were not accomplished soon.

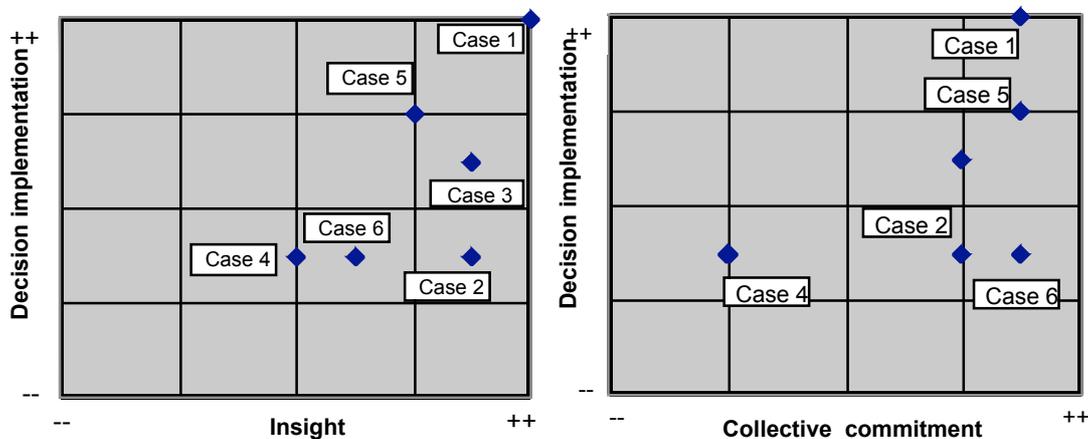
Table 2
Cross-Case Data on Indicators for SDM Turbulence

Construct/Indicator	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
<i>Problem complexity</i>	+	++	++	++	++	++
<i>Problem urgency</i>	++	+/-	++/-	+	+	+/-

Strategic momentum and organisational action

Then we turn at the relations between strategic momentum and organisational action visualised in Figure 2. So far we have repeatedly noted that, conceptually speaking, the relation between a specific decision or choice in an SDM process and the organisational is a problematic one, especially in turbulent settings. This is confirmed by the patterns shown in Figure 2. The scores for both strategic momentum (insight and collective commitment) and organisational outcomes (decision implementation) are visualised here. (Data for these are listed in table 3). This plot shows that the answer to our first research question is a negative one: in these six cases, there was not a clear relation between strength of strategic momentum and subsequent organisational actions.

Figure 2
Scatter Plots of Insight and Collective Commitment versus Decision Implementation
(1st wave assessments only)



The left plot shows case-by-case data pairs of the level of insight and organisational outcomes, i.e., decision implementation. The right graph plots collective commitment versus decision implementation.

Both plots show that there is no clear correlation in sight. If we look at the individual case evidence, this becomes all the more apparent. In one case, Case 3, insights and collective commitment were fine but the company's main product turned out to be worthless. In another, Case 6, strategic momentum was very high but higher management stopped implementation of the findings. In Case 2, quite some insights were gained but organisational actions would require a fundamental organisational redesign and hence did not take place.

So, in all cases it was forces outside of the group of people directly involved in the SDM process that frustrated implementation; that is, turbulence. Although these are not shown in the plots, it should be noted that the longer-term scores for these indicators suggest even less a positive correlation between aspects of strategic momentum and organisational outcomes.

Table 3
Cross-Case Data on Indicators for SDM Process Constructs

Construct/Indicator	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
<i>Rational behaviour</i>	+	+/-	+	-	+	+/-
• Completeness	+/-	+/-	+/-	+/-	+	+
• Thoroughness	+	-	+	--/	+/-	+/-

• Focus	++	+	+	--	+	+/-
<i>Political Behaviour</i>	-	-	-	++/+	-/+	--/-
• Political Sensitivity	+/-	-/+	-/+	++	-/+	-
• Openness of Communication*	++	++	++	-	+	++
<i>Cultural Behaviour</i>	+/-	+/-	+/-	-	+	++
• Willingness to co-operate	-/+	+	+	--	+	++
• Involvement	+	+/-	-	-/+	+	++

*: Inverse coding used in determining score for political behaviour

Relations between process quality and strategic momentum

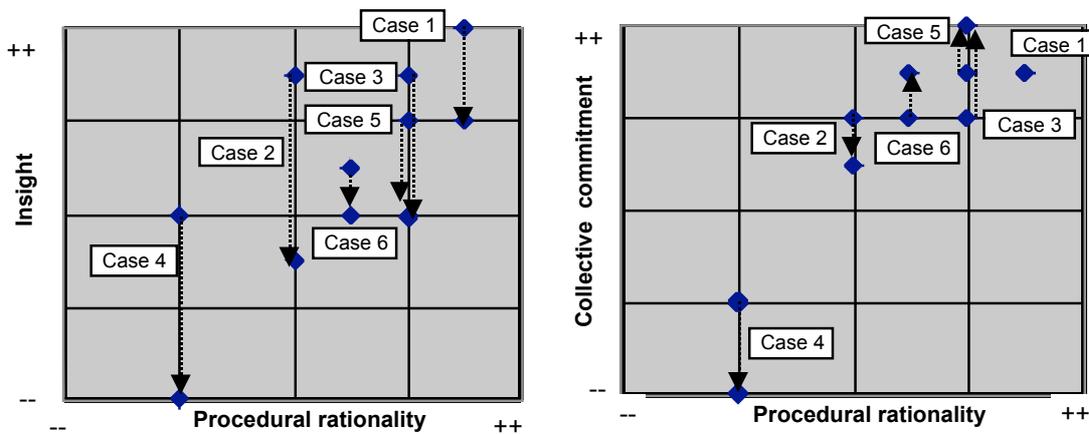
Our second research question concerned the relation between process quality and strategic momentum. Since we have distinguished three aspects of process quality (rationality, politics and culture) and two aspects of strategic momentum (insights and collective commitment, this means looking at six scatter plots. These are shown in Figures 3 tot 4. These scatter plots are more complex in form than the previous ones. This is because they contain not just the case data pairs for the 1st wave of assessments, but also the scores for the longer-term assessments of strategic momentum, obtained during the 2nd wave of interviews, 4-6 years after the SDM process had been completed. In the plots, this is visualised by vertical arrows showing the delta from the original measurement to the later one.

What we can distil from these complex charts is that there is a clear positive impact from more rational analysis, some positive impact from “cultural behaviour”, i.e., open and active communication, and that there was no clearly observable relation between political behaviour and strategic momentum in these six cases. The scores for the data contained in these plots can be found in Table 3 above and Table 4 below.

The impact of rationality on strategic momentum

A SDM process in which rational analysis plays an important part would appear to reinforce both the level of learning taken place as well as the collective commitment to translate that learning into action. Such becomes apparent from glancing over the two scatter plots in Figure 3. This is true for the assessments shortly after the formal SDM process as well as four years later, only then with considerably lower reported levels of insights gained. Look for instance at the data for Case 2: an outlier in the first wave of data, since one would expect either more rational behaviour or a lower state of strategic momentum here. But, interestingly, this is also a case where six years strategic momentum is found to be much lower than in most cases.

Figure 3
Scatter Plots of Rational Behaviour versus Insights Gained and Collective Commitment (1st and 2nd wave measurements combined)

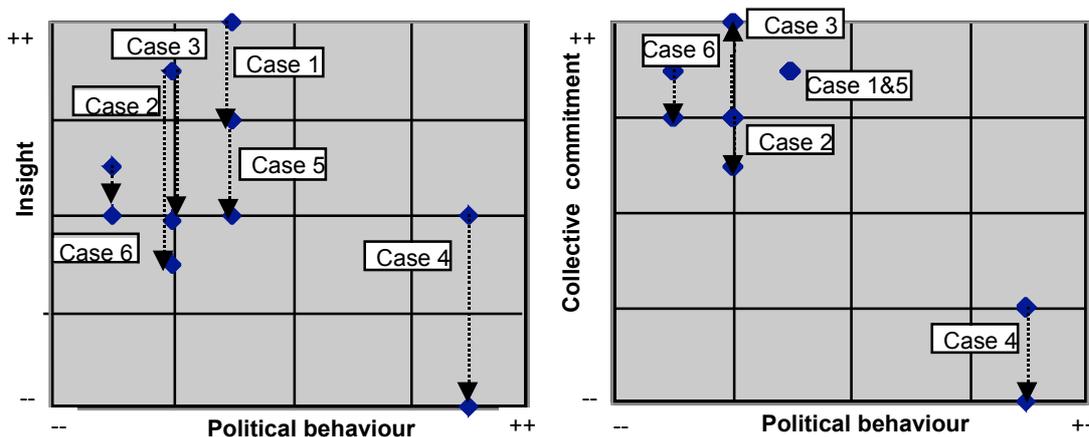


The impact of politics on strategic momentum

It is not possible to spot clear trends from the two scatter plots in Figure 4 for the level of political behaviour in the SDM process versus insights gained and collective commitment. At least partly, this is an issue of available data range. In the six cases studied, on average politics remained limited, with the clear exception of Case 4, a very much politically loaded setting indeed. So, we observe a cluster of limited political behaviour and considerable strategic momentum on the one hand, and a single case, Case 4, with high political activity and low strategic readiness on the other hand.

The fit is relatively better for the first-wave data. There, cases 1 and 6 appear to be outliers to some extent. Case 6 scores lower than might be expected on insight, but we know that this process was abandoned prematurely, resulting in fewer analytic findings than required. And we do find Case 1 with better insight and collective commitment than expected, but we know that the political behaviour in this case took place mainly outside of the group of middle managers who participated directly in the SDM process and who were interviewed afterwards. Four to six years later, the data do not suggest any clear patterns any longer.

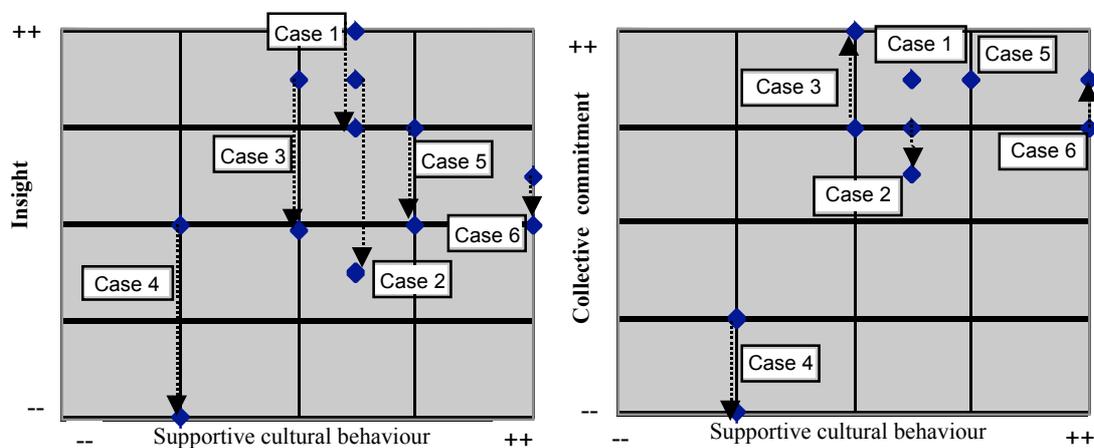
Figure 4
Scatter Plots of Political Behaviour versus Insights Gained and Collective Commitment (1st and 2nd wave measurements combined)



The impact of cultural behaviour on strategic momentum

The scatter plots in Figure 5, which show the data for supportive cultural behaviour versus insights gained and collective commitment, appear to be somewhat half-way between those for rationality and politics. That is, where the plots for rationality strongly suggest a positive relationship and the data for the impact of politics are clearly inconclusive, especially for the longer-term, Figure 5 suggests some correlation, but a fairly weak one. The link between supportive cultural behaviour and collective commitment here is the clearest one. Since the scores for collective commitment remain stable over time as we will see, this link is upheld for the longer term as well, with the exception of Case 3, which becomes a positive outlier in the longer term.

Figure 5
Scatter Plots of Cultural Behaviour versus Insights Gained and Collective Commitment (1st and 2nd wave measurements combined)



Sustainability of strategic momentum

Our third research question concerned the sustainability of strategic momentum. We stated that, from a perspective of organisational change, a strategic momentum that dies out relatively soon is of little value to the organisation. Perhaps the most surprising finding from our data analysis is that, in the six cases evaluated, the relative levels of strategic momentum were very robust, even some five to six years after the original SDM process proper had taken place. This is shown in Table 4, which contains the results of the two waves of data gathering on SDM outcomes.

TABLE 4

Results of Two Waves (1992-1994 and 1998) of Data Gathering on SDM outcomes

Case #	Time Lapsed	Insight		Collective Commitment		Decision Implementation	
		1 st wave	2 nd wave	1 st wave	2 nd wave	1 st wave	2 nd wave
1	6	++	+	++/+	+	+	+
2	6	++/+	-/+	+/-	+/-	-/+	-
3	5	++	+/-	++/+	++	+/-	--
4	5	+/-	--	--/-	--	-/+	--
5	4	+	+/-	++/+	++/+	+	++
6	4	+/-	+/-	++/+	+	-/+	-

This is especially the case for collective commitment. Here, in two cases the original level has actually gone up since then (Cases 1 and 3) and on average remains at a stable high level of + (and even higher without the outlier of case 4). This contrasts with the delta in the perceived level of insight gained from the SDM process, which is greater, on average a change from + to +/-.

DISCUSSION

Reflection: SDM back to the roots of strategy?

In this article, we have presented our concept of strategic momentum as the desired outcome of SDM in turbulent settings as a novel one. We might as well have introduced it as the revival of a very old one. If we look back beyond the thirty-odd years of modern strategy theory into history, we find many parallels in what many consider to be the basis of modern strategic thinking, i.e., theories about how best to conduct warfare.

Over two-and-a-half millennium ago, the Chinese strategist Sun Tzu already stressed the need for “insight” in turbulent settings, for what we have called rationality in the SDM process leading to insights gained, as becomes apparent from the short quote from his “The Art of War” at the beginning of this article (Wing 1989). Likewise, over one-and-a half century ago, von Clausewitz stressed that the most carefully thought-out plan is likely to become obsolete as a result of unforeseen events and reactions of the enemy. Specific decisions made beforehand are of little use in the turbulent setting of war, as the adjacent quote from his classic “On War” from 1832 indicates (von Clausewitz 1997). What these classical authors do not emphasise and we do in our concept of strategic momentum is the *group* aspect of insight and commitment, which comes so natural to us in our modern organisational life. They still write for the lonely man at the top, not for his loyal band of fellow decision-makers. Perhaps this may then count as a modern innovation to the classical adage that “no battle-plan survives first contact with the enemy” (Hindle 2002).

Limitations and suggestions for further research

The research reported here is one of the few empirical investigations of SDM outcomes operating from a change focus. By necessity, our exploratory research effort has several shortcomings. Two of these are quite obvious and are related to the nature of our sample size of six cases. Two others are more subtle and refer to the timing of our observations.

Firstly, there is the problem of only six cases. This makes our dataset rather limited, which is especially cumbersome if there is little variation in the variables of interest. One clear example is the fact that most of our cases contained little political behaviour, which makes it difficult to assess the impact of politics during the SDM process on strategic momentum.

Another shortcoming regarding our sample size is that we have not taken into account the nature of the content of the issue at stake on the SDM process and outcome. Both Hickson et al. (1986) and Nutt (1993a, 1993b) suggest that the nature of the decision content influences the decision-making mode and hence, possibly, the quality demands with respect to the SDM process. Of our six cases, four were clearly related to operations management issues, the two others also so to a lesser extent, which leaves little room for assessing the impact of content.

Two other shortcomings of this research have to do with the fact that it is only longitudinal in a very limited sense: we have measured SDM process outcomes at two points in time only. What we cannot say on the basis of our data is how strategic momentum evolves over time. We only know that, in the successful cases we investigated, it was surprisingly robust after four to six years. There are at least two areas in which this is especially unfortunate. One is that it would be nice to see if strategic momentum would remain equally solid in settings of extreme turbulence, such as in a refugee camp in Africa (Mintzberg 2001). This would address the interesting question of how the half-life of strategic momentum depends on the turbulence of the setting.

A final shortcoming of the present research and, at the same time, an opportunity for qualitative, longitudinal follow-up research, is that of the relation between strategic momentum and business results. We have established that specific the dependence between specific decisions and business results is problematic, certainly in turbulent settings. But, would the relation between strategic momentum and business results be equally problematic? These questions would be our suggested battle plan going forward.

Managerial implications

As a recent *Economist* article has pointed out, although many strategic planning departments have been closed in the past decade, this does not mean that strategic planning itself is out of favour with senior managers (Hindle 2002). On the contrary, the “fine art of being prepared” is more important than ever. Managerial implications of this are twofold. Firstly, do not search for a single strategic plan that can solve all business problems, but rather make your ability to think strategically so strong and flexible that you can put almost any plan in action, depending on the circumstances of the time.

Secondly, aim to develop groups of managers that can think strategically; encourage them to look beyond the current business issue and today’s horizon and think fundamentally about the nature of their business, as a group. This will be well worth the investment: as our research suggests, this investment will still pay off many years later, for as long as this group stays on board.

CONCLUSIONS

We have developed a research model for Strategic Decision-Making in turbulent settings based on a change focus. In this model the desired direct outcome of a well-designed SDM-process is not only an initial choice – as is the case for models on the basis of a choice focus – but also the resulting strategic momentum, defined as the combination of insight and collective commitment. In our model the quality of the SDM-process is driven by rational, political and cultural behaviour.

In our evaluation of six cases of SDM processes, we have found that the relation between strategic momentum and direct organisational action is an unclear one, as a result of environmental turbulence. We have also found that rational behaviour during the SDM process indeed has a positive impact on both insight and commitment and that cultural behaviour stressing open communication has positive impact on commitment. We have not found a clear relation between political behaviour and on strategic momentum in our cases studied. Perhaps our most surprising empirical finding was that high quality SDM-processes do indeed lead to a level of strategic momentum that can be sustained for at least four to six years after the original SDM process has taken place.

REFERENCES

- ACKOFF, R.L. (1979). The Future of Operational Research is Past. *Journal of the Operational Research Society* 30(2), 93-104.
- AKKERMANS, H.A. (1993). "Participative Business Modelling to Support Strategic Decision Making in Operations - A Case Study", *International Journal of Operations & Production Management* Vol. 13, No. 10, 34-48.
- AKKERMANS, H.A. (1995a). *Modeling with Managers. Participative Business Modeling for Effective Strategic Decision-Making*, Eindhoven: Eindhoven University of Technology.
- AKKERMANS, H.A. (1995b). Developing a logistics strategy through Participative Business Modeling. *International Journal of Operations & Production Management*, 15(11), 100-112.
- AKKERMANS, H.A. and VENNIX, J.A.M. (1997). "Clients' Opinions on Group Model-Building: An Exploratory Study", *System Dynamics Review* 13(1), 3-31.
- AMASON, A.C. (1996). Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: Resolving a paradox for top management teams. *Academy of Management Journal*, 39, 123-148.
- ANDREWS, K.R. (1971). *The Concept of Corporate Strategy*. Homewood: Richard D. Irwin.
- ANSOFF, H.I. (1965). *Corporate Strategy: An Analytic Approach to Business Policy for Growth and Expansion*. New York: McGraw-Hill.
- ARGYRIS, C. and SCHÖN, D.A. (1978). *Organizational learning. A theory of action perspective*. Reading, MA: Addison-Wesley.
- AXELROD, R. (1997). *The complexity of cooperation. Agent-based models of competition and collaboration*. Princeton, NJ: Princeton University Press.
- BELL, G.G., BROMILY, P. and BRYSON, J. (1998). Spinning a complex web: Links between strategic decision making context, content, process and outcome. In V. Papadakis and Barwise, P. *Strategic Decisions*, 164-178. Dordrecht/Boston/London: Kluwer.
- BOULDING, E. (1956). General systems theory — The skeleton of science. *Management Science*, 2: 197-208.
- BOURGEOIS, L.J. (1980). Performance and consensus. *Strategic Management Journal* 1, 227-248
- BOURGEOIS, L. and EISENHARDT, K. (1988). Strategic decision processes in the microcomputer industry. *Management Science*, 34, 816-835.
- BROWN, S.L. and EISENHARDT, K.M. (1998). *Competing on the edge. Strategy as structured chaos*. Boston 1998, Harvard Business School Press.
- BRUNSSON, N. (1993). Ideas and Actions: Justification and Hypocrisy as alternatives to Control. *Accounting, Organization and Society* 18(6), 489-506
- BRYSON, J.M. and BROMILY, P. (1993). Critical factors affecting the planning and implementation of major projects. *Strategic Management Journal* 14, 319-337

- CHAFFEE, E.E. (1985). Three models of strategy. *Academy of Management Review* 10(1), 89-91.
- COHEN, M.D., MARCH, J.G. and OLSEN, J.P. (1972). 'A garbage can model of organizational choice' *Administrative Science Quarterly* 17, 1-25.
- DAS, T.K. (1999). Cognitive biases and strategic decision processes: an integrative perspective. *Journal of Management Studies* 36(6), 757-778
- DE GEUS, A. (1988). Planning as learning. *Harvard Business Review* 66(2), 70-74.
- DE GEUS, A. (1997). *The living company*. Boston, MA: Harvard Business School Press.
- DEAN, J.W. and M.P. SHARFMAN. (1993a). The relationship between procedural rationality and political behaviour in strategic decision making. *Decision Sciences*, 24, 1069-1083.
- DEAN, J.W. and M.P. SHARFMAN. (1993b). Procedural rationality in the strategic decision making process. *Journal of management studies* 30, 607-630.
- DEAN, J.W. and M.P. SHARFMAN. (1996). Does decision process matter? A study of strategic decision making effectiveness. *Academy of Management Journal*, 39, 368-396.
- DUTTON, J.E., FAHEY L. and NARAYANAN V.K. (1983). Toward understanding strategic issue diagnosis. *Strategic Management Journal* 4(4), 307-323.
- EISENHARDT, K.M. and BOURGEOIS, L.J. (1988). 'Politics of strategic decision making in high velocity environments: Towards a midrange theory' *Academy of Management Journal* 31, 737-770.
- EISENHARDT, K.M. (1989). Building theories from case study research, *Academy of Management Review*, 14(4), 532-550.
- EISENHARDT, K.M. (1998). "Strategic decision-making as improvisation", In V. Papadakis and P. Barwise, *Strategic Decisions*, 251-257. Dordrecht/ Boston/ London: Kluwer.
- EISENHARDT, K.M., KAHWAJY, J.L. and BOURGEOIS, L.J. (1997). How management teams can have a good fight, *Harvard Business Review*, 75(4), 77-85.
- EISENHARDT, K.M. and ZBARACKI, M.J.(1992). Strategic Decision making. *Strategic Management Journal* 13, 17-37
- EMERY, F.E. and TRIST, E.L.(1965). The Causal Texture of Organizational Environments. *Human Relations*, February, 21-32
- FLICK, U. (1998). *An Introduction to qualitative research*. Sage, London.
- FOLSOM, M.B. (1962). *Executive Decision Making*. New York: McGraw-Hill.
- FORRESTER, J.W. (1961). *Industrial Dynamics*, Cambridge, MA: MIT Press.
- FREDRICKSON, J.W. (1984). 'The comprehensiveness of strategic decision processes: extension, observations, future directions'. *Academy of Management Journal* 27, 445-466.
- GILL, J. (1983). Research as action: an experiment in utilising the social sciences. In: F Heller (ed.) *The use and abuse of social science*. SAGE, London.
- GUBA, E.G. and LINCOLN, Y.S. (1981). *Effective evaluation*. San Francisco: Jossey-Bass.
- GUTH, W. and MACMILLAN I. (1986). *Strategic Management Journal* 7, 313-327
- HARRISON, E.F. (1987). *The managerial decision-making process*. (3rd ed.) Boston: Houghton Mifflin.
- HARRISON, M.I. and PHILIPS, B. (1991). 'Strategic Decision Making: An integrative explanation' *Research in the Sociology of Organizations* 9, 319-358.
- HATCH, M.J. (1997). *Organization Theory: Modern, Symbolic and Postmodern Perspectives*. Oxford: Oxford University Press.
- HENDRY, J. (2000). Strategic decision making, discourse and strategy as social practice. *Journal of Management Studies* 37(7), 955-977
- HICKSON, D.J., BUTLER, R.J., CRAY, D., MALLORY, G.R. and WILSON, D.C. (1986) *Top Decisions: Strategic Decision-Making in organizations*. London: Basil Blackwell
- HINDLE, T. (2002) "Back to basics. A survey of Management". *The Economist*, March 9, 2002.

- HITT, M. and TYLER, B. (1991). Strategic decision models: Integrating different perspectives. *Strategic Management Journal* 6(2), 171-180.
- HOFSTEDE, G. (1991). *Cultures and Organizations*. London: McGraw-Hill Book Company.
- HOLLAND, J.H. (1998). *Emergence: From chaos to order*. Reading, MA: Addison-Wesley.
- JANIS, I.L. (1982). *Groupthink: Psychological Studies of Policy Decisions and Fiascoes* (2nd ed.). Boston: Houghton Mifflin Company.
- KAUFMANN, S. (1995). *At home in the universe. The search for the laws of self-organization and complexity*. Oxford, Oxford University Press.
- KORSGAARD, M.A., SCHWEIGER, D.M. and SAPIENZA, H.J. (1995). Building commitment, attachment, and trust in strategic decision making teams: The role of procedural justice. *Academy of Management Journal*, 38, 60-84.
- LEVITT, B. and NASS, C. (1989). 'The lid on the garbage can: Institutional constraints, on decision-making in the technical core of college-text publishers'. *Administrative Science Quarterly* 34, 190-207.
- LEWIN, K (1997) "Field theory and experiment in social psychology" (Originally published in 1942). In: *Resolving social conflicts and Field theory in social science*, American Psychological Association, Washington.
- LINDBLUM, C.E.(1959). The Science of Muddling Through. *Public Administration Review*, 79-88
- MAGJUKA, R. (1988). 'Garbage can theory of decision-making: A review'. *Research in the Sociology of Organizations* 6, 225-259.
- MARCH, J.G. and OLSEN, J.P. (1976). *Ambiguity and Choice in Organizations*. Bergen: Universitets forlaget.
- MARCH, J.G. and WEISSINGER-BAYLOU, R. (1986). *Ambiguity and Command: Organizational Perspectives or Military Decision Making*. Marshfield: Pitman Publishing.
- MCGRATH, J.E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall.
- MEADOWS, D.L. (1970). *Dynamics of commodity production cycles*. Cambridge, MA: Wright-Allen Press.
- MILES, M. and HUBERMAN, A.M. (1984). *Qualitative Data Analysis. A Sourcebook of New Methods*, London: Sage.
- MILES, R.E. and SNOW, C.C. (1978). *Organizational Strategy, Structure and Process*. New York: McGraw-Hill.
- MILLER, D. and FRIESEN, P.H.(1980). Momentum and revolution in organizational adaptation. *Academy of Management Journal* 23, 591-614
- MILLER, D. and FRIESEN, P.H.(1982). Innovation in Conservative and Entrepreneurial Firms: Two Models of Strategic Momentum. *Strategic Management Journal* 3,1-25
- MINTZBERG, H. (2001) Managing exceptionally. *Organization Science* 12(6), 759-777.
- MINTZBERG, H. and QUINN, J.B. (1992). *The Strategy Process: Concepts, Contexts, Cases*. (2nd ed.). Englewood Cliffs: Prentice Hall.
- MINTZBERG, H. and WATERS, J.A. (1982). 'Tracking strategy in an entrepreneurial firm' *Academy of Management Journal* 25, 465-499.
- MINTZBERG, H. and WATERS, J.A. (1990) Does Decision Get in the Way? *Organization Studies* 11(1), 1-6
- MINTZBERG, H. (1990). The design school: Reconsidering the basic premises of strategic management. *Strategic Management Journal* 11, 171-195.
- MINTZBERG, H., RAISINGHANI, D. and THÉORET, A. (1976) 'The structure of unstructured decision-processes' *Administrative Science Quarterly* 21, 246-275.

- MONTGOMERY, C.A., WERNERFELT, B. and BALAKRISHNAN, S.(1989). Strategy context and the research process: a critique and commentary. *Strategic Management Journal* 10, 1189-1197
- NUTT, P.C.(1993a). The formulation processes and tactics used in organizational decision making. *Organization Science* 4, 226-251
- NUTT, P.C.(1993b). The identification of solution ideas during organizational decision making. *Management Science* 39, 1071-1085
- NUTT,P.C. (2000). Decision-making succes in public, private and third sector organizations: finding sector dependent best practice. *Journal of Management Studies* 37(1), 77-108
- PAPADAKIS, V.M., LIOULAS, S. and CHAMBERS, D. (1998). Strategic decision-making processes: The role of management and context. *Strategic Management Journal* 19, 115-147.
- PAPADAKIS, V.M. and BARWISE, P. (1998). *Strategic Decisions: 17-33*. Dordrecht/ Boston/London: Kluwer.
- PENNINGS, J.M. (ed) (1985). *Organizational Strategy and Change: New Views on Formulating and Implementing Strategic Decisions*. San Francisco: Jossey-Bass
- PETTIGREW, A.M. (1990) Studying Strategic Choice and Strategic Change. A Comment on Mintzberg and Waters: ‘Does Decision get in the Way?’ *Organization Studies* 11(1), 6-11
- PETTIGREW, A.M. (1973). *Politics of Organizational Decision-Making*. London: Tavistock.
- PFEFFER, J. (1981). *Power in Organizations*. Marshfield: Pitman Publishers.
- PFEFFER, J. (1992). *Managing in with Power: Politics and Influence in Organizations*. Boston: Harvard Business School Press.
- PORTER, M.E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press.
- QUINN, J.B. (1980). *Strategies for Change: Logical Incrementalism*. Homewood: Richard D. Irwin.
- QUINN, J.B. (1989). ‘Strategic Change. Logical Incrementalism’. *Sloan Management Review*. summer, 45-60.
- RAJAGOPALAN, N., RASHEED, A.M.A. and DATTA, D.K. (1993). ‘Strategic Decision Processes: Critical Review and Future Directions’ *Journal of Management* 19, 349-384.
- RAJAGOPALAN, N., RASHEED, A., DATTA, D.K. and SPREITZER, G.M. (1998). A multi-theoretic model of strategic decision-making process, In V. Papadakis and P. Barwise, *Strategic Decisions*, 229-249. Dordrecht/Boston/London: Kluwer.
- REASON, P. and BRADBURY H (eds) (2000) *Handbook of Action Research: Participative Inquiry and Practice*. SAGE, London .
- RUMELT, P.D., SCHENDEL, D.E. and TEECE, D.J. (1994). *Fundamental issues in strategy: a research agenda*. Boston: Harvard Business School Press.
- SCHEIN, E.H.(1969). *Process consultation: its role in organizational development*. Reading: Addison-Wesley
- SCHWEIGER, D.M., SANDBERG, W.R. and RECHNER, P.L. (1989). Experiential effects of dialectical inquiry, devil’s advocacy and consensus approaches to strategic decision making. *Academy of Management Journal*, 32, 745-772.
- SCHWENK, C.R. (1998). ‘Diversity, Eccentricity, and Devil’s Advocacy’, . In V. Papadakis and P. Barwise, *Strategic Decisions*, 85-106. Dordrecht/Boston/London: Kluwer.
- SENGE, P.M. (1990). *The Fifth Discipline. The Art and Practice of the Learning Organization*. New York: Doubleday Currency.
- SHARFMAN, M.P. and DEAN, J.W. (1997). Flexibility in strategic decision making: informational and ideological perspectives. *Journal of Management Studies* 34(2), 191-217
- SHARFMAN, M.P. and DEAN, J.W. (1998). The effects of context on strategic decision making processes and outcomes’. In V. Papadakis and P. Barwise, *Strategic Decisions*, 179-203. Dordrecht/Boston/London: Kluwer.

- STACEY, R.D. (1995). The science of complexity: an alternative perspective for strategic change processes *Strategic Management Journal*, 16, 477-495.
- STERMAN and MORECROFT (1994)
- TICHY, N.M. (1983). *Managing strategic change. Technical, political and cultural dynamics*. Chichester: Wiley.
- TRULL, S.G. (1966). Some factors involved in determining total decision success. *Management Science* 12, B270-B280
- VENNIX, J.A.M., AKKERMANS, H.A. and ROUWETTE, E. (1996). Group model-building to facilitate organizational change: An exploratory study, *System Dynamics Review*, 12(1), 39-58.
- VENNIX J.A.M. (1996). *Group Model-Building. Facilitating Team Learning Using System Dynamics*. Wiley, Chichester.
- VON CLAUSEWITZ, C. (1997). *On War*. Wordsworth: Ware.
- WALDROPP, M.M. (1992). *Complexity. The emerging science at the edge of order and chaos*. London: Penguin Books.
- WING, R.L. (1989). *The art of strategy. A New Translation of Sun Tzu's classic The Art of War*. Aquarian Press, Wellingborough.
- WITTE, E. (1972). 'Field Research on Complex Decision Making Processes: The Phase-Theorem'. *International Studies of Management and Organization*, 156-182.
- WOOLRIDGE, B. and FLOYD, S.W. (1990). The strategy process, middle management involvement, and organizational performance. *Strategic Management Journal*, 11, 231-241.
- YIN, R. K. (1989). *Case Study Research: Design and Methods*, London: Sage.