Strategic issue diagnosis:
The roles of organizational scanning, information processing structure of top management teams, and managers' cognitive complexity

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Acknowledgements

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Abstract

Managers in organizations are continuously confronted by an array of ambiguous data and vaguely felt stimuli which they must somehow order, explicate and imbue with meaning before they decide on how to respond. This study of 162 members of organizations' top management teams employed a cross-level analysis to investigate how individual-, group- and organizational-level factors relate to how managers diagnose strategic issues. Findings show that managers' cognitive style, the information processing structure of top management teams, and organizational scanning, each are uniquely related to how managers makes sense of environmental trends or events. Thus, contrary to previous issue interpretation research, individual characteristics were found to be related to strategic issue diagnosis. Moreover, different forms of organizational scanning were differently associated with managers' sensemaking. Finally, the relationship between cognitive style and strategic issue diagnosis was moderated by the level of organizational information processing. The discussion addresses the implications of these findings for future research on strategic issue diagnosis.

INTRODUCTION

How organizational members conceptualize and make sense of their organizational worlds has been an important topic in organizational science during the past twenty years (Porac, Meindl, and Stubbart 1996). This dissertation is an attempt to contribute to this research by identifying and empirically testing the impact of factors influencing how managers' diagnose strategic issues. It intends to add to research literature on strategic issue diagnosis by: (1) refining and extending the conceptual and empirical basis of strategic issue diagnosis; (2) empirically testing antecedents at the individual, group and organizational level of analysis; and (3) introducing previously untested antecedents to strategic issue diagnosis.

1.1 Strategic issue diagnosis

The open system metaphor underlying most research on strategy and organizational decision making emphasizes organizations' dependence on their surrounding and ever-changing environments (Aldrich and Marsden 1988). Classical work on organization-environment relations have treated these ever changing environments either as pools of information (e.g. Dill 1958; Duncan 1972) or as stocks of resources (e.g. Aiken and Hage 1968; Pfeffer and Salancik 1978; Thompson 1967). In both these perspectives, organizations depend on the environment for scarce and valued resources and must often cope with unstable, unpredictable external events, which in turn create organizational uncertainty. In order to reduce this uncertainty, organizations gather information from the environment and seek cooperative arrangements with other environmental agents (e.g. Thompson 1967). However, such uncertainty-reducing behavior should not be seen as simple organizational techniques used to cope with their external environment. As Weick (1979a) argued, organizational environments are created through processes of selective attention. Managers in organizations are continuously confronted by an array of ambiguous data and vaguely felt stimuli which they must somehow order, explicate and imbue with meaning before they decide on how to respond (Dutton, Fahey, and Narayanan 1983). In other words, they must diagnose strategic issues, which is the overall topic of the present study.

When environmental data and stimuli signify some kind of importance to the firm, they are often referred to as *strategic issues*. Following Ansoff (1980) and Dutton, Fahey and Narayanan (1993), strategic issues refer to emerging developments, trends or events which in the judgment of some strategic decision makers is likely to have the potential to affect organizational performance. Thus, no issue is inherently strategic. Rather, an issue becomes strategic when managers believe that it has relevance for organizational performance (Dutton and Ashford 1993). However, this does not preclude the possibility that managers fail to notice or misinterpret important developments, trends or events.

Strategic issues involve matters other than tactical or operational concerns and usually concern whole organizations and their goals (Dutton 1986b; Ginsberg 1988). The potential impact of such issues is uncertain (Mintzberg, Raisinghani, and Theoret 1976), which make them ill structured and ambiguous (Lyles 1981), and open to multiple interpretations (Daft and Weick 1984). As such, strategic issues are not "prepackaged"; rather, managers identify, interpret and formulate them by selectively attending to some aspects of their environment while ignoring others (Cowan 1986; Thomas, Shankster, and Mathieu 1994). Such mental processes refer to the concept *strategic issue diagnosis*, which in the present study is defined as the individual level, cognitive process through which managers notice and form interpretations about environmental developments, trends or events.

Strategic issue diagnosis is the starting point for the formulation of strategy and strategic decision making in organizations (e.g. Mintzberg, Raisinghani, and Theoret 1976). Its importance stems from its pervasiveness and centrality in the context of strategic decisions, its impact upon later decision phases and its potential for changing managers understanding of their internal and external environment (Dutton, Fahey, and Narayanan 1983). Strategic issue diagnosis is held to critically affect both the process and content of subsequent phases of strategic decision making (Dutton, Fahey, and Narayanan 1983) and thus organizational choice and action (e.g. Daft and Weick 1984; Thomas, Clark, and Gioia 1993). In other words, the responses to an organization's environment, and ultimately, the organization's performance, may be highly dependent on managers ability to notice and adequately interpret the strategic

environment of the organization (Daft and Weick 1984; Dutton, Fahey, and Narayanan 1983; Huber and Daft 1987). Over the past ten years, empirical evidence has also shown that managers' strategic issue diagnosis makes a difference in terms of patterns of action, commitments to organizational change, and organizational performance (Ginsberg and Venkatraman 1992; Ginsberg and Venkatraman 1995; Lant, Milliken, and Batra 1992; Meyer 1982; Thomas, Clark, and Gioia 1993). Accordingly, strategic issue diagnosis is arguably crucial to the organization (e.g. Daft and Weick 1984).

1.2 Purpose and contribution of the study

There are two particular findings from research in strategic issue diagnosis and related topics that have stimulated the present investigation.

First, even when exposed to identical developments, trends or events, different managers often understand them differently. For example, a situation that is viewed as a threat by some managers may be viewed as an opportunity by others (e.g. Dutton 1993a; Ginsberg and Venkatraman 1992; Jackson and Dutton 1988; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990). Such differences in strategic issue diagnosis have been attributed to differences in managers' individual attributes (e.g. Dutton 1993a; Dutton, Fahey, and Narayanan 1983; Ramaprasad and Mitroff 1984). It is also suggested that the differences may be, in part, the result of frameworks or contexts that direct information, attention and interpretation in organizations (Daft and Weick 1984; Kiesler and Sproull 1982). Accordingly, several authors have suggested that organizational and group characteristics are key determinants of how managers interpret the environment (e.g. Denison et al. 1996; Ginsberg and Venkatraman 1992; Huber and Daft 1987; Meyer 1982; Milliken 1990; Sutcliffe 1994; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991; Thomas, Shankster, and Mathieu 1994). Thus, strategic issue diagnosis should be seen as a product of multiple sources of influence (e.g. Thomas, Shankster, and Mathieu 1994). However, multiple context approaches to strategic issue diagnosis have mainly been theoretical (Denison et al. 1996; Thomas, Shankster, and Mathieu 1994). One purpose of the present study is to extend the inquiry to explore and empirically test the question of whether and how

antecedents at different contextual levels influence managers' noticing and interpretation of environmental developments, trends and events.

The second finding that has stimulated this study is that managers sometimes make serious mistakes in strategic issue diagnosis. That is, they fail to notice or misinterpret developments, trends or events (e.g. Dutton 1993b; Kiesler and Sproull 1982; Lai 1994; Lant, Milliken, and Batra 1992; Milliken and Lant 1991; Schwenk 1984; Starbuck and Milliken 1988; Zajac and Bazerman 1991). However, most previous strategic issue diagnosis research has not focused on mistakes or success in managers' noticing and interpretation. It has been predominantly occupied with a single strategic issue diagnosis dimension; whether or to what extent decision makers frame or label a particular environmental situation as an opportunity or a threat (e.g. Dutton, Walton, and Abrahamson 1989; Jackson and Dutton 1988; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991). Therefore, research that goes beyond the threat-opportunity issue and includes other dimensions of strategic issue diagnosis and interpretation in general is now needed (Sutcliffe 1994). Thus, the second purpose of the proposed research is to move beyond the investigation of whether antecedents at different levels are associated with threat-opportunity differences to explore whether multiple contexts affect other dimensions of strategic issue diagnosis.

Finally, to the extent that individual characteristics have been included in studies of strategic issue diagnosis, researchers have primarily been occupied with demographic variables like managers' age, organizational or executive tenure, education level and functional or occupational background. Psychological measures allow more specified explanations of the relationships under study, and they usually contain less noise than observable managerial characteristics (Hambrick and Mason 1984). Thus, research that goes beyond directly observable managerial characteristics and focuses on cognitive abilities or skills might be an important way to increase our understanding of strategic issue diagnosis.

Consequently, the present study adds to the research literature on strategic issue diagnosis by: (1) empirically testing antecedents at the individual, group and organizational level of analysis; (2) refining and extending the conceptual and

empirical basis of strategic issue diagnosis; and (3) introducing previously untested antecedents to strategic issue diagnosis.

1.3 Multiple contextual effects on strategic issue diagnosis

Despite the extensive research on strategic issue diagnosis over the last decade, little is known about the effect multiple contexts have on strategic issue diagnosis (Thomas, Shankster, and Mathieu 1994). Some contributions have examined individual, group, and organizational antecedents to strategic issue diagnosing and decision making (e.g. Hitt and Tyler 1991; Thomas and McDaniel 1990; Thomas, Shankster, and Mathieu 1994). Still, there is a need to continue to focus on antecedents at more than a single level of analysis if we are to develop our understanding of strategic issue diagnosis and its outcomes (Thomas and McDaniel 1990; Thomas, Shankster, and Mathieu 1994). The overall conclusion from existing research is that strategic issue diagnosis or decision making cannot be accurately modeled with one contextual level alone (Hitt and Tyler 1991; Thomas, Shankster, and Mathieu 1994). However, the link between multiple contexts and strategic issue diagnosis is a general research topic too broad to be thoroughly explored in a single contribution. Therefore, the scope of the present investigation is narrowed to one particular antecedent to strategic issue diagnosis at each of three following contextual levels; the individual, group and organizational level.

1.3.1 Organizational scanning

At the organizational level, the present study will investigate the effects of *organizational scanning* on managers' strategic issue diagnosis. Organizational scanning is defined as structured and deliberate efforts in acquisition, availability and use of environmental data, stimuli and information in order to monitor the organizational environment. Availability refers to how easily available environmental data, stimuli and information are for managers in the organization. Descriptive as well as normative literature stress the importance of monitoring and analyzing the external environment in order to provide early warning signals from emerging developments, trends and events, to create a better understanding of the environment, and to increase organizational responsiveness (e.g. Daft and Weick 1984; Stoffels 1994). The

significance of organizational scanning derives from the notion that managers can only interpret, disseminate and analyze data and stimuli that enter the organization (Hambrick 1982).

Researchers still report considerable gaps of knowledge concerning how organizations process information and possible effects of different modes of information processing (e.g. El Sawy and Pauchant 1988; Lenz and Engledow 1986a; Lenz and Engledow 1986b; Schick, Gordon, and Haka 1990). While there are several studies predominantly occupied with individual and/or more problem oriented or active modes of scanning (e.g. Aguilar 1967; Choo 1994; Daft, Sormunen, and Parks 1988; O'Reilly 1980; O'Reilly 1982), research on organizational scanning aimed at monitoring the environment has been less exhaustive. In addition, the primary focus of research on organizational scanning has been to assess the state-of-the-art of environmental analysis among different organizations (e.g. Diffenbach 1983; Fahey and King 1977; Fahey, King, and Narayanan 1981; Jain 1984; Lenz and Engledow 1986a; Stubbart 1982). Moreover, researchers interested in organizational scanning *effects* have shown a tendency to translate organizational scanning directly to output like organizational response or financial performance (e.g. Dollinger 1984; Gannon, Smith, and Grimm 1992; Jennings and Lumpkin 1989; Reid 1984; Smith et al. 1991), without paying attention to individual decision makers, their strategic issue diagnosis or decisions within the organization.

1.3.2 The information processing structure of the top management team

At the group level, the present investigation will focus on the *information processing structure of the top management team*, which is defined as the rules, procedures and patterns of interaction and participation that characterize the top management team when it addresses strategic issues. In general, structure influences the flow of information and the context and nature of human interactions (Miller 1987). It channels collaboration, specifies modes of coordination, allocates power and responsibility, and prescribes levels of formality and complexity (Bower 1970). The main reason to investigate the effects of the information processing structure of top management teams is that these relatively small groups at the tops of organizations

provide the structural context for top managers' strategic issue diagnosis (Thomas and McDaniel 1990).

The information processing structure of the top management team is a concept developed by Duncan (Duncan 1973; Duncan 1974) and refined and used in strategic issue diagnosis research (e.g. Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991; Thomas, Shankster, and Mathieu 1994). It is conceptualized on a mechanistic-organic continuum, where "organicness" or "looseness" is defined by (1) the degree to which the team's members participate in strategic decision making, (2) the inverse degree to which strategic decision making is formalized, and (3) the degree of interaction among the team's members. The notion of "*information processing* structure" relates to findings that indicate that these structural characteristics influence the team's capacity to process information (Duncan 1973; Duncan 1974; Galbraith 1973). Moreover, strategic issue diagnosis research has provided both strong theoretical arguments (e.g. Dutton 1993a) and some empirical evidence (e.g. Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991; Thomas, Shankster, and Mathieu 1994) that suggest that the information processing structure of the top management team will influence strategic issue diagnosis. However, previous strategic issue diagnosis research has only studied the effects on threat-opportunity interpretations.

1.3.3 Managers' cognitive complexity

At the individual level, this study will investigate the effects of managers' *cognitive complexity*. Following the general principles in contemporary complexity theories (e.g. Streufert and Streufert 1978; Streufert and Swezey 1986), cognitive complexity is defined as the ability to differentiate and integrate stimuli and information in perception and evaluation. Differentiation refers to the ability to perceive several dimensions in a stimulus array, and integration refers to the development of connections among the differentiated characteristics.

Despite the increasing focus on the role of managerial cognition and its influence on organizational decision making, strategy and performance outcomes (e.g. Walsh 1995), research within organization theory and strategic management have rarely

studied managers' cognitive complexity empirically (McGill, Johnson, and Bantel 1994). The most commonly used indicators of personal characteristics in empirical research have been demographic characteristics like managers age, industry, organizational or executive tenure, educational level and functional or occupational background (Bluedorn et al. 1994). In strategic issue diagnosis research, empirical studies have indicated no or only weak effects of such demographic characteristics on strategic issue diagnosis (Schneider and DeMeyer 1991; Thomas, Clark, and Gioia 1993; Thomas, Shankster, and Mathieu 1994). However, instead of viewing these findings as reasons to downplay the role of managerial characteristics in strategic issue diagnosis, research should move on to test previously untested individual characteristics. In that respect, cognitive complexity represents a promising alternative to demographic characteristics. Strategic issue diagnosis is a typical example of a complex and ill-structured managerial task, and previous research on cognitive complexity provides strong theoretical arguments and some empirical evidence that suggests that in complex and ill-structured tasks, cognitively complex individuals are more effective than their less complex counterparts (e.g. Bartunek, Gordon, and Weathersby 1983; Calori, Johnson, and Sarnin 1994; Denison, Hooijberg, and Quinn 1995; McGill, Johnson, and Bantel 1994; Streufert and Streufert 1978; Streufert and Swezey 1986; Weick 1979b).

1.4 General research question

As we have seen, empirical studies of each of these three antecedents to strategic issue diagnosis have the potential to contribute to research occupied with managers' noticing and interpretation. In investigating all three antecedents, the primary aim of the present study is to explore the question of whether and how antecedents at different contextual levels influence managers noticing and interpretation of environmental developments, trends and events. The investigation is based on a cross-level analysis (Klein, Dansereau, and Hall 1994; Rousseau 1985) of strategic issue diagnosis. Hence, the focal or target unit of the study is the strategic issue diagnosis performed by individual top managers. To that end, the more general research questions can be formulated as:

RQ: *Do the cognitive complexity of managers, the information processing structure of*
an organization's top management team, and the organizational scanning of an
organization, each uniquely affect managers' strategic issue diagnosis?

1.5 Theoretical perspectives

Given the interest in antecedents to strategic issue diagnosis at different contextual
levels, a *multidisiplinary perspective* is the most appropriate for the present study.
Consequently, research from the fields of cognitive psychology, behavioral decision
making, strategy and organizational theory provides knowledge about the potential
effects of the chosen antecedents on strategic issue diagnosis. In later years, research
interested in the relationship among mind, management and organization have
become known under the notions of "strategic cognition" (Schwenk 1988) or
"managerial and organizational cognition" (e.g. Meindl, Stubbart, and Porac 1994;
Walsh 1995). A typical feature of this perspective, which also applies for the present
investigation, is the use of basic psychological research in studying realistic
managerial tasks of substantive organizational importance (Walsh 1995).

At a more specific level, the present study adopts an organizational and a managerial
information processing perspective. While information processing theories of
strategic issue diagnosis or related topics usually reflect either an organizational or a
managerial (individual) perspective (Corner, Kinicki, and Keats 1994; O'Reilly 1983;
Streufert and Swezey 1986), this study adopts both. Moreover, it integrates them, as
far as acknowledging both levels of information processing, and developing
theoretical explanations of the proposed relationships by connecting individual, group
and organizational information processing can be considered an integrative approach.

A managerial or individual information processing perspective refers to the view that
managers are assumed to be information workers (McCall and Kaplan 1985). That is,
they spend their time seeking, absorbing, processing, and disseminating information
about issues, opportunities, and problems (e.g. Lord and Maher 1991; Walsh 1995).
Managerial thinking and behavior is viewed as a function of individual level cognitive
processes, which is heavily dominated by their knowledge structures (Corner, Kinicki,
and Keats 1994). Moreover, managers, like all individuals, have limited cognitive

capacity (Simon 1957a). These capacity limits mean that scarce attentional resources are preserved through more or less automatic modes of schematic information processing (e.g. Dutton 1993b; Dutton, Fahey, and Narayanan 1983; Lord and Foti 1986; Louis and Sutton 1991; Shaw 1990) and reliance on heuristics or judgmental short-cuts to form inferences (e.g. Jackson and Dutton 1988; Nisbett and Ross 1980; Schwenk 1984; Tversky and Kahneman 1974). Theories of cognitive complexity are central to an individual information processing perspective, since they address the structural dimensions that underlie the flow, processing, and use of information (Streufert and Swezey 1986).

An organizational information processing perspective refers to attempts to explain organizational behavior by examining the flows of information occurring in and around organizations (Knight and McDaniel 1979). According to this perspective, the acquisition and processing of environmental information is seen as one of the most critical tasks of the organization (Shank et al. 1988; Weick 1979a). Organizational information processing, of which organizational scanning and information processing structure of top management teams are important concepts, are conceptually linked to managerial information processing through its filtering and distributive mechanisms (e.g. Huber and Daft 1987). In essence, organizational and group level information processing influence the amounts and types of data, stimuli, information and perspectives available to individual organizational members. Thus, different elements of organizational information processing, like organizational scanning and top management team structure, might be viewed as instruments to overcome some of the limitations in individual information processing (March and Simon 1993; O'Reilly 1983).

1.6 Delimitation and scope

This study focuses on individual managers' strategic issue diagnosis. Although several organizational actors take part in strategic issue diagnosis, members of the top management team are responsible for providing organizations' interpretations of their environment and strategic responses (e.g. Daft and Weick 1984). Moreover, the top management team members are the only individuals whose information processing has a direct influence on strategic decisions (Corner, Kinicki, and Keats 1994). Thus,

in the present study, managers (or top managers) refers to members of the top management team, defined as an organization's chief executive officer or executives who report directly to the chief executive officer or top administrator (e.g. Bourgeois 1985; Sutcliffe 1994).

Strategic issue diagnosis, seen as the early phases of strategic decision making, is an organizational phenomenon (e.g. Dutton, Fahey, and Narayanan 1983; Hambrick 1994). Strategic decisions require a variety of organizational members for their recognition, formulation, evaluation and implementation. Consequently, the focus on individual top managers' diagnosis could be seen as a serious limitation of the study in terms of its face validity. However, studying strategic issue diagnosis at the group or top management team level would require both additional and alternative theoretical and methodological foci and approaches (e.g. Klein, Dansereau, and Hall 1994). In such a perspective, the question of the appropriate level of analysis for strategic issue diagnosis becomes a question of priority, not a question of the right or wrong level. In that respect, it seems like a more natural development in strategic issue diagnosis research to further develop the notion of strategic issue diagnosis from the threat-opportunity focus to other dimensions of strategic issue diagnosis and to empirically test untested antecedents, than to study threat-opportunity diagnosis at the team level.

Another delimitation of the present investigation is that it focuses on managerial diagnosis without paying much attention to later phases of strategic decision making or its link to organizational outcomes. This specialized focus is largely a consequence of the combination of the importance of the early phase of strategic decision making represented by strategic issue diagnosis (e.g. Mintzberg, Raisinghani, and Theoret 1976) and the complexity of the phenomenon (e.g. Dutton, Fahey, and Narayanan 1983). However, the emphasis on other dimensions of strategic issue diagnosis than threat-opportunity interpretations, is an attempt to make a closer link between managerial noticing and interpretation and organizational outcomes than found in previous strategic issue diagnosis research. As will be further explicated in the next chapter, one of the criteria used to identify and select previously untested dimensions of strategic issue diagnosis, is the potential to affect subsequent cognition and behavior at the individual, group or organizational level in a favorable manner.

1.7 Organization of the study

The remainder of this study is organized as follows. In the next chapter the overall concept of "strategic issue diagnosis" is developed and defined. Then, in chapter three, the theoretical perspective is further elaborated and followed by literature reviews and the development of the conceptual framework relating the central concepts to each other. In chapter four, these relationships are translated into more specific and testable hypotheses, while the research methodology is discussed in chapter five. Chapter six deals with the development and evaluation of measures, while the hypotheses are tested in chapter seven. Finally, in chapter 8 the results are discussed and interpreted.

CONCEPTUALIZING STRATEGIC ISSUE DIAGNOSIS

Along with the increased interest in strategic, managerial and organizational cognition over the last decade (e.g. Meindl, Stubbart, and Porac 1994; Porac, Meindl, and Stubbart 1996; Schwenk 1988; Walsh 1995), a growing body of research by Jane E. Dutton, James B. Thomas and others have paid particular attention to the phenomenon called strategic issue diagnosis. In this chapter, the meaning of strategic issues and strategic issue diagnosis are explicated, and the relationship between the process of diagnosis, strategic issues and the organizational environment are clarified. Next, the cognitive structures and processes that are assumed to be involved in strategic issue diagnosis are discussed and related to schema theories and theories of cognitive heuristics and biases. Then, strategic issue diagnosis is discussed from the perspective that some types of diagnosis may have more or less potential to contribute to effectiveness in strategic decision making than others. Based on this perspective, four concepts of strategic issue diagnosis that extend previous conceptualizations are developed.

2.1 The organizational environment, strategic issues and strategic issue diagnosis

Strategic issues are defined as emerging developments, trends or events which in the judgment of some strategic decision makers are likely to have a significant impact on the organization's present or future strategy. Therefore, no issue is inherently strategic, but becomes strategic when managers believe that it has relevance for organizational performance (Dutton and Ashford 1993). Moreover, strategic issue diagnosis is defined as the individual level, cognitive process through which managers notice and form interpretations about environmental developments, trends or events. Finally, it has been emphasized that managers identify, interpret and formulate issues by selectively attending to some aspects of the environment, while ignoring others. This selectivity in diagnosis is rooted in the assumption of limited cognitive capacity, i.e. that man has limited capacity to notice, seek, store, handle and make sense of data (Simon 1957a). Besides, motivational and emotional factors may also influence

managerial thinking (e.g. Fiske and Taylor 1991). In the terminology of strategic issue diagnosis, one implication of these assumptions is that strategic issues will never be perfect representations of environmental developments, trends or events. Rather, there is a reciprocal influence between the subject (managers) and the object (developments, trends and events). On the one hand, developments, trends and events, the raw material of issues, do have some objective reality to them which affects how individuals notice, perceive, bound, and act on them. On the other hand, managers interact with and affirm the existence of developments, trends and events, which create and cast them in particular light for themselves and for other organizational members (Dutton 1993a).

To clarify the relationship between the process of strategic issue diagnosis, strategic issues and environmental developments, trends and events, a modified version of Haukedals (1994) scheme of stimulus objects (SO), strategic stimuli (SS) and strategic issues (SI) is presented in Figure 1. The objective environment refers to a stimulus object (SO) or simply "what is going on in the environment", registered or not by managers. The stimulus object is the source of the strategic stimulus (SS), which is seen as the data associated with the stimulus object reaching the perceiver. In the language of perception psychology (e.g. Coren, Lawrence, and James 1994), the stimulus object would be a distal stimulus while the strategic stimulus would be referred to as a proximal stimulus (Coren, Lawrence, and James 1994). Strategic issue diagnosis, i.e. the process through which decision-makers notice and form interpretations about environmental developments, trends or events, refers to the complete cognitive process. Strategic stimuli (SS) can be seen as the point of departure of this process, while a strategic issue (SI) represents the end product (Dutton, Fahey, and Narayanan 1983; Haukedal 1994). In the current research, like most work in strategic issue diagnosis, the end product, i.e. strategic issues, is the main focus.

Strategic issue diagnosis

SO ⟶ SS ⟶ SI
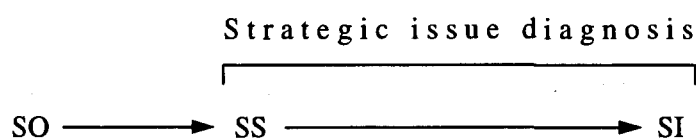
Figure 1.1: The environment, strategic stimuli and strategic issues

The essential point so far, is that strategic issues are not identical to the developments, trends and events in the environment. Some data are not registered, others are missed, added and changed during the process of diagnosis. Thus, there will always be a gap between the stimulus object (SO) and the strategic issue (SI).

2.2 The cognitive foundation of strategic issue diagnosis

The distinction between noticing and interpretation is related to the notion that diagnosis involves two conceptually different cognitive processes (e.g. Daft and Weick 1984; Dutton, Fahey, and Narayanan 1983; Kiesler and Sproull 1982; Starbuck and Milliken 1988).

Noticing refers to those activities and acts by which data and stimuli are translated into focused issues (i.e. attention organizing acts), while interpretation refers to the exploration and the construction of meaning in relation to an issue. This is admittedly a difficult distinction in practice because people simultaneously notice stimuli and make sense of them, and each of these activities depends upon the other (Starbuck and Milliken 1988). Thus, a strategic issue can be seen as an outcome of both noticing and interpretation (Dutton, Fahey, and Narayanan 1983). It is determined in part by which data are registered and how these data are given meaning and constructed into an issue. However, in strategic issue diagnosis research, one is particularly interested in explaining and understanding why different managers interpret the same development, trend or event differently, i.e. how and why they differ in diagnosis output. Since interpretation is conceptually closer to diagnosis output than noticing, the primary focus in strategic issue diagnosis research has usually been interpretation.

The focus on the output of diagnosis in strategic issue diagnosis research, along with the strong links to strategy and organization theory rather than to cognitive psychology, can explain why most descriptions and discussions of the cognitive foundation of strategic issue diagnosis have been somewhat restricted in detail and depth (important exceptions include Dutton and Duncan 1987a; Dutton, Fahey, and Narayanan 1983; Dutton and Jackson 1987). However, this should not be considered as a serious weakness of strategic issue diagnosis research. Applying basic psychological research when studying realistic managerial problems, corresponds to

the partnership between the basic and applied sciences that has emerged over the past decade in managerial and organizational cognition (Walsh 1995). Basic psychological research has established that knowledge structures affect information processing in predictable ways, while the management research community has taken the lead in examining how the use of knowledge structures and processes relate to consequences of substantive organizational importance. However, in order to provide a basis for the development of other strategic issue diagnosis dimensions than threat-opportunity interpretations, a more detailed description of the cognitive structures and processes that are assumed to be involved in noticing and interpretation are discussed next.

2.2.1 Schema theories

According to Walsh (1995), most work in managerial cognition relies on a "top-down" or "theory-driven" human information processing paradigm. The basic idea is that managers use existing cognitive structures referred to as schemas, maps, categories, prototypes or scripts to transform data into information.

The term schema is used here as a general term that describes internal knowledge structures that organize information about "things", i.e. objects, people, events, situations and so on (Jackson and Dutton 1988; Markus and Zajonc 1985). Although the terms schema and scripts are often used interchangeably, a script is a narrower term referring to a well-structured sequence of events associated with a highly familiar activity that happen across a period of time (Matlin 1998). A cognitive map may be defined as a mental device that codes and simplifies the way our spatial environment is arranged (e.g. Kitchin 1994). Finally, categories are cognitive structures organized according to prototypes, which are items that are most typical of a category (Rosch 1973).

Schemas can be seen as parts of a persons overall or more general cognitive structure or framework (e.g. Cowan 1986; Shaw 1990). Schemas, which are mental representations of concepts and beliefs, provide interpretive lenses through which individuals view the world. The interpretive lens of a cognitive schema selects certain aspects of an issue as important, ignores others, and links them to certain actions or consequences (Dutton, Fahey, and Narayanan 1983). Thus, the existing knowledge

base of individuals, developed through past experience and learning and organized in cognitive schemas, should heavily influence strategic issue diagnosis.

This does not imply that "data-driven" or "bottom up" information processing, where the current information context guides the processing (Walsh 1995), does not occur. While top-down processes might interact with "bottom-up" processes (Neisser 1976), top-down information processing is supposed to be the dominant response in most managerial situations (Walsh 1995).

Despite the importance of schemas and schema-driven information processing, it is impossible to predict diagnosis outputs from cognitive schemas alone (Dutton, Fahey, and Narayanan 1983). The "messy" characteristics of strategic issues imply that managers rarely have ready-made appropriate schemas for the environmental developments, trends or events in the environment. When an environmental situation is incongruent to a schema, managers often fill in gaps in the existing data and draw inferences beyond the existing evidence in order to fit the situation to the schema (Dutton, Fahey, and Narayanan 1983; Dutton and Jackson 1987). Another option is to deploy additional cognitive resources (Lord and Foti 1986; Schwenk 1988). Managers can respond by using a more bottom-up or data-driven processing mode, that is to continue to process registered data until an existing schema is made to account for the situation or until a new schema is generated (Dutton, Fahey, and Narayanan 1983). This process refers to more conscious, controlled or active modes of cognition, as opposed to automatic or "habits of mind" modes (e.g. Dutton 1993b; Lord and Foti 1986; Louis and Sutton 1991; Shaw 1990). In active modes of strategic issue diagnosis, greater attentional resources are expended to form multiple interpretations, to sort relevant from irrelevant information and to search beyond the information that is readily available (Dutton 1993b). Automatic diagnosis on the other hand, involves the fitting of situations to schemas, using less cognitive effort or expenditure of attentional and analytic resources in understanding an issue (Dutton 1993b). Given the complex nature of the raw material of strategic issues, strictly schema-driven automatic processing might be an inappropriate way of giving meaning to strategic issues (Corner, Kinicki, and Keats 1994; Dutton 1993b; Lord and Foti 1986; Louis and Sutton 1991). In practice, however, fully automatic or "mindless" processing is hard to imagine in managers' strategic issue diagnosis. Even when top-down

processes dominate managerial thinking, there are room for flexible use of schematic knowledge. When managers respond as if a particular situation fit a particular schema, they appear to be determining that the situation is *analogous* to those situations from which the schema was originally derived (Dutton, Fahey, and Narayanan 1983; Rummelhart and Ortony 1977; Schwenk 1988). Analogies can be applied strictly and narrowly or rather broadly and loosely, and it is this quality that produces flexibility in human thought (Markus and Zajonc 1985).

At a very basic level, we know very little about how managers actually organize issue knowledge in memory (Dutton, Fahey, and Narayanan 1983; Walsh 1995) and what kinds of processing modes that best describe managerial thinking (Stubbart 1987). According to Markus and Zajonc (1986), schemas are multidetermined and multiply activated and have diverse and varied consequences. Even though we have limited knowledge of how schemas influence managerial thinking in general, and strategic issue diagnosis in particular, schema theories offers a framework that provides a deeper understanding of important managerial and organizational phenomena (e.g. Lord and Foti 1986; Schwenk 1988; Schwenk 1995; Stubbart 1989; Walsh 1995). Moreover, it might well be the case that schemas have most to offer when individuals are confronted with ambiguous and conflicting stimuli, which requires some structure to be processed meaningfully or efficient (Markus and Zajonc 1985). An important implication is that while schema theories emphasize a tendency to inflexibility in human thought, flexible and open cognition might be the most appropriate response for managers confronted with unique and complex environmental developments, trends or events.

2.2.2 The heuristic and bias approach

The behavioral decision theory literature provides a somewhat different material for the study of cognition in organizational settings. While paying less attention to knowledge structures and theoretical explanation as such, researchers in the field have empirically demonstrated systematic departures from the rational model of human choice. By studying such departures, errors or biases in the laboratory, Tversky and Kahneman (1974) and other behavioral decision researchers have identified that people rely on a number of simplifying strategies, rules of thumb, or *heuristics* in

making inferences and judgments. These heuristics may provide efficient short cuts in information processing, but sometimes they lead to severe and systematic errors (Tversky and Kahneman 1974). The difficulty with heuristics is that individuals typically do not recognize that they are using them, and consequently fail to distinguish between situations in which their use is more or less appropriate. The errors emanating from heuristics are often termed cognitive biases, which refers to situations in which a heuristic is inappropriately applied by an individual making a judgment or a decision (e.g. Bazerman 1994; Haley and Stumpf 1989).

While schema theories and heuristic decision making usually are treated separately in the literature, cognitive heuristics can be understood in relation to the schema-concept (Lord and Foti 1986; Nisbett and Ross 1980; Schwenk 1988). Many cognitive biases in human inferences and judgment are the results of invoking inappropriate schema-knowledge (Markus and Zajonc 1985; Schwenk 1988) and automatic modes of information processing (Louis and Sutton 1991). Take for instance the availability heuristic. It suggests that decision-makers assess the frequency, probability, or likely causes of an event by the degree to which instances or occurrences of that event are readily "available" in memory (Tversky and Kahneman 1974). Thus, an event that evokes emotions and is vivid, easily imagined, and specific will be given more weight in inferential processes than will an event that is unemotional in nature, bland, difficult to imagine or vague. This mechanism may be called the ease of recall bias (Bazerman 1994). The point is that what is vivid, easily imagined and so on, will be affected by schematic knowledge, and vivid, easily imagined events will affect which schemas are activated. Thus, when an inappropriate schema is activated, setting an inference process in motion that may lead to wrong conclusions, the result might be a cognitive bias.

While most heuristics and biases have been demonstrated in laboratory settings, several researchers have begun to suggest that they may influence strategic issue diagnosis and decision making in the "real world" as well (e.g. Barnes 1984; Dutton 1993b; Lai 1994; Lant, Milliken, and Batra 1992; Milliken and Lant 1991; Schwenk 1984; Schwenk 1986; Schwenk 1988; Zajac and Bazerman 1991). In relation to strategic issue diagnosis, the identification of typically used heuristics along with systematic biases are particularly useful in the explanation of pathological diagnosis.

The threat bias for example, i.e. that managers view strategic issues as threats unless there is strong evidence to do otherwise, is the tendency for managers to be more sensitive to data that suggests the presence of a threat than to data that suggests the presence of an opportunity (Jackson and Dutton 1988).

To sum up, managers confronted with strategic issues, like all individuals, have limited cognitive capacity. These capacity limits mean that scarce attentional resources are preserved through more or less automatic modes of schematic information processing and reliance on heuristics or judgmental short-cuts to form inferences. Cognitive schemas provide managers with a knowledge base that serves as a guide for noticing and interpretation and help simplify and manage strategic issues. Thus, different cognitive schemas and different modes of information processing offer cognitive explanations of the broad question of why different managers give different meaning to the same environmental development, trend or event. In the rest of this chapter, this knowledge provides the foundation for the discussion and development of four concepts of strategic issue diagnosis that goes beyond previous conceptualizations.

2.3 The focus on threat-opportunity interpretation in strategic issue diagnosis

The importance of strategic issue diagnosis stems from its pervasiveness and centrality in the context of strategic decisions, its impact upon later decision phases and its potential for changing managers understanding of their internal and external environment (Dutton, Fahey, and Narayanan 1983). It critically affects both the process and content of subsequent phases of strategic decision making (Dutton, Fahey, and Narayanan 1983) and thus organizational choice and action (e.g. Daft and Weick 1984; Thomas, Clark, and Gioia 1993). In other words, how managers diagnose developments, trends or events is critical since variations in diagnosis can lead to different strategic responses (Dutton and Dukerich 1991; Dutton and Duncan 1987b; Lant, Milliken, and Batra 1992). Finally and most importantly, some diagnosis may result in more effective strategic decisions and higher levels of performance than others (Gooding and Kinicki 1995; Meyer 1982). *How* diagnosis can affect performance is less than clear.

Most empirical strategic issue diagnosis research has been occupied with effect valence, or the extent to which managers frame an issue in positive or negative terms. The typical approach has been to present managers with a case scenario describing a development, trend or event and ask them to complete a questionnaire. The questionnaire contains items assessing different dimensions strongly associated with the labels of threat and opportunity (usually the positive-negative, gain-loss and controllability-uncontrollability dimensions). While there are conflicting evidence as to whether managers actually use such labels in their strategic thinking, or how such labels are related to managers cognitive representations of the environment (e.g. Cowan 1990; Dutton 1993b; Smith 1995; Thomas, Shankster, and Mathieu 1994), there have been more consensus about two other features of such labels. First, while labels like threat and opportunity might be too simplistic and summarized to actually capture managers thinking, managers apply them to express meaning if they are given the labels (or their dimensions) or when provided overt linguistic prompts for a label (Smith 1995). Second, when such labels are used as simplifying or communicative devices, they are thought to have predictable framing effects on later cognition and behavior (e.g. Dutton 1993a; Dutton and Ashford 1993; Tversky and Kahneman 1981). Thus, how an issue is framed might produce or interact with cognitive biases in later phases of diagnosis and influence different patterns of organizational decision making. More specifically, it is usually assumed that seeing an issue as an opportunity is associated with more open and creative individual cognition, together with greater level of participation and motivation at the group and organizational level (e.g. Dutton 1993a; Dutton, Stumpf, and Wagner 1990; Dutton and Webster 1988; Nutt 1984; Schneider and DeMeyer 1991). Indeed, Dutton (1993a) suggests that the potential power of opportunities is so strong that organizations should actively construct opportunities. This is partly a reflection of the threat bias suggested by Jackson and Dutton (1988). They found that managers were more sensitive to data that suggests the presence of a threat than they were to data that suggests the presence of an opportunity. Managers concluded that threat was present when available data was ambiguous, and they did not conclude that threat was absent even when available data was clearly contrary to the presence of threat. Thus they tended to view strategic issues as threats unless there was strong evidence to do otherwise, suggesting a threat bias, and Dutton (1993a) argues that opportunity construction can suppress this bias.

Moreover, opportunities are powerful issue frames also because of their potency as legitimating and motivating symbols for issues in organizations (Dutton 1993a).

These findings suggest, as most researchers in strategic issue diagnosis claim, that positive effect valence would be more effective than negative effect valence, because of desirable framing effects on future treatment of the issue, and as an indication of less threat biased interpretation. There are however conflicting evidence concerning this assumption. Mintzberg et al. (1976) observed that managers most frequently meet problems or threats with process actions intended to be comprehensive and rational, but responded to opportunities without using formal, analytical decision aids. Similarly, Fredrickson (1985) found that MBA students endorsed actions that were significantly more comprehensive when faced with problems than when faced with opportunities. However, upper-middle level executives responded more or less equally to problems and opportunities. Furthermore, Thomas et al. (1993) in a longitudinal study, found that positive effect valence was directly and negatively linked to profit, suggesting that profit was enhanced when managers interpreted strategic issues negatively. Finally, research on cognitive processes in sensemaking suggests that managers use relatively automatic categorization processes to interpret positive events, but more effortful attributional processes to interpret negative events (Gooding and Kinicki 1995). Similarly, Dunegan (1994) found that subjects receiving positive performance feedback during a project exhibited characteristics associated with "mindless" information processing, while negative or mixed feedback were associated with "mindful" processing of information. Thus, both cognitive and behavioral effects of differences in effect valence are inconclusive, at lest for moderate values of effect valence.

Previous research on strategic issue diagnosis has not considered the potential effects of extremity in effect valence, implicitly indicating a linear positive relationship between effect valence and desirable subsequent cognition and behavior. There are however, reasons to assume that diagnosing an issue as extremely positive or negative might be associated with poor performance. First, extreme valence is for most situations a strong indicator of stereotyped or in other ways biased thinking caused by lack of knowledge or simplicity in the representation of knowledge within a domain (e.g. Linville 1982; Lord and Foti 1986). Second, simple cognitive representations

seem to be associated with both too negative and too positive evaluations (Linville 1982; Linville and Jones 1980). Thus, extremity in effect valence is likely to be poor and oversimplified images of the environmental situations they represent, no matter the direction of the valence. Third, the evidence that suggests that extreme effect valence is likely to have negative framing effects on later cognition and behavior, is relatively consistent for both extremely negative and extremely positive valence. More than moderate positive diagnosis may curtail managers' desire to understand an issue (Mintzberg, Raisinghani, and Theoret 1976) because they may assume that they can simply exploit opportunities without conducting extended analysis (Fredrickson 1985). This may lead managers to act in an overly simplistic manner toward strategic issues even though they are ill-equipped to capitalize on possible opportunities (Thomas, Clark, and Gioia 1993). In a similar fashion, research on crises and disasters demonstrates that there is a tendency for individuals, groups, or organizations to behave overly rigidly in extremely threatening situation (e.g. Dutton 1986a; Lai 1994; Starbuck, Greve, and Hedberg 1978; Staw, Sandelands, and Dutton 1981; Turner 1976). Based on this research, it is reasonable to consider extremity in effect valence to be a potentially counterproductive dimension of strategic issue diagnosis.

2.4 Strategic issue diagnosis and effectiveness

From the discussion above, one can conclude that the consequences of moderate values of effect valence are unclear, and that extreme valence might have negative consequences on later phases of issue resolution at both the individual and organizational levels. Thus, there is a need to develop strategic issue diagnosis dimensions that are less ambiguously related to effectiveness.

Diagnosis effectiveness could be defined in terms of correspondence between the stimulus object and the corresponding strategic issue, usually referred to as interpretive accuracy (e.g. Dess and Keats 1987; Shank et al. 1988; Sutcliffe 1994) or veridicality (e.g. Walsh 1995). But, given the unstructured nature of the task of interpreting the environment, it is both difficult and controversial to specify criteria that could measure accurately the performance of such a task (e.g. Lyles 1981; Milliken and Vollrath 1991; Salancik and Porac 1986; Weick 1990; Weick and Daft 1983). One difficulty is that the quality of managers' noticing and interpretation

becomes understandable only after results from the diagnosis have occurred (Smircich and Stubbart 1985; Starbuck and Milliken 1988). However, even for post-decisions or post-diagnosis, it is difficult to separate good from bad because good and bad results may arise from very similar processes (Starbuck and Milliken 1988). Furthermore, it is difficult to think of any accurate, or right or wrong description of an environmental development, trend or event that can be used as a benchmark to compare an issue against a stimulus object (Walsh 1995). The raw material of interest in strategic issue diagnosis, i.e. the environmental developments, trends or events or stimulus objects, are in a relative sense more uncertain, unpredictable, complex, ill-structured and difficult to isolate than stimulus objects used in most basic psychological research. For example, while finding the way out of a maze or solving a mathematical problem can be structured as tasks with a definable and single best solution, the raw material of interest in strategic issue diagnosis are open to multiple interpretations not only due to human cognitive limitations, but because they might have multiple potentially successful "solutions" (Dutton, Fahey, and Narayanan 1983).

Despite these difficulties, and in contrast to most work in strategic issue diagnosis, one of the potential contributions of the present study is to develop strategic issue diagnosis dimensions that are less ambiguously related to effectiveness in strategic decision making. After all, the dominant view in both theory and practice is that trying to make sense of the environment is an important and crucial activity closely related to organizational effectiveness and survival (e.g. Daft and Weick 1984; Stoffels 1994). Moreover, this activity is active and intentional (e.g. Stubbart and Ramaprasad 1990). Consequently, it is an important task for researchers interested in managerial and organizational cognition to propose concepts that can better determine if one interpretation can be said to be more effective than another. In approaching this task, the present study relies on the principle that diagnosis can be more or less reasonable rather than right or wrong (Weick and Daft 1983). To conceptually differ between what is more or less reasonable or what have the potential to contribute to effectiveness in decision making, two criteria are used. First, diagnosis that is likely to be a result of the application of appropriate schemas and appropriate modes of schema processing is considered to have the potential to contribute to effectiveness. Second, so is diagnosis that is likely to affect subsequent cognition or behavior at the

individual, group or organizational level in a favorable manner. Thus, each of the following diagnosis concepts will be discussed in relation to these two criteria;

- an extended conceptualization of effect valence,
- issue sorting,
- causal understanding, and
- data search.

The ordering of the concepts do not reflect a sequential view of the strategic issue diagnosis process. What is important is that the four concepts to be discussed next refer to different dimensions of strategic issue diagnosis and that they are more closely related to effectiveness than previous conceptualizations.

2.4.1 An extended conceptualization of effect valence

Based on the discussion of previous strategic issue diagnosis research and two criteria listed above, the traditional effect valence perspective of threat and opportunity interpretations is extended by including extremity in effect valence. Extreme valence is likely to be a result of stereotyped or in other ways biased thinking (e.g. Linville 1982; Lord and Foti 1986) and it might have counterproductive framing effects of later cognition and behavior (e.g. Dutton 1986a; Mintzberg, Raisinghani, and Theoret 1976). Effect valence extremity is defined as the perceived positive effects an opportunity has on a manager's own organization compared to other organizations, and the perceived negative effects a threat has on a manager's own organization compared to other organizations.

Most studies of threat and opportunity have treated them (and their underlying dimensions) as two ends of a single dimension and assessed this dimension through "neutral" or ambiguous developments, trends or events (e.g. Fombrun and Zajac 1987; Ginsberg and Venkatraman 1992; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990). Work by Jackson and Dutton (1988) and Denison et al. (1996), in contrast, suggests that threat and opportunity represent distinct dimensions relevant to issue interpretation. In order to address this concern, and be able to assess extremity in

effect valence for both opportunities and threats, a distinction is made between threat and opportunity interpretations.

Finally, in order to build on and to compare the present investigation with previous work, the traditional dimensions of positive-negative, gain-loss and controllability-uncontrollability interpretations are included. Since the positive-negative and gain-loss dimensions have been shown to be operationally indistinguishable and highly correlated (e.g. Thomas and McDaniel 1990), they are collapsed into a single positive-gain interpretation and a negative-loss interpretation dimension. Thus, as in most studies since Thomas and McDaniel (1990), positive-gain and negative-loss are defined as the perceived advantage/disadvantage and probability of gain/loss associated with an issue. Controllability and uncontrollability refer to the perceived capability to capitalize on an opportunity and to manage a threat.

In summary, effect valence refer to opportunity and threat interpretations where opportunity interpretation will be conceptualized in terms of positive-gain, controllability and opportunity extremity perceptions, and threat interpretation in terms of negative-loss, uncontrollability and threat extremity perceptions.

2.4.2 Issue sorting

Issue sorting refers to the act of distinguishing relevant developments, trends or events from less relevant environmental changes. With limited cognitive capacity (Simon 1957b) and scarce attentional resources to be invested in further elaboration of issues (Dutton, Stumpf, and Wagner 1990), the task of sorting the wheat from the chaff in the fields of potential issues facing managers becomes an important managerial task with the potential to strongly influence the performance and even survival of organizations (Dutton, Walton, and Abrahamson 1989). First, explanations of crises, disasters, or organizational decline often focus on how managers failed to spot major environmental threats or opportunities or failed to heed well-founded warnings (Starbuck, Greve, and Hedberg 1978; Starbuck and Milliken 1988; Whetten 1988). Furthermore, explanations of organizational success often cite managers' awareness of environmental changes or the ability to sort out the important aspects of

the environment (e.g. Gannon, Smith, and Grimm 1992; Lant, Milliken, and Batra 1992; Meyer 1982).

One way that managers differentiate between developments, trends and events is through judgments of importance and feasibility (Dutton, Stumpf, and Wagner 1990). Importance is defined as the perceived urgency and impact associated with an issue, while feasibility is the perception of how easy it is to understand an issue. To effectively differentiate between developments, trends and events in terms of importance and feasibility imply an ability to register vague and ambiguous environmental data and stimuli, to classify signals from noise, to construct issues out of noticed data and to compare issues against each other. Several studies have demonstrated that decision makers and people in general sometimes pay too much or too little attention to data and stimuli with certain properties (e.g. Bazerman 1994; Hogarth 1987; Kiesler and Sproull 1982; Starbuck and Milliken 1988; Tversky and Kahneman 1974). Consistent with the availability and representativeness heuristics (Tversky and Kahneman 1974), data that are easy to understand, concrete, quantitative and memory or schema-consistent are shown to attract people's attention (e.g. Hogarth 1987). Moreover, when managers engage in more automatic modes of processing, they are more likely to make impressionistic interpretations of strategic data and less likely to differentiate across types and sources of data (Corner, Kinicki, and Keats 1994). Hence, high levels of differentiation would imply application of appropriate modes of schema processing. Finally, in terms of influence on subsequent cognition or behavior at the individual, group or organizational level, differentiation in terms of importance and feasibility is important since it determines the allocation of time and priorities to issues (Dutton, Stumpf, and Wagner 1990).

2.4.3 Causal understanding

In the process of issue resolution, managers generate understanding that relate various events or concepts together in a causal manner (Dutton, Fahey, and Narayanan 1983). These beliefs are stored in cognitive schemas as parts of the more specific schema content. Thus, causal understanding represents relational statements which allow diagnosing participants to impose a logic for understanding an issue as well as a logic for resolving it if necessary (Dutton, Fahey, and Narayanan 1983). Such relational

statements are critical dimensions of strategic issue diagnosis, as they frame an issue in a particular way thus affecting subsequent interpretations and actions (Dutton, Fahey, and Narayanan 1983).

The relative superiority of any particular understanding of and environmental development, trend or event is difficult to demonstrate. However, in order to generate several interpretations and understandings of environmental situations so that the "variety" in the understanding becomes more equivalent to the variety in the situation (Bartunek, Gordon, and Weathersby 1983), nuanced causal understanding in terms of being open to multiple cause-effect relationships will most likely be more reasonable than understanding issues in terms of universal, unambiguous or simple one-to-one causal relationships. More specifically, nuanced causal understanding increases the probability that individuals will perceive complex events more accurately, synthesize diverse perceptions and experiences more completely.

According to schema theory, this kind of "rich" understanding requires highly developed cognitive schemas, application of multiple schemas and controlled as opposed to automatic cognition. Unnuanced or simple and narrow causal understanding on the other hand, is likely to be a result of too simple or in other ways inappropriate cognitive schemas, use of single schemas, or the application of more or less appropriate schemas in a too rigid or automatic manner (e.g. Dutton 1993b; Kiesler and Sproull 1982; Lord and Foti 1986; Louis and Sutton 1991). While being cognitively effective in terms of relatively effortless understanding of complex phenomena, unnuanced causal understanding might lead to outdated and overly simplified subsequent cognition and action (e.g. Gioia 1986; Kiesler and Sproull 1982; Louis and Sutton 1991), in addition to inhibitation of learning and schema development (Lord and Foti 1986).

2.4.4 Data search

Data search is more related to the strategic issue diagnosis *process* than the diagnosis concepts discussed so far. Gathering, use and interpretation of data are interactive processes, where search does not unambiguously precede interpretation and interpretation influence further search activities (Dutton, Fahey, and Narayanan

1983). Thus, when effect valence, issue sorting and causal understanding are more easily understood as endproducts of strategic issue diagnosis (although temporal), data search is a concept describing overt behavior in the process of strategic issue diagnosis.

Data search is defined in terms of the amount and type of data managers gather and use in diagnosing strategic issues. Given that some data are more closely related to an issue and more difficult to gather than other data, different types of data are categorized as core data, additional data and new data. While accepting the notion that more information is not necessarily better (e.g. Feldman and March 1981; O'Reilly 1980; Schick, Gordon, and Haka 1990), it is reasonable to assume that the use of large amounts and different types of data is crucial in strategic issue diagnosis. The raw material of interest in strategic issue diagnosis research is complex and unique environmental situations that are difficult to isolate and understand. Accordingly, managers faced with such situations should search for and use large amounts and different types of data in order to clarify and understand them (e.g. Daft, Sormunen, and Parks 1988; Thomas and McDaniel 1990). However, managers often demonstrate heuristics and biases in data search behavior, leading to limited search in terms of amount, scope and type of data. Individuals are frequently biased towards schema-consistent data and towards data with certain properties (e.g. Bazerman 1994; Hogarth 1987; Kiesler and Sproull 1982; Starbuck and Milliken 1988; Tversky and Kahneman 1974). They tend to have little understanding of what they do not know (McGee, Dowling, and Megginson 1995), have little appreciation for the value of additional data (e.g. Cooper, Folta, and Woo 1995), and rarely rely on high quality sources of information (e.g. O'Reilly 1982; O'Reilly, Chatman, and Anderson 1987). Confronted with strategic issues, this type of biased data search behavior is less likely to lead to sufficient understanding and subsequent appropriate behavior than more comprehensive search. For example, if a manager starts out with a poor or overly simplified initial or preliminary understanding, he is likely to limit data search, which in turn might preserve or even further simplify his or her understanding of the issue. Hence, the search for and use of large amounts and different types of data is considered to contribute to effectiveness in strategic issue diagnosis.

2.5 Summary of the chapter

In this chapter, the meaning of strategic issues and strategic issue diagnosis was explicated and the relationship between the process of diagnosis, strategic issues and the organizational environment was clarified. In addition, strategic issue diagnosis was related to schema theories and theories of heuristics and biases. Finally, four different concepts of strategic issue diagnosis that extend previous conceptualizations were presented. The development, refinement or choices of these concepts were guided by the principle that these strategic issue diagnosis concepts should be less ambiguously related to effectiveness in strategic decision making than the traditional effect valence approach.

LITERATUREREVIEW AND CONCEPTUAL FRAMEWORK

The purpose of this chapter is to discuss managers' cognitive complexity, the information processing structure of organizations' top management teams and organizations' environmental scanning as antecedents to strategic issues diagnosis. The chapter begins with a presentation of the theoretical perspective applied. Then, the selection, definitions and potential effects of each antecedent are discussed. In this discussion, previous theory and empirical research on each of the antecedents are reviewed in order to provide initial support for their effects on strategic issue diagnosis. Furthermore, the relative effects of the contextual and individual antecedents, and possible moderating effects of the contextual antecedents on the relationship between the individual antecedent and strategic issue diagnosis are discussed. The review is summarized in a figure presenting the conceptual framework for the study.

3.1 A multiple context information processing perspective

Information processing theories of strategic issue diagnosis or decision making usually reflect either an organizational or an individual (or managerial) level of analysis. The single level focus of these theories makes them incomplete representations of how strategic decisions actually are made in organizations (Corner, Kinicki, and Keats 1994; Streufert and Swezey 1986). The present study adopts both the individual and the organizational information processing perspectives in the investigation of strategic issue diagnosis. Moreover, it integrates them as far as acknowledging both levels of information processing and developing theoretical explanations of the proposed relationships by connecting individual, group and organizational information processing can be considered an integrative approach.

The *individual* or managerial information processing perspective refers to the view that managers are seen as information workers (McCall and Kaplan 1985). That is, they spend their time absorbing, processing, and disseminating information about issues, opportunities, and problems (Lord and Maher 1991; Walsh 1995). Managerial

thinking and behavior is viewed as a function of individual level cognitive processes, which is dominated by their knowledge structures (Corner, Kinicki, and Keats 1994). This perspective rests on the description of the cognitive foundation underlying strategic issue diagnosis discussed in the previous chapter. In short, managers have limited capacity to process information and these limits mean that scarce attentional resources are preserved through more or less automatic modes of schematic information processing and reliance on heuristics or judgmental short-cuts to form inferences.

The *organizational* information processing perspective refers to attempts to explain organizational behavior by examining the information flows occurring in and around organizations (Knight and McDaniel 1979). In this perspective, the acquisition and processing of environmental information is seen as one of the most critical tasks of the organization (Shank et al. 1988; Weick 1979a). This is not a new or infrequently applied perspective in organizational research. Organizational performance and behavior are seen so closely linked to organizational information processing that a number of organizational scientist have advocated that organizations should be viewed as information processing systems (e.g. Galbraith 1977; Huber 1982; O'Reilly 1983; Simon 1973; Streufert and Swezey 1986; Tushman and Nadler 1978).

Organizational information processing can be conceptually linked to individual information processing through its filtering and distributive mechanisms. In essence, it influences the amounts and types of data, stimuli and information available to individual organizational members. Thus, organizational information processing can be seen as a basis or an instrument to overcome some of the limitations in individual information processing capacity (e.g. Dutton and Ottensmeyer 1987; Glynn 1996; Goldstein and Zack 1989; Hedberg 1981; March and Simon 1993; O'Reilly 1983).

Earlier attempts to integrate these two perspectives have mainly been theoretical (e.g. Corner, Kinicki, and Keats 1994; Hambrick and Mason 1984; Macdonald 1995; O'Reilly 1983; O'Reilly, Chatman, and Anderson 1987) and/or typically biased toward one perspective where the other is partly assumed away (Corner, Kinicki, and Keats 1994). Despite the convincing assumption that information plays a vital role in the cognitive process through which decision-makers notice and form interpretations

about environmental developments, trends or events, there are relatively few studies taking an organizational information processing view on strategic issue diagnosis (Thomas and McDaniel 1990). If environmental data and stimuli are important input in managers effort to understand and make sense of the environment, one should expect that factors related to organizational acquisition, distribution and sharing of such data and stimuli would influence managers' strategic issue diagnosis. Such factors can include a variety of organizational and group characteristics (e.g. O'Reilly, Chatman, and Anderson 1987). The present study focuses on two different concepts within organizational information processing that are frequently discussed in the organizational information processing literature; organizational scanning and information processing structure of top management teams. These concepts represent essential antecedents to managerial noticing and interpretation since they relate to the channeling of available stimuli to the manager from which he selects a subset (Kiesler and Sproull 1982).

To summarize, in the multiple context information processing perspective applied in the current research, managers' strategic issue diagnosis is assumed to be affected by both organizational, group and individual level information processing characteristics. This argument will be further explicated below, where the selection, definitions and potential effects of the three antecedents are discussed in relation to previous theory and empirical research, starting with organizational scanning.

3.2 Organizational scanning

Organizational scanning is defined as structured and deliberate efforts in acquisition, availability and use of environmental data, stimuli and information in order to monitor the organizational environment. *Scanning profile* refers to (a) the degree of scanning in terms of how frequently an organization scan the environment and (b) the degree of availability and use of different types of information in an organization. Both descriptive and normative literature stress the importance of monitoring and analyzing the external environment in order to provide early warning signals from emerging developments, trends and events, to create a better understanding of the environment and to increase organizational responsiveness (e.g. Daft and Weick 1984; Stoffels 1994). The significance of organizational scanning derives from the notion that

managers can only interpret, disseminate and analyze data and stimuli that enter the organization (e.g. Hambrick 1982). In short, in order to keep an organization in touch with the environment, it must be designed to ensure that decision makers receive information in an amount and form that facilitates effective interpretation and decision making (Daft, Bettenhausen, and Tyler 1993).

Organizational scanning is a broad concept that might involve several modes of information behavior by organizations and their members. Scanning is sometimes differentiated between the *searching* for data, stimuli and information about a specific question, and *viewing* data, stimuli and information without a specific need in mind (e.g. Aguilar 1967; Auster and Choo 1994). Following Huber and Daft (1987), who use *scanning* versus *probing* to denote the differences between viewing and searching, organizational scanning will refer exclusively to the viewing or monitoring mode in the present investigation. Furthermore, scanning can include both formal and informal modes (e.g. Aguilar 1967; Hambrick 1982), and be studied as an organizational phenomenon (e.g. Lenz and Engledow 1986a) or as managerial information behavior or practice (e.g. Hambrick 1982). Given the possibility that managers in organizations that do not use formal systems for environmental scanning tend to focus on their own short-term interests and fail to share information with other managers (Reinhardt 1984; Thomas 1974), the present study focus on the organizational level, formal and deliberate practice of viewing or monitoring the environment.

There are several reasons why organizational scanning as defined above should be included in the study of strategic issue diagnosis. The most obvious one is the combination of its potential to influence managers noticing and interpretation and the lack of previous empirical research. Turning to the latter first, researchers still report considerable gaps of knowledge concerning how organizations process information and possible effects of different modes of information processing (e.g. El Sawy and Pauchant 1988; Lenz and Engledow 1986a; Lenz and Engledow 1986b; Schick, Gordon, and Haka 1990). While there are several studies predominantly occupied with individual and/or more active or problem oriented modes of scanning (e.g. Aguilar 1967; Auster and Choo 1994; Choo 1994; Culnan 1983; Daft, Sormunen, and Parks 1988; Hambrick 1981a; Hambrick 1982; Keegan 1974; Kefalas and Schoderbek 1973; O'Reilly 1980; O'Reilly 1982; Sawyerr 1993; Stoffels 1994), contributions on

formal or institutionalized organizational scanning are less exhaustive (Yasai-Ardekani and Nystrom 1996).

The primary focus of studies on organizational scanning has been to assess the state-of-the-art of environmental analysis among different organizations (e.g. Diffenbach 1983; Fahey and King 1977; Fahey, King, and Narayanan 1981; Jain 1984; Lenz and Engledow 1986a; Stubbart 1982). Moreover, researchers interested in organizational scanning effects have demonstrated a tendency to translate organizational scanning directly to output like response or financial performance (e.g. Dollinger 1984; Gannon, Smith, and Grimm 1992; Jennings and Lumpkin 1989; Reid 1984; Smith et al. 1991), without paying attention to decision makers' interpretations or decisions within the organization. Despite this lack of research, we do know that the scanning effort varies from organization to organization (e.g. Daft and Weick 1984; Jain 1984; Lenz and Engledow 1986a; Meyer 1982; Yasai-Ardekani and Nystrom 1996). Moreover, organizational scanning is usually a relatively stable and routinized organizational feature (Huber and Daft 1987) with an explorative character (Mintzberg, Raisinghani, and Theoret 1976). In general, it is often designed and conducted without any clear notion of when data, stimuli and information will benefit the organization (O'Reilly 1980). In fact, it is suggested that only a small part of an organization's total informational effort is directly related to strategic decision making (Aguilar 1967; Huber and Daft 1987; Sabatier 1978). However, organizational scanning can still be seen as a deliberate and intentional organizational task and a top priority in many organizations (e.g. Jain 1984; Lenz and Engledow 1986a; Lenz and Engledow 1986b), although the motives for scanning the environment probably go beyond the search for threats and opportunities (e.g. Huber and Daft 1987). The most important question in the present investigation, however, is whether it updates the knowledge of managers and provides early input for noticing and interpretation, and thereby actually influences strategic issue diagnosis?

This question is at the heart of the relationship between organizational and individual information processing. There are several arguments that suggest that organizational scanning might not influence strategic issue diagnosis. First, several organizational members and units others than those responsible for strategic issue diagnosis are engaged in scanning (e.g. Daft and Weick 1984; Hambrick 1982), and empirical

studies indicate that organizations are usually not successful in having their informational input integrated into the strategic management process (e.g. Diffenbach 1983; Jain 1984; Lenz and Engledow 1986a; Stubbart 1982). Such findings are usually explained as a distribution problem, i.e. that data, stimuli and information is often blocked or distorted as it travels in organizational communication networks (e.g. O'Reilly 1978). Consequently, the input used in diagnosis is not necessarily the same as what is collected at organizational boundaries. This explanation is also consistent with the observation that managers often rely primarily on their individual scanning, i.e. their self designed information system of sources outside the organization's formal scanning system (e.g. El Sawy 1985; Kotter 1982). Finally, even in cases of successful distribution and where managers rely on input from organizational scanning, the effects on strategic issue diagnosis are questionable. Organizations and their members often collect more information than they use or have the capacity to process (e.g. Feldman and March 1981; O'Reilly 1980; Schick, Gordon, and Haka 1990). The combination of more information and limited information processing capacity can lead to the phenomenon called information overload, which is assumed to negatively influence managerial thinking and decision making effectiveness (e.g. Schick, Gordon, and Haka 1990; Schneider 1988; Schwenk 1986).

In contrast to these arguments and findings, the literature review will demonstrate that there are several studies *indicating* that organizational scanning actually will influence strategic issue diagnosis. Included in the review are contributions that have investigated organizational scanning or other closely related conceptualizations of organizational information processing as antecedents to strategic issue diagnosis or similar forms of managerial sensemaking.

3.2.1 Review of the literature

Due to the vast literature on organizational contextual effects on different aspects of managerial cognition (see Walsh (1995) for an extensive and recent review), this review is rather selective. It only includes studies that are occupied with organizational scanning or closely related organizational level antecedents to strategic issue diagnosis, unless there are other particular reasons to include them.

Pfeffer and Salancik (1978) provided early arguments for the relationship between organizational context in terms of the structure of the organization, the structure of the information system in the organization, and the activities of the organization on the one hand, and attentional processes in organizations on the other. By an information system, they mean the reports, statistics, facts, or information that are regularly collected and their pattern of transmission through the organization. According to Pfeffer and Salancik (1978), regularity of information collection focuses the organization's attention. The collection of certain information occupies the time and attention of the organization. Moreover, the existence of the information conveys the impression that it is important, and the availability of the information will create a demand for the use of the information. Organization structure is suggested to influence attention through integration and coordination of the organization units that collect and control information. Finally, critical organizational activities, either because they constitute a major share of the organization's total activities or due to their importance for other activities, define the importance of information and thus organizational attention.

In a similar vein, Hedberg (1981) argued that organizations use attention-directing mechanisms to cope with both individual and organizational level limitations in information processing capacity. Among several such mechanisms, he stressed the importance of formal information systems. Organizations can determine what information to acquire and how accurate, timely and exhaustive that information shall be. Furthermore, organizations can increase their attention through decentralization and participative decision making that will reduce managers' cognitive work load and improve the quality of upward communication.

Daft and Weick (1984) provided a framework that relates organizational context to organizational sensemaking. This framework describes four different organizational interpretation modes; enacting, discovering, undirected viewing, and conditional viewing. The proposition made by Daft and Weick (1984) is that each mode is determined by the management's assumptions about analyzability of the environment and organizational intrusiveness, and that different interpretation modes will affect managers' attention and interpretation of issues. Intrusive organizations, as opposed to passive ones, actively search the environment by actively detecting facts through

comprehensive formal data gathering and questioning (discovering mode) or actively gathering information through experimentation, testing and inventing the environment (enacting mode). Passive organizations accept whatever information the environment gives them and respond actively only when crisis occurs.

Several studies by Dutton and colleagues have addressed contextual antecedents to attention, and these are more specific in using the language of strategic issue diagnosis. In one of these studies, Dutton and Duncan (1987a) argued that differentiated belief structures in terms of high complexity (breadth and variety of factors which are present and legitimate in a particular belief system) and low consensus are particularly important in determining the activation of strategic issues, the urgency and feasibility assessments and the resulting momentum for change. Differentiation of beliefs in organizations is supposed to increase the frequency of triggering of issues, assessment of urgency and identification of feasible alternatives. Relating their ideas to previous research, they suggested that analyzer organizations (Miles and Snow 1978) and organizations with organic structures (Lawrence and Lorsch 1967), have more differentiated belief structures.

In another study (Dutton and Duncan 1987b), they developed a framework describing the effects strategic planning processes has on an organization's issue array, or the set of strategic issues attended to in an organization. They argued that planning focus (bottom-up vs. top-down), formality, diversity and intensity, influence the scope, size, variety and turnover of an organization's strategic issue array. Among these relationships, it is suggested that formalized planning processes increase the array size, since such processes systematize information collection and dissemination and thus facilitates the identification and storage of strategic issues. Moreover, they proposed that planning diversity (horizontal involvement) broadens the scope of issues and increases the variety and the number of issues in an issue array, because such processes imply multiple perspectives and heterogeneity of informational input.

Milliken, Dutton and Beyer (1990) elaborated further on the processes by which changes are noticed, interpreted, and elicit action. Of particular interest for the present study, is their discussion of two sets of factors affecting the noticing of changes. The first set of factors has to do with the external visibility of issues. It is argued that

independent of the organization that encounters them, some issues are simply more visible than others (due to for instance the intensity of media coverage). The external visibility of an issue is important because it increases the probability that an issue will be noticed, and because more visible issues provide greater ammunition for organizational members to claim that an issue is significant and worth further elaboration. The second set of factors deals with organizational contextual factors that affect the extent of exposure managers will get to issues. Among such factors are the strategy and structure of organizations. For instance, organizations pursuing product differentiation strategies were assumed to be more likely to notice and pay attention to changes since they need to figure out how to create and maintain an image of distinctiveness for their products. Finally, greater participation, less formalization and more interaction were supposed to increase managers' exposure to information and thus increase the probability that change will be noticed.

Dutton and Ottensmeyer (1987) discussed different forms, functions and contexts of strategic issue management (SIM) systems. Such a system is rather broadly defined as a set of organizational procedures, routines, personnel, and processes devoted to perceiving, analyzing, and responding to strategic issues. Dutton and Ottensmeyer (1987) developed four forms of SIM systems dependent on whether they are active or passive and internally versus externally focused. SIM systems have instrumental functions such as timeliness, efficiency and accuracy of issue identification and issues awareness, as well as symbolic functions like detailed issue knowledge, legitimacy of decision making and perceived decision-maker control. While the authors did not develop a complete set of propositions according to their framework, they do argued that SIM systems are important in understanding the processes of sensing, formulating, and interpreting strategic issues.

In a more prescriptive article, Ansoff (1980) discussed how SIM systems can be developed for early identification and fast response to important trends and events both inside and outside the organization. Early identification can be assured in two ways. First, by engaging in continuously strategic issue management, for instance by monthly reviewing and updating a list of key strategic issues. Second, by performing continuous surveillance both inside and outside the organization for "fast" issues which may arrive between reviews of the issue list, and by employing a "red light

signal" to alert management when such issues arise. To assure fast response, organizations should give the responsibility for managing the system to a senior management group which has the resources and authority to initiate prompt action without unnecessary delays, organize SIM activities across normal hierarchical organizational lines, and assign responsibilities not only for planning response, but for resolving the issue. As a parallel to what Milliken et al. (1990) referred to as external visibility, Ansoff (1980) emphasized the importance of weak signals. A SIM system based on detecting such signals requires a trained staff and a substantial investment time. Therefore, its use should be reserved for environments in which very fast changes are frequent.

Thomas et al. (1993) directly addressed scanning and strategic issue diagnosis. Although they conceptualized and measured individual scanning, their study is included in the review since it is one of the few empirical contributions that have investigated information processing and strategic issue diagnosis, as well as action and organizational performance outcomes. Using data from 156 hospitals over a period of three years, they provided support for the hypothesis that information use among managers is positively related to positive-gain and controllability perceptions of two environmental changes. However, the hypotheses that external information use is positively related to positive-gain and controllability was not supported. Consequently, there are mixed results concerning the relationship between individual scanning and interpretation. Their test of the link between interpretation and organizational action also provided mixed evidence. While controllability perception was positively related to product-service changes (action), positive-gain perception was not. Finally, product-service changes was significantly related to all performance measures, including profit. Thomas et al. (1993) also controlled for managers' age, education and organizational experience, but found no significant effects on either interpretation or action.

Denison et al. (1996) did not study organizational scanning, but their contribution is included in this review since they investigated organizational-level antecedents to strategic issue diagnosis that are relevant from an organizational information processing perspective. For instance, one of the antecedents, organizations' experience in the issue domain, was closely related to organizational scanning, as its

assumed effects have to do with availability and use of information in sensemaking. The two other antecedents included were organizational inertia (age and size) and organizational resources (prior performance, slack, growth and capability). Using data from 320 organizations, they found that global business experience, firm size, and perceived capability to respond to the issue were significant predictors of managers' perception of threat and opportunity. Another interesting finding, was that threat and opportunity perceptions were generally a "mirror image", since the same features of organizational context influenced both types of interpretation. Finally, using a split sample analysis based on level of global experience, they found that the results were greater for more experienced organizations, which indicates that the value of organizational context in predicting issue interpretation is dependent on issue salience.

Meyer (1982) did not study scanning either, but included several strategy and ideology variables closely related to organizational scanning. In a natural experiment, he investigated organizational adaption to an environmental jolt (a sudden and unprecedented event). Using data from 19 hospitals that experienced a doctors' strike, the study focused on the impact of hospitals' strategy, ideology, organizational slack and structure on the hospitals' ability to anticipate and adapt to the environmental jolt. Of particular interest, it was found that hospitals with strategies characterized by innovativeness, extensive boundary spanning and attention to the environment, and ideology in terms of perceived importance of the environment, detected the potential for a strike earlier than other hospitals. Although structural variables accounted for less variance than the strategy and ideology variables, both formalization and centralization were negatively related to anticipation of the strike. Organizational slack variables were not significantly related to anticipation.

Goldstein and Zack (1989) adopted Daft and Weick's (1984) framework of organizations as interpretive systems and investigated the relationship between organizational information processing and knowledge acquisition. These researchers did not study managers' interpretation of specific trends, events or developments like Thomas et al. (1993), but knowledge acquisition, which was defined as the process of developing insights into the relationship between the organization and its environment. Employing a structured focused comparison method of two

organizations, they examined how information use was influenced by the supply and distribution of information and how knowledge among product managers was related to information use. In addition, the existing knowledge base and culture were compared to information supply and use, and knowledge acquisition. Their findings suggest that managers in the organization that had the greatest supply of internal and external data and analytic tools, used more information, had more factual knowledge and a better understanding of causality between elements in the environment. The same organization, Beta, integrated its external information sources, facilitating more sophisticated and extensive environmental analysis. Product managers at Alpha, the other organization, did not know the impact of previous promotions and found it difficult to plan new promotions. At Beta, in contrast, product managers examined the impact of previous promotions and used this knowledge to plan new ones. Additionally, Beta had considerable more knowledge about their competitors and their activities than Alpha did. Goldstein and Zack (1989) tentatively concluded that culture, level of knowledge, and information supply and usage represent a self-reinforcing web of causal links. For instance, greater knowledge among Beta's product managers, allowed them to be more directed in defining and meeting their information needs. As knowledge increases, more variables and relationships are identified and made explicit, and more facts are demanded. As more facts are gathered and analyzed, knowledge increases and the cycle repeats. Based on these findings and speculations, Goldstein and Zack (1989) argued that the prescription of fit between an organization's information requirements and its information processing capabilities (e.g. Galbraith 1973; Tushman and Nadler 1978) becomes a stationary objective. If the information use/knowledge relationship is reciprocal, "good" fit at low levels will further decrease the information processing requirements and capabilities in organizations.

Sutcliffe (1994) studied a previously underexamined aspect of managers' interpretation, namely the accuracy of their perceptions. She investigated whether organizational scanning, top management team characteristics and organizational structure influence the extent to which managerial perceptions of environmental instability and munificence (resource levels or trends) are congruent with objective measures of these environmental conditions. Using a sample of 345 managers from 65 organizations in several industries, it was found that intensity and frequency of

organizational scanning and the inverse degree of centralization were the two variables that had the strongest positive relationship with perception accuracy of environmental instability. This finding was attributed to the assumption that both organizational scanning and decentralized structures increase the breadth and variety of informational inputs. Top management team tenure and organizational scanning were both positively related, while functional diversity of the top management team was negatively related to perception accuracy of environmental munificence. Sutcliffe (1994) suggested that environmental munificence may be more difficult to detect and understand than instability, since it seems that accurate perceptions is enhanced by factors (low diversity and high tenure) that increase the depth and integration of team information processing, as opposed to breadth and variety of informational inputs.

The studies reviewed so far are particularly relevant due to their direct focus on the relationship between organizational information processing and strategic issue diagnosis or similar forms of managerial sensemaking. However, additional insight into this relationship might be provided by empirical studies that link organizational information processing to organizational action or performance. For instance, Lenz and Engledow (1986a) examined organizational scanning in ten "leading edge" high performing corporations that were known for their serious commitment to environmental analysis activities. One of their findings was that each firm was using a continuous process of information gathering, similar to the discovery mode described by Daft and Weick (1984) and as prescipted by Ansoff (1980). Another finding consistent with Ansoff (1980), was that integrated scanning, as opposed to free-standing scanning units, seemed to be the most promising way to organize organizational scanning activities.

Jennings and Lumpkin (1989) studied organizational scanning activities among savings and loan companies in Texas after a deregulation of the industry. Using data from 44 companies classified as high on strategic momentum and 71 that were classified as low on strategic momentum, they found that the first group was more active in scanning for opportunities and obtaining information about customer attitudes. Companies low on strategic momentum, on the other hand, tended to use scanning activities to identify threats and largely scanned competitors and the regulatory environment.

Smith et al. (1991) investigated the relationship between organizational information processing and response to competitors' moves among 32 U.S. domestic airline companies over an eight-year period. Using structured content analysis of an industry magazine, they detected 418 competitive responses to 191 tactical and strategic actions during the period. An important finding in this study was that an organization's external orientation (in terms of the relative number of vice presidents located in marketing and customer services) was significantly positively related to response likelihood and negatively related to response lag and order. In commenting this finding, the authors suggested that organizations with an external orientation have more and richer information on competitors' actions because these organizations are better at sensing and interpreting the competitive environment. It was also found that structural complexity (the number of organizational levels and departments relative to size) was significantly negatively related to response likelihood, which is linked to the finding that increasing structural complexity might increase the probability that the information being transmitted will be distorted or blocked. Among several other findings, Smith et al. (1991) found that management teams with fewer years of experience were more likely to respond and to respond early than more experienced teams.

Based on the same data as Smith et al. (1991), Gannon et al. (1992) conducted a study of organizational information processing characteristics and first-mover activity. The hypotheses that first-mover activity is positively related to boundary spanning and negatively related to structural formalization were supported. Top management team characteristics were also examined, and it was found that educational level was positively, and years of industry-specific experience was negatively, related to the level of first-mover activity. These findings were explained with reference to research that has indicated that both less-experienced and more-educated managers tend to be more exhaustive in searching out information than their more-experienced and less-educated counterparts (Hambrick and Mason 1984). Finally, they did not find support for hypotheses that suggest that the level of first-mover activity increases with product specialization and market share and decreases with absorbed slack. Based on their findings, Gannon et al. (1992) constructed an organizational profile of first movers. Such organizations tend to avoid formalization, stress boundary-spanning activities,

possess an ample amount of resources or at least are not experiencing financial difficulty, possess a major but not dominant share of the market, and are managed by more-educated and less-experienced top management teams than firms that do not move first.

Table 3.1: Summary of research on the relationship between organizational information processing, focusing on scanning and strategic issue diagnosis or response.

Source	Organizational information processing	SID/sensemaking or response	Hypothesized effects	Empirical support
Pfeffer and Salancik (1978)	Information systems, structure, and organizational activities	Attention	Association	N.appl.
Hedberg (1981)	Information systems, decision making structure, etc.	Attention	Association	N.appl.
Daft and Weick (1984)	Interpretive modes	Attention and interpretation	Association	N.appl.
Dutton and Duncan (1987a)	Differentiated belief structures	Issue activation, assessment of urgency and feasible alternatives, and response	Pos. ass.	N.appl.
Dutton and Duncan (1987b)	Focus, formality, diversity, and intensity of strategic planning	Scope, size, variety and turnover of issue array	Association	N.appl.
Milliken et al. (1990)	External visibility and organizational exposure (e.g. strategy and structure)	Noticing	Positive ass.	N.appl.
Dutton and Ottensmeyer (1987)	Different forms of SIM systems	Sensing, formulation and interpretation	Association	N.appl.
Ansoff (1980)	Continuously SIM, top management responsibility and integration of SIM	Identification and response	Pos. ass.	N.appl.
Thomas et al. (1993)	Information use	Positive-gain and controllability	Pos. ass.	+
	Use of external information	Positive-gain and controllability	Pos. ass.	-
	Positive-gain	Product and service changes	Pos. ass.	-
	Controllability	Product and service changes	Pos. ass.	+
	Product and service changes	Performance	Pos. ass.	+
Denison et al. (1996)	Global experience	Opportunity/Threat	Pos./neg. ass.	+/+
	Organizational size	Opportunity/Threat	Neg./pos. ass.	+/+
	Organizational age	Opportunity/Threat	Neg./pos. ass.	-/-
	Prior performance	Opportunity/Threat	Pos./neg. ass.	-/-
	Organizational slack	Opportunity/Threat	Pos./neg. ass.	-/-
	Growth	Opportunity/Threat	Pos./neg. ass.	-/-
	Capability	Opportunity/Threat	Pos./neg. ass.	+/+
Meyer (1982)	Strategy, ideology, structure and organizational slack	Anticipation of environmental jolts	Association	+/-
Goldstein and Zack (1989)	Supply and distribution of information	Information use	Pos. ass.	+
	Information use	Knowledge acquisition	Pos. ass.	+
Sutcliffe (1994)		Perception accuracy of:		
	Organizational scanning	environmental instability/munificence	Pos./pos. ass.	+/+[a]
	Centralization	environmental instability/munificence	Neg./neg. ass.	+/-
	TMT diversity	environmental instability/munificence	Pos./pos. ass.	-/-[b]
	TMT tenure	environmental instability/munificence	Pos./pos. ass.	-/+
Lenz and Engledow (1986a)	Continuous and integrated environmental scanning	Ten "leading edge" corporations	Association	N.appl.
Smith et al. (1991)	External orientation	Competitive response	Pos. ass.	+
	Structural complexity		Pos. ass.	+
	Management's years of experience		Neg. ass.	+
Gannon et al. (1992)	Boundary spanning	First-mover activity	Pos. ass.	+
	Formalization		Neg. ass.	+
	TMT educational level		Pos. ass.	+
	TMT experience		Neg. ass.	+
	Product specialization		Pos. ass.	-
	Market share		Pos. ass.	-
	Organizational slack		Neg. ass.	-

[a]Marginally significant
[b]Significantly negative relationship

Although the latest studies reviewed did not assess strategic issue diagnosis or sensemaking directly, they contribute in establishing the importance of organizational information processing to strategic issue diagnosis. First, the availability of information and managers' use of information are the mechanisms used to explain the empirical relationship between organization information processing and response or performance. An important part of this explanation, i.e. that information availability is an important predictor of information use, is supported by studies of individual information behavior (e.g. Culnan 1983; Culnan 1984; O'Reilly 1982) as well as by Goldstein and Zack (1989).

To conclude, the literature review indicates that organizations with high scanning profiles tend to be more responsive to environmental changes than organizations with lower scanning profiles. Furthermore, previous research strongly suggests that managers in organizations with high scanning profiles use more data, stimuli and information in strategic issue diagnosis. Finally, organizational scanning or other closely related conceptualizations of organizational information processing, seem to predict attention, interpretive accuracy, causal understanding of the environment, and threat and opportunity perceptions. Based on this review and the four concepts of strategic issue diagnosis explicated in the previous chapter, it is proposed that the scanning profile of an organization will influence managers' strategic issue diagnosis.

3.3 Top management team information processing structure

While organizational scanning primarily refers to the acquisition and availability of environmental input, the information processing structure of the top management team deals more directly with face to face intra-organizational distribution, sharing and processing of data, stimuli and information. The information processing structure of the top management team is defined as the rules, procedures and patterns of interaction and participation that characterize the top management team when it addresses strategic issues.

In general, organization structure influences the flow of information and the context and nature of human interactions (Miller 1987). It channels collaboration, specifies modes of coordination, allocates power and responsibility, and prescribes levels of

formality and complexity (Bower 1970). The present study focuses on the structure of the organization's top management team, because this relatively small group at the top of an organization provide the structural context for top managers' strategic issue diagnosis (Corner, Kinicki, and Keats 1994; Thomas and McDaniel 1990).

The information processing structure of the top management team is a concept developed by Duncan (Duncan 1973; Duncan 1974) and refined and used in previous strategic issue diagnosis research (e.g. Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991; Thomas, Shankster, and Mathieu 1994). It is conceptualized on a mechanistic-organic continuum, where "organicness" or "looseness" is defined by (1) the degree to which the team's members participate in strategic decision making, (2) the inverse degree to which strategic decision making is formalized, and (3) the degree of interaction among the team's members. The notion of *"information processing* structure" relates to findings that indicate that these structural characteristics influence the team's capacity to process information (Duncan 1973; Duncan 1974; Galbraith 1973) and thus facilitate or impede the use of data, stimuli, information and perspectives in strategic issue diagnosis (e.g. Daft and Lengel 1986; Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991).

3.3.1 Review of the literature

Several of the studies reviewed in relation to organizational scanning effects on strategic issue diagnosis, also discussed or empirically explored organization structure (e.g. Ansoff 1980; Dutton and Duncan 1987a; Dutton and Duncan 1987b; Gannon, Smith, and Grimm 1992; Hedberg 1981; Lenz and Engledow 1986a; Meyer 1982; Pfeffer and Salancik 1978; Smith et al. 1991; Sutcliffe 1994). Below, some additional studies that have addressed structural influence on strategic issue diagnosis or sensemaking are reviewed. At the end of the review, the particular dimensions of top management team information processing structure, participation, flexibility and interaction, are related to strategic issue diagnosis.

Shank et al. (1988) developed an information processing model of environmental perceptions where organization structure, top management team interaction and individual scanning are seen as predictors of environmental perception accuracy. The

model suggests that formalization, centralization and complexity are negatively related to accuracy of individual perceptions because such structural characteristics limit organizational information processing. Furthermore, a curvilinear relationship between individual scanning and accurate perceptions was suggested. The idea is that as scanning reach very high levels, only a marginal increase in accuracy is possible and this marginal gain may be offset by information overload. Finally, communication density and openness within the top management team were expected to be positively related to perception accuracy, due to greater information sharing and acceptance and analyses of conflicting and diverse information.

Milliken (1990) examined the interpretation of a specific environmental change (a decline in the number of 18-22-year-olds) among 211 top managers representing 122 colleges and universities. Among several organizational antecedents to strategic issue diagnosis, she investigated how decentralization and participation in strategic decision making was related to state certainty (noticing), effect certainty (interpretation of effects) and response certainty (confidence about response options and their effectiveness). Milliken (1990) argued that decentralization of strategic decision making allows managers to be exposed to the opinions of others who may be more active boundary spanners than themselves, thus becoming more informed about environmental changes. Contrary to the hypotheses, decentralization was not related to effect or response certainty, but was positively related to the likelihood that the environmental change had been noticed.

Of particular interest for the present study, Thomas and McDaniel (1990) examined how the top management team (TMT) information processing structure and organizational strategy were related to managers' information usage and effect valence. In their study of 151 hospital top managers, they found that high levels of participation, interaction and flexibility, i.e. "organic" or "rich" TMT information processing structures, were positively related to information usage, and positive, potential gain and controllability interpretations. It was also found that managers in organizations oriented toward domain offense strategies used more information and were more likely to interpret issues as controllable than managers in domain defensive organizations. The hypotheses that strategy was related to positive and potential gain interpretations were not supported.

Thomas et al. (1994), shifted from the focus on threat and opportunity interpretations toward the interpretation labels of "strategic" and "political" in order to better capture how certain issues affect an organization in terms of both its strategic positioning and the issue's political underpinnings. Additionally, they empirically investigated the relationship between several individual, group and organizational level variables and issue interpretation. Using data from 611 executives from 372 colleges and universities, it was found that neither executive level, position tenure, institutional tenure or academic background were related to strategic interpretation, but that executive level and position tenure were significantly negatively related to political interpretation. TMT information processing structure was not significantly related to strategic interpretation, but significantly negatively related to political interpretation. Overall, organizational level variables did not produce significant findings. The only significant findings for strategic interpretation were found for two additional group level variables, namely group identity and political activity, that were both positively related to strategic interpretation. The finding that low levels of participation, interaction and flexibility were linked to strong perceptions of political implications is seen in relation to absence of information exchange among top management team members, leading managers to see issue as arenas for protecting or enhancing their control.

In a follow-up study, Gioia and Thomas (1996) conducted a two-phase research approach that progressed from a grounded model anchored in a case study to a quantitative, generalizable study of interpretation processes. Using the same data as Thomas et al. (1994), but with different analytical techniques (path and mediation analyses), the quantitative part of the study showed that the TMT information processing structure played a key role in interpretation. First, as Thomas et al. (1994), a direct negative relationship between organic TMT structures and political interpretation was found, but no significant relationship between TMT information structure and strategic interpretation. However, Gioia and Thomas (1996) found that organic TMT structures were related to stronger identities, present image and desired future image. These findings suggest that if the emphasis is on "who we are" (present image), information processing structure provides the means for justifying and reinforcing the status quo. On the other hand, if the emphasis is on "who we want to

be" (desired future image), information processing structure becomes a driver for legitimizing an altered image. Finally, from the grounded part of the study, Gioia and Thomas (1996) found that managers did not use the threat/opportunity labels in interpretation, a finding in line with Smiths (1995) study of managers' classification of problems.

Table 3.2: Summary of research on the relationship between organizational information processing, focusing on organization or top management team structure, and strategic issue diagnosis or response.

Source	Organizational information processing	SID/sensemaking or response	Hypothesized effects	Empirical support
Shank et al. (1988)	Organization structure, top management team interaction and individual scanning	Perception accuracy	Association	N.appl.
Milliken (1990)	Decentralization	State certainty, effect certainty and response certainty	Pos. ass.	+/-
Thomas and McDaniel (1990)	TMT info. processing structure Strategy	Information usage and effect valence	Pos. ass. Pos. ass.	+/+ +/-
Thomas et al. (1994)	Ownership	Strategic/political interpretation	Association	-/-
	Organizational type	Strategic interpretation	Association	-
	Organizational size	Strategic/political interpretation	Association	-/-
	TMT info. processing structure	Strategic/political interpretation	Association	-/+
	Group identity	Strategic/political interpretation	Association	+/+
	Political activity	Strategic/political interpretation	Association	+/+
	Executive level	Strategic/political interpretation	Association	-/+
	Position tenure	Strategic/political interpretation	Association	-/+
	Institutional tenure	Strategic/political interpretation	Association	-/-
	Academic background	Strategic/political interpretation	Association	-/-
Gioia and Thomas (1996)	TMT info. processing structure	Strategic/political interpretation	Association	-/+
		Identity	Association	+
		Present image/desired future image	Association	+/+

While there are numerous empirical investigations on different forms of organizational structure and its antecedents and multiple effects, empirical studies linking structure to strategic issue diagnosis are still rare. However, several studies (in addition to those reviewed here) have given strong theoretical linkages between how the top management team is structured to process information about strategic issues, and how it might limit or enhance recognition of stimuli, impede the search for data, and influence the use and exchange of perspectives and understanding in strategic issue diagnosis (e.g. Duncan 1974; Dutton 1993a; Dutton 1993b; Dutton and Duncan 1987b; Dutton and Jackson 1987; Fredrickson 1986a; Hedberg 1981; Knight and McDaniel 1979; O'Reilly, Chatman, and Anderson 1987; Pfeffer and Salancik 1978; Shank et al. 1988; Staw, Sandelands, and Dutton 1981). Moreover, strategic issue diagnosis research by Thomas and colleagues have empirically demonstrated that organic or rich information processing structures are associated with greater data search efforts and a tendency to view issues as opportunities (Thomas and McDaniel 1990) and negatively related to political interpretation (Gioia and Thomas 1996;

Thomas, Shankster, and Mathieu 1994). Furthermore, research on diagnosis relevant topics have provided empirical support in the same direction on the recognition of environmental jolts (Meyer 1982), emerging environmental events (Milliken 1990), and interpretive accuracy (Sutcliffe 1994). Additionally, studies of perceived environmental uncertainty (PEU) and structure have also shed some light on the relationship of interest here. Some researchers have found indications of higher PEU in tightly structured than in loosely structured groups (e.g. Huber, O'Connell, and Cummings 1975; Schmidt and Cummings 1976) while other contributors have found support for the opposite (e.g. Leifer and Huber 1977). However, the conflicting findings are not explained with reference to the effects of structure, but to the effects of flows of information. Leifer and Huber (1977) argues that limited flows of information buffer and simplify "real" uncertainty and thus result in low PEU. Huber et al. (1975) and Schmidt and Cummings (1976) on the other hand, argue that limited flows of information increase PEU as a reflection of lack of information. Thus, all studies referred to above support the view that loosely structured groups are characterized by greater flows of information.

Finally, the particular dimensions of top management team information processing structure, participation, flexibility and interaction, are related to strategic issue diagnosis. More *participation* in decision making by members of the top management team increases the number and variety of information processors, thus increasing the total information processing capacity. Hence, increased participation can increase the number of variables considered, the number of possible cause-and-effect relationships suggested, and the number of possible outcomes that potentially will result from strategic issue diagnosis (Thomas, McDaniel, and Anderson 1991). If the team members have different functional experience, additional variation in knowledge and perspectives can be expected, providing the group and its individual members with a more complete image of the organization's environment (e.g. Hambrick and Mason 1984; Milliken and Vollrath 1991; Wiersema and Bantel 1992).

Several organizational members and units others than those responsible for strategic issue diagnosis are engaged in scanning (e.g. Daft and Weick 1984; Hambrick 1982). Therefore, data, stimuli and information might be blocked or distorted as it travels from boundary spanning personnel to decision makers (e.g. O'Reilly 1978). The level

of participation in the top management team might influence such distribution problems since the team members are important links between other organizational members and the top management team. Thus, increased participation might enhance the channeling of environmental data, stimuli and information from other organizational members, through top management team members, to the top management team. This argument might also hold for the channeling of perspectives and goals from the top management team to the rest of the organization. For example, low levels of participation in the top management team reduces the team members' knowledge of important issues, which in turn distorts the link between the top of the organization and other organizational members. Then, team members as well as other organizational members, might fail to recognize important environmental signals (e.g. Fredrickson 1986a), or recognize potentially important signals but not rely information to the top management team because they question its value or relevance for the top management team (Shank et al. 1988; Sutcliffe 1994). Finally, to the extent that low participation implies low diversity in goals and preferences of team members, they may tend to look for and accept data that conforms to existing expectations, preferences and believes (Schwenk 1984). Norms of consistency may facilitate use of narrow and homogenized perspectives, increase commitment to past actions, and reinforce old ways of seeing the world (Staw 1981). Thus, even if top managers are exposed to potentially important and relevant data, they may ignore or disregard it.

Flexibility refers to the inverse of specification of behaviors in advance of their execution through the use of rules, programs, and standard operation procedures (Galbraith 1973). Low flexibility or high formalization is best applied in situations of low uncertainty where issues that arise are anticipated and well understood, and where information is routine, which is not the case for strategic issues. Therefore, low degrees of flexibility may limit the number of variables considered, the number of possible causal relationships identified, and the number of possible outcomes that might result from strategic issue diagnosis (Thomas, McDaniel, and Anderson 1991).

Interaction among top management team members may occur both within and outside formal group settings and will increase the amount of information processed (Duncan 1974). Reliance on informal networks will especially increase the capacity to process

non-routine information (Galbraith 1973). Such networks will not only supplement formal communication patterns, but also sometimes represent alternatives to formal interaction arrangements (Stevenson and Gilly 1991). Thus, both formal and informal interaction will increase the information capacity of the top management team, and informal interaction will provide freedom to exchange and develop new perspectives in viewing strategic issue.

In conclusion, there are strong theoretical arguments and some empirical support that suggest that the information processing structure of the top management team will influence strategic issue diagnosis. Since participation, flexibility and informal interaction directly influence the quality, quantity and diversity of the availability and use of data, stimuli, and information (e.g. Miller 1987; O'Reilly, Chatman, and Anderson 1987), the differentiation of team members' belief structures (e.g. Dutton 1993a; Dutton and Duncan 1987a), the challenge of managers perspectives and understanding, and thus the degree to which decision makers become subjects to biases and errors in strategic issue diagnosis (e.g. Dutton 1993a; Dutton 1993b; Leifer and Huber 1977; Schweiger, Sandberg, and Rechner 1989; Schwenk 1984), it is proposed that the characteristics of an organization's top management team will influence managers' strategic issue diagnosis.

3.4 Cognitive complexity

Theories of cognitive complexity lies at the heart of an individual information processing perspective as they address the structural dimensions that underlie the flow, processing, and use of information. Following the general principles in contemporary complexity theories (e.g. Streufert and Streufert 1978; Streufert and Swezey 1986), cognitive complexity can be defined as the extent to which individuals differentiate and integrate data and stimuli in perception and evaluation. Differentiation refers to the ability to perceive several dimensions in a stimulus array, and integration refers to the development of connections among the differentiated characteristics. A third dimension occasionally used is discrimination, which refers to the extent to which an individual sees shades of grey among dimensions (Streufert and Swezey 1986).

Cognitive schemas have been described as simplified models of some parts of the environment, and heuristics as simplifying strategies in managerial information processing. While such simplification might be associated with errors in judgment and decision making, simplification is both useful and necessary. Without it, managers would become paralyzed by the need to analyze extensive ambiguous data (e.g. Bazerman 1994; Daft and Weick 1984; Kiesler and Sproull 1982; Tversky and Kahneman 1974; Walsh and Fahey 1986; Weick 1979b). This duality raises the issue of the adequate level of cognitive simplicity versus complexity (Calori, Johnson, and Sarnin 1994; Streufert and Swezey 1986). It is generally assumed that in complex and ill-structured tasks, like dealing with strategic issues, high cognitive complexity will lead to more accurate perception and more effective behavior (Bartunek, Gordon, and Weathersby 1983; Calori, Johnson, and Sarnin 1994; Denison, Hooijberg, and Quinn 1995; Streufert and Swezey 1986; Weick 1979b). Weick (1979b:261) argued that it is difficult to overemphasize the importance of developing complexity in managers, and advised them to "complicate" themselves. Moreover, since there is evidence that the complexity of managerial work is generally increasing (e.g. Peters 1988), cognitive complexity will be an even more important managerial attribute today and in the future than it has been in the past.

While it is generally acknowledged that an accurate understanding of strategic decisions require consideration of the effects of managers' personal characteristics (e.g. Gupta 1988; Norburn 1989), there is a dearth of knowledge about this topic in general (Jackofsky and Slocum 1988). More specifically, and despite the increasing focus on the role of managerial cognition and its influence on organizational strategy and performance outcomes, research within organization theory and strategic management have rarely studied managers' cognitive complexity empirically (e.g. McGill, Johnson, and Bantel 1994). The most commonly used personal characteristics in empirical research have been demographic characteristics like managers age, industry, organizational or executive tenure, education level and functional or occupational background (Bluedorn et al. 1994). While these individual factors are generally believed to influence managers' cognitive complexity (e.g. Calori, Johnson, and Sarnin 1994) or serve as indicators of managers cognitive base or style (e.g. Hambrick and Mason 1984; Wiersema and Bantel 1992), research that goes beyond directly observable managerial characteristics and focuses on cognitive abilities or

skills might be an important way to increase our understanding of the more general question of whether and how the individual manager matters in strategic decision making (e.g. O'Reilly and Chatman 1994). Psychological measures allow more specified explanations of the relationships under study, and they usually contain less noise than observable managerial characteristics (Hambrick and Mason 1984).

3.4.1 Review of the literature

Since studies of cognitive complexity have been thoroughly reviewed elsewhere (e.g. Hooijberg, Hunt, and Dodge 1997; Streufert and Nogami 1989; Streufert and Streufert 1978; Streufert and Swezey 1986), and most studies have been conducted in structured laboratory settings (Chang and McDaniel 1995), the review below will be based on more general findings from these reviews along with some examples of cognitive complexity research in field or other ill-structured settings.

Cognitive complexity has not yet been studied in strategic issue diagnosis research. In fact, even within cognitive complexity theory, relatively few researchers have focused on complex or ill defined or ill structured issues, problems or decision making (Streufert and Streufert 1978; Streufert and Swezey 1986). Despite this lack of research, cognitive complexity theory provide strong arguments for an association between cognitive complexity and strategic issue diagnosis. The overall impressions from previous research is that cognitively complex individuals are more effective in complex tasks (Streufert and Streufert 1978). They generally tend to search for more information (Tuckman 1964), different kinds of information (Dollinger 1984; Karlins and Lamm 1967) and engage in more effective integration of that information in their decision processes (Schwenk 1986; Stone, Sivitanides, and Magro 1994; Streufert and Swezey 1986). Moreover, research reviewed by Streufert and Nogami (1989) suggest that less cognitively complex individuals are more directly responsive to the quantity of information present in the environment, i.e. they search more when information is inadequate and less when information overload exists, independently of the relevance of information. In general, cognitively complex individuals seem to be more actively information orientated and their search activities are more a function of information need than of environmental conditions (Streufert and Nogami 1989). Finally, they are more sensitive to and more able to utilize minimal cues that might have been obtained

through information search (Harvey 1966). Turning to evaluation, impression formation and attribution, cognitive complexity is positively related to more abstract reasoning (Neuliep and Hazleton 1986), increased capacity to reconceptualize problems (Lepsinger et al. 1989; Merron, Fisher, and Torbert 1987), tolerance for ambiguity and diversity (Streufert, Streufert, and Castore 1968) and more accurate and balanced perceptions (Miller 1969). Moreover, cognitively complex individuals tend to be more capable of taking the perspectives of others (Triandis 1977) and generally demonstrate more moderate attributes in evaluation (Linville 1982; Linville and Jones 1980). Finally, Streufert and Nogami (1989) points to several studies occupied with leadership and task performance, where cognitive complexity has been found to be positively related to strategic planning activities and the tendency to focus on a variety of components of the leadership role. In sum, previous research suggests that cognitively complex individuals process information differently and perform certain tasks better than less complex individuals. Below, four more recently conducted studies of cognitive complexity in field or other ill-structured settings are reviewed.

Chang and McDaniel (1995) studied individuals' use of search strategies in a loosely structured yet information rich environment where no clear questions were provided to give direction to the search. Using a HyperCard software program containing information about the Vietnam War, 32 students were queried by the investigator while they browsed freely through the program. Among several cognitive variables included (cognitive complexity, scholastic aptitude, need for cognition and learning orientation), cognitive complexity was the single most important characteristic determining the level of investigative direction in search. Cognitively complex students were more likely to exhibit connectedness between topic choices in the program and searched less randomly than their less cognitively complex counterparts. The subjects were also instructed to write a summary of the information in the program, and the complexity of the summary was significantly positively related to search strategies and all the cognitive variables, including cognitive complexity. The authors conclude that "cognitive complexity may translate to an intention to understand, to avoid premature closure, to consider alternative viewpoints, and to arrive at reasonable conclusions" (Chang and McDaniel 1995, p. 103).

Wofford (1994) empirically investigated antecedents and consequences of the cognitive processes employees use in handling job problems among 74 subjects in two organizations. Job problems were defined as the issues, decisions, and tasks that employees handle in their work. He found that cognitively complex employees used a significantly higher number of script tracks for frequently occurring job problems as well as rarely occurring problems, indicating that cognitively complex employees applied multiple perspectives, tried out more approaches and gathered more information than employees low in cognitive complexity. Wofford (1994) also found that the number of script tracks used for rarely occurring job problems was positively related to the likelihood of being promoted and that job complexity moderated the relationship of cognitive complexity and promotability. These findings made Wofford (1994) to conclude that organizations should attempt to hire or promote cognitively complex employees for complex jobs and for jobs that require the use of a large number of script tracks.

McGill, Johnson and Bantel (1994) found a strong relationship between cognitive complexity and four measures of performance among eight bank managers. Cognitively complex bank managers were rated significantly higher by superiors on (1) short and (2) long term performance based on short and long term financial results, (3) over-all performance appraisal and (4) other performance accomplishments in the role as bank manager. Additionally, complex bank managers were also rated as significantly less conform by their superiors. In testing an interaction model, McGill et al. (1994) found that cognitive complexity had a direct effect on performance, as well as an indirect effect on performance through a large negative effect on conformity. Although the performance measures are quite different from the dimensions of strategic issue diagnosis used in the present study, the effects are explained through the same mechanisms that might influence strategic issue diagnosis. In their own words; "The effect is driven by superior information processing, creativity, abstraction, breadth of focus, and communication skills of cognitively complex managers" (McGill et al. 1994, p. 1454).

Hitt and Tyler (1991), who studied managers' evaluation of acquisition candidates, did not find any effects of cognitive complexity. With data from 65 top executives from several industries, it was found that industry and several personal characteristics

had significant but small effects on evaluation. The main effects of objective criteria were by far the strongest, since more than 80 percent of the total explained variance in evaluation was attributed to objective target firm characteristics. In testing moderating effects of industry and personal characteristics, Hitt and Tyler (1991) found that industry, age, type of education, amount of work experience and level of the executive were all statistically significant moderators of the relationship between objective criteria and evaluation of acquisition candidates, while level of education, risk orientation and cognitive complexity were not. Due to these findings, the authors suggest that managers are fairly rational in decision making. Another possible explanation is that the target firm cases used in their study were too simple and easy to understand compared to actual acquisition candidates. Moreover, Hitt and Tyler (1991) focused exclusively on social cognitive complexity, i.e. how complex managers were in evaluation of other people.

Therefore, Hitt and Tyler's (1991) findings are too inconclusive to be treated as an argument to stop looking for cognitive complexity effects on managers' strategic issue diagnosis or decision making. Based on more than 30 years of research, it seems that cognitively complex subjects compared to less complex subjects, in general apply multiple, complementary perspectives to describing and analyzing events, perceive events more accurately, synthesize diverse perceptions and experience more completely, and generally behave more effectively in strategic decision making (Bartunek, Gordon, and Weathersby 1983; Streufert and Swezey 1986). While mainly demonstrated among students in laboratory settings, these findings suggest that managers' cognitive complexity will influence strategic issue diagnosis.

Table 3.3: Summary of research on the relationship between cognitive complexity and strategic issue diagnosis

Source	Cognitive complexity	SID/sensemaking or performance	Hypothesized effects	Empirical support
Chang and McDaniel (1995)	Cognitive complexity, scholastic aptitude, need for cognition, learning orientation, and investigative search strategies	Investigative search strategies and complexity of summaries	Pos. ass.	+
Wofford (1994)	Cognitive complexity	Number of script tracks used for job problems	Pos. ass.	+
McGill et al. (1994)	Cognitive complexity	Performance	Pos. ass.	+
Hitt and Tyler (1991)	Personal, industry and objective characteristics	Evaluation of acquisition candidates	Association	+/-

3.5 The relative importance of cognitive complexity and organizational context

The primary aim of the present study is to explore whether and how antecedents at different levels of analysis influence managers' strategic issue diagnosis. So far, the relative importance of organizational scanning and the information processing structure of the top management team on the one side, and managers' cognitive complexity on the other, have not been discussed. Most behavioral scientists agree that both personal or individual and situational or contextual characteristics influence behavior (e.g. Chatman 1989; Pervin 1989). However, the challenge has been not only to determine *if* person and situation variables are valid predictors of behavior but also determine *when* and to *what extent* person and situation variables predict behavior (Chatman 1989; Pervin 1989; Schneider 1987). Along with the interactionist debate in psychology (see Pervin (1989) for a review of its history), there has been a controversy within the fields of organization theory and strategy about the role of the top manager versus the organization or the external environment of the organization (e.g. Aldrich 1979; Bourgeois 1980; Child 1972; Child 1997; Eisenhardt and Zbaracki 1992; Gupta 1988; Hambrick and Finkelstein 1987; Hambrick and Mason 1984; Hannan and Freeman 1977; Hitt and Tyler 1991; Hrebiniak and Joyce 1985; Jackofsky and Slocum 1988; Pfeffer and Salancik 1978; Porter 1980; Rumelt 1991; Thomas, Shankster, and Mathieu 1994). It is not the intention here to go deep into this controversy, and as Pervin (1989) concludes, the person-situation debate cannot be ultimately resolved.

However, the present investigation can shed further light on the question of to what extent the cognitive complexity of managers and the organizational and group contexts respectively predict the particular managerial task of strategic issue diagnosis. Since cognitive complexity has not yet been studied in relation to strategic issue diagnosis, and most strategic issue diagnosis research has focused predominantly on threat-opportunity construction, little theory or empirical evidence exist to guide the development of propositions about the question of relative importance. Therefore, two competing suggestions are proposed. These will be based on theory in strategic management and decision making and be rooted in a strategic choice versus an organizational control perspective. In order to simplify the

discussion, organizational scanning and top management team information processing structure will be treated together and be referred to as the organizational information processing context.

3.5.1 An organizational control perspective

The case for contextual direct effects on strategic issue diagnosis is based on two closely related mechanisms; the exposure effect and the developmental effect. The most widely used argument from the organizational information processing literature is the *exposure effect*. This effect implies that organizational scanning and the structure of the top management team, through their filtering and distributive mechanisms, will in large part determine the exposure of amounts and diversity of data, stimuli and information in organizations. This in turn will guide the instantiation of managers cognitive representations. The organization provides cues which trigger cognitive schemas, and individual managers will use the triggered schemas in interpreting and selecting incoming data, stimuli and information, and to retrieve more specific internal information from memory (e.g. Calder and Schurr 1981; Svyantek, Jones, and Rozelle 1991) and additional input from the organizational environment (e.g. O'Reilly 1983). Organizational context, like organizational scanning and structure, might also provoke a switch in cognitive modes from "habits of mind" or more automatic processing, to more active modes of thinking (e.g. Louis and Sutton 1991).

The *developmental effect* is based on the rather clear principle that people draw heavily on accumulated experience to aid their understanding (e.g. Fiske, Kinder, and Larter 1983) and the assumption that organizational context plays an important role in the development of managers' cognitive representations of the internal and the external environments (Weick 1979b). More specifically, it is suggested that exposure of amounts and diversity of data, stimuli and information over time will influence managers understanding. Accordingly, some organizational contexts should be more capable of promoting and developing managers' domain specific knowledge and understanding than other contexts. High levels of organizational scanning might create such an organizational context, since managers will be exposed to greater amounts and more diverse stimuli and information (e.g. Goldstein and Zack 1989).

Moreover, organic top management team structures are supposed to challenge individual top managers perspectives and understanding (e.g. Dutton 1993a; Dutton 1993b) and thus increase the differentiation of their belief structures (e.g. Dutton 1993a; Dutton and Duncan 1987a). Bartunek and Louis (1988) suggest that high participation and group involvement, a characteristic of loosely structured top management teams, foster individual integration of stimuli and information. First individuals are exposed to different perspectives. Then they are encouraged to let knowledge of these perspectives lead to a new resolution, which incorporates elements of each (Bartunek and Louis 1988). Given such developmental effects on managers' experience, managers in organizational contexts characterized by high levels of scanning and loosely structured TMT teams might develop more detailed and meaningful domain-specific schema (e.g. Lurigio and Carroll 1985), make more use of context-specific knowledge and relate new situations to their personal experience (Haukedal and Grønhaug 1994), and generally be more effective information processors within the domain (e.g. Glaser 1982). Early empirical support for the developmental effect is partly provided by Calori et al. (1994), who found that top managers in firms with an international geographic scope were more domain specific cognitively complex than top managers of organizations with a narrower scope. Similarly, Day and Lord (1992) found that managers in firms with a more diversified product and service portfolio categorized issues differently from managers in less diversified firms, implying that managers in more diversified firms had more domain specific complex knowledge structures. Thus, the exposure as well as the developmental effect, would suggest that both cognitively complex and less complex managers in organizations with high scanning profiles and loosely structured top management teams will diagnose strategic issues differently from managers in organizations with lower scanning profiles and less rich or organic structured top management teams.

Since few, if any, organizational information processing theorists argue that managers do not matter, an "organizational control perspective" should not be considered purely situationistic or deterministic. However, its focus on organizational characteristics influencing organizational outcomes, explicitly or implicitly through organizational members, emphasize the organizational control over individual organizational members. This emphasis should not be seen as an argument for downplaying the

importance of individual characteristics, but more as a response to lack of research adopting an organizational view of decision making, strategy and performance (e.g. O'Reilly 1983). In other words, there exist few theoretical arguments or explanations supporting a potential organizational or contextual dominance over individual characteristics. Therefore, arguments must be sought in empirical research that demonstrates the importance of organizational context.

To that end, there are at least three sources of evidence that support the proposition that the organizational information processing context is more important in predicting strategic issue diagnosis than individual cognitive complexity. The first and strongest refers to the few empirical studies that have investigated the effects of both individual and organizational (including group) factors on strategic issue diagnosis. Of these studies, Thomas et al. (1994) found that individual level characteristics did not play a significant role in strategic issue diagnosis after organizational and group contexts were accounted for. This finding corresponds to those of Schneider and DeMeyer (1991) and Thomas et al. (1993).

The second, but more modest source of evidence, refers to studies that have found strong empirical support of organizational (including group) factors influencing strategic issue diagnosis or other dimensions of strategic cognition or decision making, but that do not control for individual characteristics. Several studies have taken this approach, and empirical support exists for organizational scanning (Sutcliffe 1994), strategy (Ginsberg and Venkatraman 1992; Meyer 1982; Thomas and McDaniel 1990), structure (Leifer and Huber 1977; Schmidt and Cummings 1976; Sutcliffe 1994; Thomas and McDaniel 1990) and organizational size (Denison et al. 1996).

The third and weakest source of evidence refers to findings of strong empirical support for direct associations between organizational scanning and organizational outcomes like responsiveness and financial performance (e.g. Dollinger 1984; Gannon, Smith, and Grimm 1992; Jennings and Lumpkin 1989; Reid 1984; Smith et al. 1991).

It is harder to come up with sound explanations for why the organizational information processing context should be more important than individual complexity, than to find empirical evidence that supports such a proposition. However, as indirectly suggested by Thomas et al. (1993), a possible explanation is that that top managers act and possibly think on behalf of their organizations. Moreover, Hitt and Tyler (1991), that found no support for the cognitive complexity hypothesis, suggest that the narrow range of cognitive complexity among top managers (i.e. they are all generally high in cognitive complexity) in part can explain the lack of cognitive complexity effects. The final suggestion is that data, stimuli, information and perspectives provided by the organizational context represent the primary input for managers in strategic issue diagnosis. This would mean that organizational context, through its filtering and distributive mechanisms, actually controls and guides managers individual information processing.

3.5.2 A strategic choice perspective

First, people, not organizations, make decisions, and their decisions depend on prior processes of human perception and evaluation (Child 1972). Moreover, the experience that affect their cognitive structures is unique for each individual (Simon and Kaplan 1989). In other words, the assumption that top managers matter rests on two premises: one, that top managers differ from each other, and two, that the individual top manager's decisions and actions have a significant impact on organizational activities and performance (Gupta 1988). The second assumption will not be empirically explored in the present investigation, since the focal target of the study is managers' strategic issue diagnosis. Concerning the first assumption, Gupta (1988) argues that it must be regarded as essentially indisputable due to the existing substantial scientific and anecdotal evidence as well as its obvious face validity. In this respect, Hitt and Tyler's (1991) finding of small differences in cognitive complexity between managers might be explained with reference to their measurement approach focusing only on (social) evaluation of persons. Moreover, their report of small differences in cognitive complexity among managers is not compared to other studies of cognitive complexity. Other studies have not reported any problems in finding differences in cognitive complexity, using students from the same class or program (e.g. Hendrick 1979; Stone, Sivitanides, and Magro 1994; Streufert, Streufert, and Castore 1968) and

managers from both the same and different organizations (e.g. Calori, Johnson, and Sarnin 1994; Dollinger 1984; McGill, Johnson, and Bantel 1994; Wofford 1994) as subjects.

Additionally, research on individual scanning, information behavior and managerial evaluation have demonstrated that managers often rely on information sources other than those provided by the organization (e.g. El Sawy 1985; Kotter 1982) and that networks and relations outside the organization is important in managerial evaluation (e.g. Galaskiewicz and Burt 1991). Moreover, previous general findings of the unimportance of top managers suffer from serious methodological weaknesses (see Hambrick and Mason (1984) for a brief discussion). More interestingly, the cited empirical studies that have found no effects of individual characteristics on strategic issue diagnosis have investigated observable managerial demographic characteristics (Schneider and DeMeyer 1991; Thomas, Clark, and Gioia 1993; Thomas, Shankster, and Mathieu 1994), not cognitive complexity. After all, the main argument for including cognitive complexity in the present study is the combination of its potential to predict strategic issue diagnosis and the lack of evidence from studies that have investigated other individual characteristics.

Complexity theories have mainly focused on the complexity of the task as the most important moderating mechanism between cognitive complexity and performance. These theories suggest that differences in performance between cognitively complex and less complex individuals become less pronounced as the task becomes easier (e.g. Schroder, Driver, and Streufert 1967). According to this general proposition, the effect of cognitive complexity should be strong on strategic issue diagnosis, since it represents a complex managerial task. Moreover, recent research has investigated the effects of cognitive complexity under different contextual conditions. Stone et al. (1994) for instance, found that groups of cognitively complex subjects performed better than groups of cognitively simple subjects under two different methods of formalized dissent (dialectical inquiry and devil's advocacy). Even if the difference between these two methods might be smaller and of a another kind than differences in organizational complexity, and Stone et al. (1994) studied group planning and not individual diagnosis, their study suggests that cognitive complexity is important under different contextual conditions. Thus, there are several arguments and some empirical

studies in favor of a strategic choice perspective on the relationship between cognitive complexity and strategic issue diagnosis.

3.6 Moderating effects of organizational context

Even though investigations of interactions between situational and individual variables would increase the understanding of the effects of individual characteristics of top managers on decision processes in organizations (e.g. Hambrick and Finkelstein 1987; Hambrick and Mason 1984), such investigations are less often attempted and more difficult to do (Gupta 1988). At this point of development in strategic issue diagnosis research, it seems more important to refine and extend the conceptual and empirical treatments of strategic issue diagnosis and to empirically test untested antecedents, than to go into the question of interactive effects. In the present investigation, an obstacle to include an appropriate investigation of interaction effects is the need for a more complex research design. Among other factors, it would ideally provide different combinations of low versus high cognitive complexity and organizational information processing levels.

Although interaction effects are largely beyond the scope of this study, the data needed to investigate the research question might provide some preliminary insight into how the interaction of organizational context and managers' cognitive complexity affect strategic issue diagnosis. While neither complexity theory or strategic issue diagnosis research provide any directly relevant findings in this respect, they do indicate the *existence of* interactive effects (e.g. Dutton 1993a; Schneider and DeMeyer 1991; Streufert and Swezey 1986; Thomas, Clark, and Gioia 1993; Thomas, Shankster, and Mathieu 1994). First, it is possible that fit or match between managers' cognitive complexity and the level of organizational information processing is important in predicting effects on strategic issue diagnosis. As Streufert and Swezey (1986) suggest, where the abilities, limitations, and styles of individuals match an organization's characteristics and needs, the liaison between person and organization will more likely be happy and productive. This suggestion might imply that high levels of cognitive complexity is a condition for taking advantage of high levels of organizational information processing. Such a condition would be consistent with the information overload hypothesis (O'Reilly 1980). Combinations of low levels of

cognitive complexity and high levels of organizational information processing might produce information overload, potentially followed by poorer diagnosis than combinations of low levels of cognitive complexity and low levels of organizational information processing.

Another possibility is that high levels of cognitive complexity might compensate for low levels of organizational information processing and/or vice versa. To further complicate the issue, another option is that for some levels of cognitive complexity, compensating effects might be strongest, while for other levels the effects of fit or match between individual and organizational information processing might be the strongest. For example, refined interactive complexity theory has suggested that cognitively complex individuals are able to adjust their functional level of cognitive complexity to meet the demands of the complexity of the task (Streufert and Swezey 1986). Following this flexibility argument, and as suggested by Hambrick and Finkelstein (1987), cognitively complex managers might be less influenced by context than cognitively simpler managers. Consequently, it might be suggested that organizational information processing would be less influential on strategic issue diagnosis if the top managers of the organization are cognitively complex. Accordingly, if cognitively simple managers are more influenced or dependent on organizational context, complexity of the organization would be a more influential antecedent to strategic issue diagnosis if its managers are less cognitively complex. These and other untested speculations briefly discussed above, make the question of interactive effects of cognitive complexity and organizational information processing on strategic issue diagnosis to an important issue for further research. However, as a first step, the present investigation will explore the very basic question of whether organizational information processing moderates the relationship between cognitive complexity and strategic issue diagnosis.

3.7 Conceptual framework

As a summary of the literature review on the main relationships under investigation, the conceptual framework is presented in Figure 2.1. The present study is based on a cross-level analysis (Klein, Dansereau, and Hall 1994; Rousseau 1985) of strategic issue diagnosis. It will explore how multiple contexts, represented by an

organization's scanning profile, the information processing structure used by *its top management team*, and *top managers'* cognitive complexity relate to strategic issue diagnosis. Thus, the focal or target unit of the study is the strategic issue diagnosis performed by individual top managers.

Antecedents	**Managers' strategic issue diagnosis**
• Organizational scanning • Top management team information processing structure • Managers' cognitive complexity	• Effect valence • Issue sorting • Causal understanding • Data search
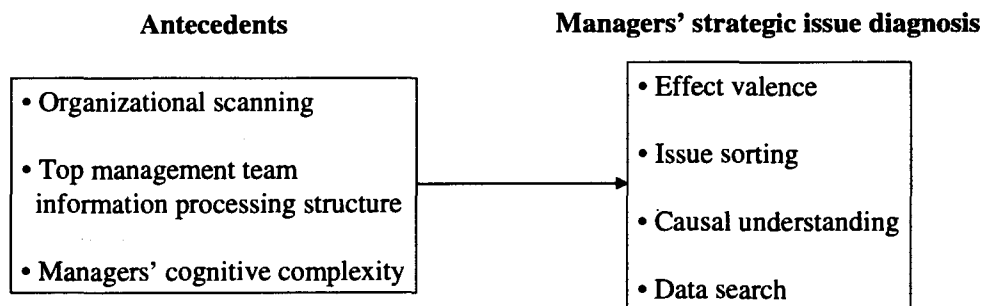
Figure 2.1: Conceptual framework

Analytically, the framework suggests that members of the top management team are influenced by the same organizational and team characteristics, leading to within-team-organization homogeneity in diagnosis. However, since organizational context may influence managers' diagnosis differently and individual characteristics are likely to influence managers' diagnosis, individual top managers within the same top management team and organization are expected to vary in their diagnosis.

Conceptually, it has been argued that differences in managers' strategic issue diagnosis can be explained by differences in organizational scanning, the information processing structure of top management teams, and managers' of cognitive complexity. Organizational scanning and the information processing structure of top management teams are assumed to influence the types and amounts of information managers are exposed to in an organization. Exposure to different amounts and diversity of data, stimuli and information, are further assumed to guide or control the instantation of managers' cognitive representations (e.g. Calder and Schurr 1981; Svyantek, Jones, and Rozelle 1991) and thus what data, stimuli, information and perspectives that will be used in strategic issue diagnosis (e.g. Goldstein and Zack 1989; O'Reilly 1983). Additionally, it is suggested that the exposure of amounts and diversity of data, stimuli, information and perspectives, over time, will influence the development of managers cognitive representations of the internal or organizational

and external environments (e.g. Weick 1979b). Finally, it is suggested that the level of cognitive complexity of managers will influence strategic issue diagnosis (Bartunek, Gordon, and Weathersby 1983; Streufert and Swezey 1986).

3.8 Summary of the chapter

In this chapter, literature on how organizational scanning, top management team information processing structure and cognitive complexity might be related to strategic issues diagnosis were reviewed. These reviews provided a theoretical answer to the research question implying that all three antecedents might uniquely affect managers' strategic issued diagnosis. Additionally, the questions of the relative importance of contextual and individual antecedents, and possible moderating effects of the contextual antecedents on the relationship between the individual antecedent and strategic issue diagnosis were discussed.

HYPOTHESES AND RESEARCH MODEL

In the previous two chapters it has been argued theoretically for the constructs and the relations between the constructs in the conceptual framework. In this chapter, the relationships in the conceptual framework are translated into sixteen specific hypotheses and presented in a figure of the research model. Finally, the discussion about the relative importance of the contextual and individual factors and the moderating effect of the contextual factors is summarized in three propositions.

4.1 Organizational scanning and strategic issue diagnosis

It has been proposed that the scanning profile of an organization will influence managers' strategic issue diagnosis. Here, the two organizational scanning dimensions, information acquisition frequency and information availability and use, will be related to the four strategic issue diagnosis concepts outlined in the second chapter.

4.1.1 Organizational scanning and effect valence

Previous research has suggested and empirically studied a range of organizational-level antecedents of managers' perceptions of threats and opportunities (e.g. Denison et al. 1996; Dutton 1993a; Dutton, Fahey, and Narayanan 1983; Dutton and Ottensmeyer 1987; Ginsberg and Venkatraman 1992; Milliken 1990; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991). However, no studies have empirically investigated organizational scanning in relation to effect valence. Moreover, most strategic issue diagnosis research have dealt with equivocal or neutral events, while the present study makes a distinction between opportunity consistent and threat consistent developments, trends or events. Therefore, evidence from previous strategic issue diagnosis research offers relatively few guidelines.

However, for positive-gain and controllability interpretations of opportunity consistent developments, trends or events, the finding that high levels of information use among managers in organizations is positively related to seeing an issue as

controllable, positive and as a potential gain (Thomas, Clark, and Gioia 1993), provides some support for a positive relationship between organizational scanning and these effect valence dimensions. In line with the exposure and developmental effects discussed in the previous chapter, managers who have available and use large amounts of information will have more raw material for constructing their interpretations (Knight and McDaniel 1979) and be equipped with more knowledge and data needed to support positive framing (Dutton 1993a; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990). Additionally, there are empirical indications that managers in high scanning organizations have more factual knowledge and a better understanding of the environment (Goldstein and Zack 1989) and are more accurate in their perceptions (Sutcliffe 1994). Factual knowledge and better understanding of the environment along with increased perception accuracy, might imply that managers will interpret opportunity consistent developments, trends or events in positive-gain terms and threat consistent developments, trends or events in negative-loss terms. Moreover, managers that have large amounts of information available, and make use of this information, might be better able to cope with ambiguity (Eisenhardt and Bourgeois 1988) and uncertainty (Milliken 1990).

Thus, with a sense of mastery and a feeling that no stone has been left unturned (Eisenhardt 1989), managers might see both threats and opportunities as controllable. Another argument to support the relationship between organizational scanning and controllability interpretations, is that managers in high scanning organizations will be exposed to more information that can be used to exploit opportunities and to effectively cope with threats (Dutton 1993a). These arguments suggest that there will be a positive relationship between organizational scanning on one side, and positive-gain, negative-loss and controllability interpretations for both opportunities and threats on the other.

While the arguments above support positive relationships between organizational scanning and positive-gain/negative-loss and controllability interpretations, they do not provide any evidence of how organizational scanning might be related to extremity in effect valence. However, since stereotyped perceptions like extreme valence might be the result of lack of knowledge and simplicity in the representation of knowledge within a domain (e.g. Linville 1982; Lord and Foti 1986), there is a

possibility that the volume and richness of information due to high levels of scanning will reduce the likelihood of extreme valence. This possibility might be particularly relevant for extremity in *negative* valence. Availability of large amounts of information might suppress the threat bias suggested by Jackson and Dutton (1988), and balance managers' interpretation of threat consistent developments, trends or events. Additionally, recent empirical evidence suggests that managers use categorization processes to interpret positive events, but more effortful attributional processes to interpret negative events (Gooding and Kinicki 1995). These arguments would suggest that organizational scanning will be negatively related to extreme negative valence.

The finding that managers use less effortful cognitive processes in interpretation of positive events corresponds with the finding that decision makers receiving positive performance feedback exhibited characteristics Langer (e.g. Langer 1989) described as "mindless" information processing and which Dutton (1993b) refer to as automatic strategic issue diagnosis (Dunegan 1994). This mode of cognitive processing increase the possibility of cognitive biases (e.g. Louis and Sutton 1991). Moreover, several cognitive biases or simplifications like overoptimism, overconfidence, influence of recent performance history, confirmation traps and illusions of control and invulnerability are often associated with positive events (e.g. Bazerman 1994; Dutton and Duncan 1987a; Lai 1994; Milliken and Lant 1991; Schwenk 1986; Thomas, Clark, and Gioia 1993; Zajac and Bazerman 1991), and such biases might actually be reinforced by large amounts of information (e.g. Russo and Schoemaker 1989). Thus, a possible pitfall of high levels of scanning is that availability of large amounts of information in situations where managers are faced with positive events increases the likelihood of extreme positive valence. Seen together, these arguments suggest an asymmetry in organizational scanning effects on extremity in effect valence. This leads to the formulation of the following hypotheses:

$H1_{EVI}$: *The level of an organization's scanning in terms of its (i) information acquisition frequency and (ii) information availability and use will be positively related to the extent to which managers interpret opportunity consistent developments, trends or events as (a) positive and potential gains, (b) controllable, and (c) extremely positive.*

$H1_{EV2}$: *The level of an organization's scanning in terms of its (i) information acquisition frequency and (ii) information availability and use will be positively related to the extent to which managers interpret threat consistent developments, trends or events as (a) negative and potential losses, and negatively related the extent to which managers interpret threat consistent developments, trends or events as (b) uncontrollable and (c) extremely negative.*

4.1.2 Organizational scanning and issue sorting

Several studies suggest that high levels of information processing will increase managerial awareness and attention and the probability that change will be noticed, along with accuracy of managers' perceptions. These relationships are explained by the exposure of a wider range or larger amounts of information and/or by the assumption that high levels of information processing provides a context that facilitates more knowledgeable, richer and complete cognitive representations of the external and internal environments. Both explanations suggest that high levels of organizational scanning will provide an organizational context that will enhance managers' issue sorting, causal understanding and data search.

Equipped with more domain-specific knowledge in terms of richer and more complete representations of the environment, managers in high scanning organizations will have the benefit of having multiple past experience against which to compare and contrast new situations. Accordingly, they might be better equipped to recognize the strategic and political implications of emerging events, developments or trends. Moreover, as people become more familiar with a domain of activity, they grow more sensitive to subtle changes within that domain (Schroder, Driver, and Streufert 1967) and should therefore be better able to classify signals from noise and to compare issues against each other. This would suggest the following hypothesis:

$H1_{IS}$: *The level of an organization's scanning in terms of its (i) information acquisition frequency and (ii) information availability and use will be positively related to the extent to which managers differentiate between developments, trends or events in terms of judgments of (a) importance and (b) feasibility.*

4.1.3 Organizational scanning and causal understanding

Given that managers in high scanning organizations develop richer and more complete representations of the internal and external environment, they should be better able to ground their interpretations in detailed factual knowledge and have higher tolerance for ambiguity and multiple perspectives (e.g. Calori, Johnson, and Samin 1994) and thus be less likely to engage in oversimplistic and impressionistic interpretations of the environment. Finally, the study by Goldstein & Zack (1989) suggests that managers in organizations with high exposure of information have more factual knowledge as well as a better understanding of causality between elements in the environment. Thus, it is suggested that:

$H1_{CU}$: *The level of an organization's scanning in terms of its (i) information acquisition frequency and (ii) information availability and use will be positively related to the extent to which managers are nuanced in causal understanding of developments, trends or events.*

4.1.4 Organizational scanning and data search

Studies of the relationship between exposure or availability and use of data, stimuli and information (e.g. Culnan 1983; Culnan 1984; Goldstein and Zack 1989; O'Reilly 1982), strongly suggest that managers in organizations with high levels of organizational scanning will search for more data in strategic issue diagnosis. Moreover, if managers in high scanning organizations have more detailed and meaningful knowledge structures, they might attend to more signals and have better appreciation for the value of information (Cooper, Folta, and Woo 1995; Karlins and Lamm 1967) and better understand what they do not know (McGee, Dowling, and Megginson 1995). These arguments suggest the following hypothesis concerning organizational scanning and data search;

$H1_{DS}$: *The level of an organization's scanning in terms of its (i) information acquisition frequency and (ii) information availability and use will be positively related to the extent to which managers search for different types of data in order to clarify and define strategic issues.*

4.2 TMT information processing structure and strategic issue diagnosis

Past studies do not provide any clear evidence about the relationship between top management team information processing structures and strategic issue diagnosis. However, several mechanisms related to different structural configurations that might influence strategic issue diagnosis may be identified. Below, these mechanisms are used to develop five hypotheses about top management team information processing structure and strategic issue diagnosis.

4.2.1 TMT information processing structure and effect valence

Thomas and McDaniel (1990) found that rich or organic information processing structures were significantly positively related to positive-gain and controllability interpretations. Since such structures increase the information processing capacity of the team due to a greater number and variety of information processors, the team might be less vulnerable to information overload (Mintzberg 1983) and be better able to cope with stress and anxiety (Eisenhardt 1989). Moreover, top management teams with high information processing capacity tend to focus on and process information that they see as positive and as leading to potential gains, even in times of crisis (Smart and Vertinsky 1984). On the other hand, information processing structures characterized by narrow or restricted capacities will tend to lead managers to perceive low levels of positive stimuli (Fredrickson 1986a), and these structural configurations are often chosen in order to guard against threats, not to scan for opportunities (Bourgeois, McAllister, and Mitchell 1978). These arguments suggest that rich information processing structures should be positively related to positive effect valence and negatively related to negative effect valence. However, although such information processing structures might enhance the construction of opportunities more often or more easily, managers' ability to cope more effectively with uncertainty and to respond more productively to stress and avoid information overload, suggest a negative relationship between such structures and extremely positive valence. Furthermore, if organic structures lead to more differentiated belief structures within teams (Dutton and Duncan 1987a), greater exchange of ideas and more careful deliberation of issues (Milliken 1990), managers might be provoked to use more

active cognitive modes which reduces the possibility of cognitive simplification and biases (e.g. Louis and Sutton 1991; Schwenk 1984). These argument fit in with the link between similar structural characteristics and perception accuracy (Shank et al. 1988; Sutcliffe 1994). Thus, the following hypotheses are suggested:

$H2_{EV1}$: *The level of (i) participation, (ii) interaction and (iii) flexibility within an organization's top management team will be positively related to the extent to which managers interpret opportunity consistent developments, trends or events as (a) positive and potential gains, and (b) controllable, and negatively related to the extent to which managers interpret opportunity consistent developments, trends or events as (c) extremely positive.*

$H2_{EV2}$: *The level of (i) participation, (ii) interaction and (iii) flexibility within an organization's top management team will be negatively related to the extent to which managers interpret threat consistent developments, trends or events as (a) negative and potential losses, (b) uncontrollable, and (c) extremely negative.*

4.2.2 TMT information processing structure, issue sorting and causal understanding

With increased information processing capacity, greater exchange of ideas and more careful deliberation of issues, better ability to cope with stress and to avoid information overload, use of more effortful modes of cognition and less cognitive simplification, rich or organic top management team information processing structures should improve managers' issue sorting, causal understanding and data search.

Due to the complexity of the task of sorting the wheat from the chaff in the fields of potential issues facing managers (Dutton, Walton, and Abrahamson 1989), the task should be more effectively conducted with active modes of cognitive processing (Dutton 1993b; Louis and Sutton 1991; Reger and Palmer 1996). Active or mindful processing should also facilitate more nuanced causal understanding, since it reduces the chances of simplified interpretation. Thus, to the extent that rich or organic information processing structures provoke managers to use active modes of

information processing, such structures should enhance managers' issue sorting and causal understanding. Moreover, as suggested by Shank et al. (1988), communication density and openness within top management teams facilitate greater information sharing and acceptance and analyses of conflicting and diverse information. In a similar vein, Thomas et al. (1991) argued that participation will increase the number of variables considered, the number of possible causal relationships considered, and the number of possible outcomes that potentially will result from strategic issue diagnosis. Thus, managers in organizations with rich information processing structures, should, in general be better informed about environmental changes (Milliken 1990; Sutcliffe 1994) and be equipped with a greater set of cause-and-effect relationships. This might suggest that they will be more sensitive to subtle changes and better able to classify signals from noise and be more nuanced in causal understanding. Finally, to the extent that low participation implies low diversity in goals and preferences of team members, managers may tend to look for and accept data that conforms to existing or outdated expectations, preferences and believes (Schwenk 1984). Norms of consistency may facilitate use of narrow and homogenized perspectives, increase commitment to past actions, and reinforce old ways of seeing the world (Staw 1981), which might decrease the possibility of nuanced causal understanding. This leads to the formulation of the following hypotheses:

$H2_{IS}$: *The level of (i) participation, (ii) interaction and (iii) flexibility within an organization's top management team will be positively related to the extent to which managers differentiate between developments, trends or events in terms of judgments of (a) importance and (b) feasibility.*

$H2_{CU}$: *The level of (i) participation, (ii) interaction and (iii) flexibility within an organization's top management team will be positively related to the extent to which managers are nuanced in causal understanding of developments, trends or events.*

4.2.3 TMT information processing structure and data search

Empirical support for a positive relationship between the richness of top management team structures and data search is provided by Thomas and McDaniel (1990). They suggested that when top management teams have high information processing

capacity, managers can attend to more data and consider each piece of data more fully during interpretation efforts than they can in teams with low information processing capacity. Furthermore, given that managers of such team are less vulnerable to information overload (Mintzberg 1983), they should search for more data in strategic issue diagnosis than managers in less rich or organic structured teams, since managers tend to reduce search and simplify decision rules in times of information overload (Abelson and Levi 1985; Schneider 1988). Finally, if organic structures lead to more differentiated belief structures within teams (Dutton and Duncan 1987a) and greater exchange of ideas and more careful deliberation of issues (Milliken 1990), managers might be less likely to oversimplify complex situations and limit data search. Thus, it is suggested that:

$H2_{DS}$: The level of (i) participation, (ii) interaction and (iii) flexibility within an
organization's top management team will be positively related to the extent to which
managers search for different types of data in order to clarify and define strategic
issues.

4.3 Cognitive complexity and strategic issue diagnosis

The final set of hypotheses relates managers' cognitive complexity in terms of cognitive differentiation and integration strategic issue diagnosis.

4.3.1 Cognitive complexity and effect valence

Previous research within cognitive complexity and strategic issue diagnosis provide few guidelines for relating cognitive complexity to effect valence. However, the finding that cognitively complex individuals tend to be more accurate in perceptions than less complex individuals (Miller 1969), might imply that cognitive complexity is positively related to positive-gain and negative-loss interpretations. On the other hand, differences between more and less cognitively complex individuals in terms of accurate perceptions are usually greatest when information contains inconsistencies (Streufert and Nogami 1989), which is not the case in the present study. However, due to better integration of information (e.g. Karlins and Lamm 1967), cognitively complex managers might be more inclined to recognize a wider set of implications of

issues than their less complex counterparts. Such characteristics might suggest that cognitively complex managers should interpret opportunity consistent developments, trends or events in positive-gain terms and threat consistent developments, trends or events in negative-loss terms to a greater extent than less complex managers.

Turning to controllability, uncontrollability and extremity perceptions, existing evidence suggest a negative relationship with cognitive complexity. First, a number of studies suggest that cognitively complex individuals are more balanced and moderate and less extreme or polarized in perception and attribution than less complex individuals (Durand and Lambert 1979; Linville 1982; Linville and Jones 1980; Miller 1969; O'Keefe and Brady 1980). This would suggest that cognitively complex managers should be less extreme in effect valence than their less complex counterparts. Moreover, data obtained by a number of researchers suggest that cognitively complex perceivers take more information into account and form more well-rounded impressions than less complex perceivers (Streufert and Swezey 1986). They tend to search for diverse (not only confirmatory) information, are generally able to integrate inconsistent sets of information, while less complex individuals tend to focus on either the earlier or the later set (Streufert and Nogami 1989), and have less tolerance for ambiguity and diversity (Streufert, Streufert, and Castore 1968). Finally, cognitively complex managers seem to be more likely to redefine problems rather than accept them exactly as presented (Lepsinger et al. 1989; Merron, Fisher, and Torbert 1987). These findings might imply that complex managers to a lesser extent think that they can simply exploit opportunities without effort or behave overly rigid in threatening situations. Thus, cognitive complexity might be negatively related to controllability perceptions of opportunity consistent developments, trends or events and to uncontrollability perceptions of threat consistent developments, trends or events. Thus, the following two hypotheses are suggested:

$H3_{EVI}$: *The level of managers' cognitive (i) differentiation and (ii) integration will be positively related to the extent to which managers interpret opportunity consistent developments, trends or events as (a) positive and potential gains, and negatively related to the extent to which managers interpret opportunity consistent developments, trends or events as (b) controllable and (c) extremely positive.*

H3ₑᵥ₂: *The level of managers' cognitive (i) differentiation and (ii) integration will be*
    positively related to the extent to which managers interpret threat consistent
    developments, trends or events as (a) negative and potential losses, and negatively
    related to the extent to which managers interpret threat consistent developments,
    trends or events as (b) uncontrollable and (c) extremely negative

4.3.2 Cognitive complexity and issue sorting

Cognitive complexity theory (Streufert and Swezey 1986) argues that managers differ in their ability to identify distinct attributes of the information they receive and to meaningfully interrelate these attributes. For instance, research on interpersonal perception has shown that cognitively complex individuals are better able to integrate conflicting information about other persons and less likely to categorize them into simple "good" versus "bad" groupings or engage in attitude polarization (e.g. O'Keefe and Brady 1980). Less complex individuals on the other hand, more often tend to form impressions on the basis of one-sided evidence even where opposing information is presented (e.g. Mayo and Crockett 1964). Thus, cognitively complex managers might to a grater extent thaMcGill, Johnson, and Bantel 1994n less complex managers go beyond surface characteristics of issues and base their interpretations on more and more diverse information or script tracks (Chang and McDaniel 1995). With a deeper and more "mindful" elaboration of issues, cognitively complex managers might be better able to recognize subtle differences between issues. Thus, it is suggested that;

H3ᵢₛ: *The level of managers' cognitive (i) differentiation and (ii) integration will be*
    positively related to the extent to which managers differentiate between developments,
    trends or events in terms of judgments of (a) importance and (b) feasibility.

4.3.3 Cognitive complexity and causal understanding

The same arguments that were used to support a negative relationship between cognitive complexity and extremity and controllability interpretations, suggest a positive relationship between the level of managers' cognitive complexity and nuanced causal understanding. Additionally, cognitively complex subjects have been

shown to be better at abstract reasoning (Neuliep and Hazleton 1986) and use a greater number of script tracks in handling problems (Wofford 1994). Finally, cognitive complexity seem to be related to an intention to understand, to avoid premature closure and to consider alternative viewpoints (Chang and McDaniel 1995). These arguments and findings might suggest that the level of cognitive complexity will be negatively related to simplified causal understanding. Thus, one might expect:

$H3_{CU}$: *The level of managers' cognitive (i) differentiation and (ii) integration will be positively related to the extent to which managers are nuanced in their causal understanding of developments, trends or events.*

4.3.4 Cognitive complexity and data search

While earlier theories suggested that cognitively complex individuals should be more open to all kinds of information, later research has shown that information orientation interacts with stimulus conditions or tasks (Streufert and Swezey 1986). They seem to be more actively information orientated and their search activities more a function of information need than of environmental conditions (Streufert and Nogami 1989). While cognitively complex persons generally search for more different kinds of information (Dollinger 1984; Karlins and Lamm 1967) and seek more novel information and across a greater number of information categories (Streufert and Swezey 1986), they do not necessarily search for more information than less complex subjects. Accordingly, it is generally assumed that cognitively complex persons are better able to search for near-adequate amounts of relevant information (Streufert and Nogami 1989). These arguments suggest that cognitively complex managers not necessarily will search for more data than less complex managers in terms of core data, but that they might search for more novel information in terms of additional and new data. Thus, the final hypothesis suggests that:

$H3_{DS}$: *The level of managers' cognitive (i) differentiation and (ii) integration will be positively related to the extent to which managers search for additional and new data in order to clarify and define strategic issues.*

4.4 Research model

Translating the relationships in the conceptual framework (Figure 2.1) into testable hypotheses results in the overall research model in Figure 4.1. Due to number of underlying dimensions of effect valence and the mix of positive and negative relationships, the hypotheses regarding effect valence-is presented separately in Figure 4.2.
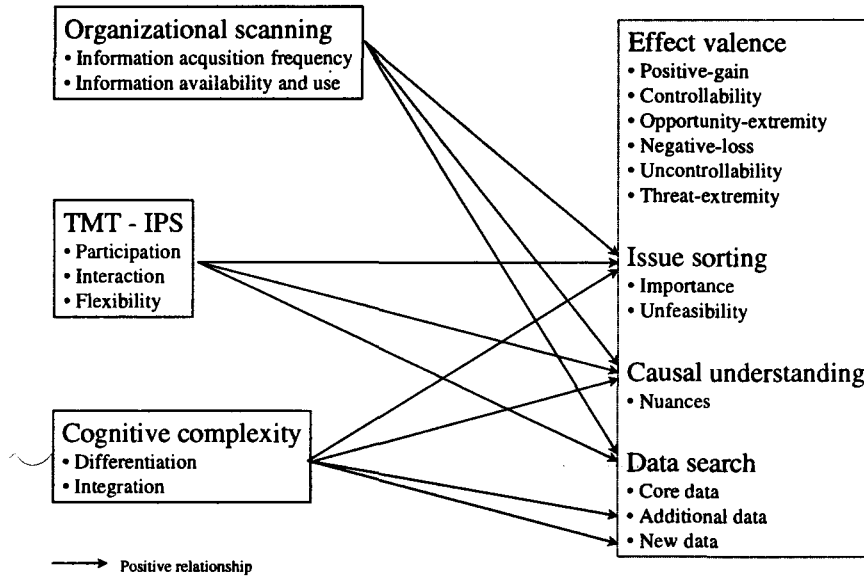
Figure 4.1: Overall research model
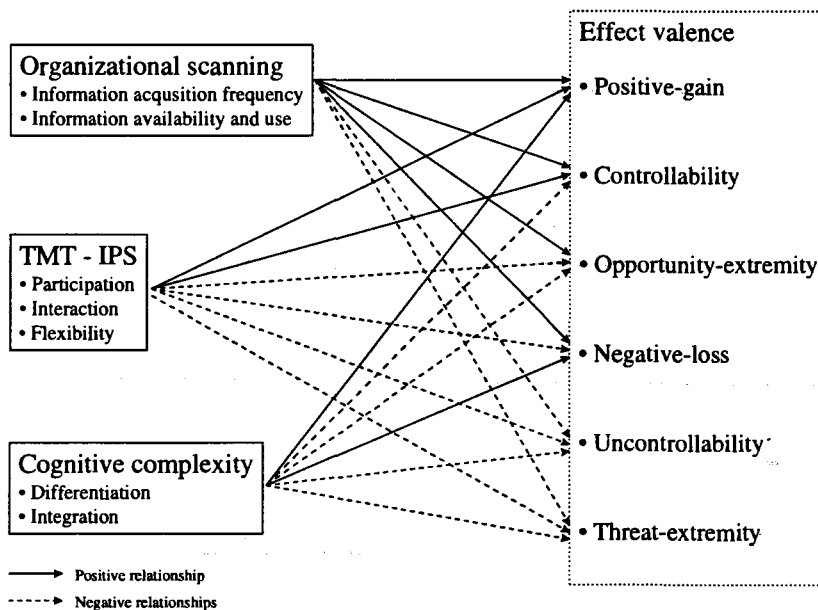
Figure 4.2: Specification of effect valence

4.5 Propositions on relative and moderating effects

The theoretical or empirical bases of the relative importance of organizational information processing versus cognitive complexity in predicting strategic issue diagnosis are considered too limited to develop specific hypotheses. Cognitive complexity has not yet been studied in relation to strategic issue diagnosis and most strategic issue diagnosis research has focused predominantly on threat-opportunity construction. Therefore, two propositions based on an organizational control perspective and a strategic choice perspective respectively, are presented:

P1:   *Organizational scanning and top management team information processing structure*
        will explain a significant amount of variance in managers' strategic issue diagnosis,
        above and beyond the variance explained by managers' cognitive complexity.

P2:   *Managers' cognitive complexity will explain a significant amount of variance in*
        managers' strategic issue diagnosis, above and beyond the variance explained by
        organizational scanning and top management team information processing structure.

As a first step in the direction of increased insight into interaction effects between organizational context and managers' cognitive complexity, the present investigation will explore the very basic question of whether organizational information processing do moderate the relationship between cognitive complexity and strategic issue diagnosis. Thus, whether organizational context compensate for low levels of cognitive complexity or whether a fit or match between cognitive complexity and the level of contextual information processing would be most productive, will not be explored in the present investigation. However, despite the lack of theory and empirical research on how such interactions might affect strategic issue diagnosis, contributors within the field suggest the *existence* of interaction effects (e.g. Dutton 1993a; Schneider and DeMeyer 1991; Streufert and Swezey 1986; Thomas, Clark, and Gioia 1993; Thomas, Shankster, and Mathieu 1994). Thus, it is proposed that:

P3:   *Organizational scanning and top management team information processing will*
        moderate the relationship between managers' cognitive complexity and strategic issue
        diagnosis.

RESEARCH METHODOLOGY

In this chapter, the employed research design is described along with the research context, sampling and data collection.

5.1 Research design

A cross sectional design was considered appropriate to test the hypotheses and explore the propositions in the previous chapter. This design allows for comparison in terms of determining whether values of one variable[1] covary with values of other variables, which makes it suitable to test and explore the covariation hypotheses and propositions in the present investigation. The cross sectional design does not permit formal test of causality since causes and effects are not separated in time and because other factors can not be ruled out as rival explanations of observed associations between independent and dependent variables. The time order component would be difficult no matter the choice of design, so the strongest proof of time order would have to be based on previous theory and empirical research that posit an association between conceptually similar variables (e.g. Hitt and Tyler 1991; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990; Thomas, Shankster, and Mathieu 1994). There are, however, clear limitations in terms of controlling for the possibility that all relevant third variables may affect relations between independent and dependent variables. Although one can test whether the observed relations are nonspurious by including control variables, the single control variable included in this study do not rule out the effects of known and unknown third variables that might be related to the relations under investigation.

5.2 A single-industry field simulation method

Studying strategic issue diagnosis requires identification or instrumentally creation of stimulus objects to be diagnosed by the managers. These stimulus objects must be ill-structured and ambiguous enough to meet the requirements of what constitute the raw

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[1] In the previous chapters, the terms concept or construct have been used. In this chapter, "variables" will be used to denote the central terms, since the discussion relates to the empirical part of the study.

material of strategic issues (e.g. Dutton, Fahey, and Narayanan 1983). Additionally, there should not be strong a priori reasons to assume that their impact on organizations is strongly affected by variables not included in the study. At the same time, the stimulus objects should be as equally relevant as possible across individual managers and their organizations.

Based on the above considerations, stimulus objects were created and presented to managers in the form of case-scenarios, instead of relying on real world developments, trends or events. Case-scenarios are short stories (often about five to ten sentences long) that describe a development, trend or an event. This approach offers expert input in the form of real managers as well as theoretically driven control over the stimulus material (Fredrickson 1986b; Nichols and Dukerich 1991; Snow and Thomas 1994). By providing a common reference point across informants, scenarios enable the assessment of variance in diagnosis that likely exists between managers facing the same development, trend or event. Moreover, using managers from organizations in the same industry make it easier to construct case scenarios that are realistic, interesting and detailed enough to stimulate cooperation and commitment from respondents and that at the same time are relevant for managers across organizations (Fredrickson 1986b).

In other words, choosing a single industry does not only eliminate the impact of industry characteristics on strategic issue diagnosis (e.g. Milliken, Dutton, and Beyer 1990; Sutcliffe 1994; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990; Yasai-Ardekani 1986). It also provides a context where the case scenario construction is made easier. The case-scenario methodology described here is referred to as the *field simulation method* (Fredrickson 1986b). In short, this is a two-phase research method using interviews and expert input to first develop case scenarios that represent stimulus objects, followed by written case scenarios to which managers respond by answering a questionnaire.

5.3 Research context

After having considered several candidate industries, the newspaper industry in Norway was selected. First, there are enough newspaper firms in Norway to constitute

a satisfactory numbers from which to draw a sample of managers. Although the Norwegian Newspaper Publishers' Association (NAL) counts no more than 154 newspapers, which account for about 98 percent of the total circulation of newspapers in Norway, most newspaper firms have the necessary characteristics to be included in this study; they have some form of a top management team and they are confronted with strategic issues. In general, small and large newspaper firms are similar in terms of their organization structure and main functions, and they face very much the same strategic threats and opportunities (Fink 1988). Finally, the NAL showed a willingness to assist the empirical part of this study, which was considered important in terms of recruiting a panel of experts and to increase the response rate.

Newspaper firms are, like most firms, businesses that must be managed efficiently and profitably. Besides, the newspaper industry in Norway is quite turbulent and changing, which makes it suitable for an investigation of *strategic* issues. For instance, very much like newspapers in other countries, newspaper firms face an increasing number of vigorous competitors fighting for reader time and advertiser money, the source of any newspaper's strength. In addition, the Norwegian newspaper industry is currently undergoing structural changes through a series of mergers and acquisitions. Moreover, there is considerable uncertainty related to public regulation of the industry in terms of for example governmental incentives to obtain a differentiated press and arrangements to secure the protection of privacy. Thus, even small newspaper firms are confronted with and influenced by environmental changes and should be expected to conduct strategic analysis and planning (Wilberg 1994a; Wilberg 1994b). Finally, the newspaper industry is an intriguing industry (e.g. Fink 1988; Grønhaug and Falkenberg 1990; Thompson 1989). Newspaper managers work under severe time limits and are continuously confronted with strategic dilemmas (e.g. Fink 1988), which make strategic issue diagnosis a particularly important managerial function. For instance, the product has to be renewed every day. Secondly, most newspapers represent a "double" product since they produce and market news as well as advertisement space. Thirdly, most newspapers have higher ideals than just making money.

It might be argued that these distinct characteristics might be considered as a threat against the generalizability of the results of the present study. However, the *aim* is to

create a research context with as little "noise" as possible in order to identify mechanisms of *general* applicability. This is done by eliminating industry effects and selecting an industry that suits the purpose of the research.

5.4 The measurement development process

The measurement development process included three main phases. In the first phase, constructs were first conceptually defined by using subconstructs or dimensions (e.g. *organizational scanning* was defined in terms of *acquisition* and *availability and use*). Furthermore, the domains of the constructs were specified by delineating what was included in the definition and what was excluded (e.g. structured and deliberated efforts and environmental data, stimuli and information). Then, the subconstructs and the specifications guided the development of a pool of items (and case scenarios) for each construct. This first phase was guided by both "general" and industry specific theory and empirical research, as well as input from industry experts in an expert panel (the following section about the dependent variables gives a fuller description of the role of the expert panel and the development of case scenarios). A major concern in the latest step of this phase was to "translate" questions and items into the newspaper industry context.

The second phase was concerned with a preliminary exploration of a first draft of the questionnaire. Particular attention was paid to the user-friendliness and clarity of every section of the instrument, including general and specific instructions. Three fellow colleagues acquainted with surveys read through the questionnaire and gave feedback on the wording and format. After having cleared design, inconsistencies and bad wording, the members of the expert panel completed the questionnaire while making verbal comments that were recorded during the sessions. This process resulted in several minor changes, but also deletion of some items that did not seem relevant for the newspaper context.

The third phase was a small scale pilot test[2] of the instrument within a limited sample of nine newspaper managers from two newspaper firms. Five managers responded by mail, i.e. the administrative procedure that was followed in the actual study, and four completed the questionnaire with me present. Verbal and written comments from the managers resulted in minor changes of the wording of some of the items. Additionally, some items were deleted because there were almost no variation in the responses from the nine managers. A potential problem with this pilot test was that the managers were recruited from two large newspaper firms. However, attention was paid to the potential problem of size during the first two phases of the measurement development process and one of the reasons to select the newspaper industry was that small and large newspaper firms are similar in terms of their organization structure and main functions (Fink 1988).

5.4.1 Development of case scenarios

As a basis for constructing the case scenarios to measure three of the dependent constructs (effect valence, issue sorting and data search), a list of possible topics was compiled by tapping several sources; informal interviews with newspaper managers, consultants and researchers, publications and reports by NAL and strategic newspaper management related research and literature (e.g. Brumback 1992; Fink 1988; Grønhaug and Falkenberg 1990; Noon 1994; Thompson 1989; Ulvenes, Svardal, and Gammelsæter 1986; Vogel 1993; Wilberg 1994a; Wilberg 1994b; Zack and McKenney 1995).

Then a panel of experts was formed, consisting of three persons with newspaper management experience. The main purpose of this panel was to propose topics and evaluate scenarios according to some pre-established criteria. Before the first meeting, the members of the expert panel received a short description of the planned study. This report included the criteria for the case scenarios, as well as some examples of general (i.e. not industry-specific) case scenarios used in related research. The first criterion was that case scenarios should not affect different organizations differently,

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[2] Strictly speaking, this was more like pretesting since not all of the managers completed the questionnaire using the administrative procedure that was used in the actual study and because they were told to give comments (e.g. Bourque and Fielder 1995).

where particular attention were paid to size, ownership, competitive posture, and whether the newspaper published a local, regional or national newspaper. If strong arguments were found that a particular development, trend or event would affect a special kind of newspaper organization very differently from others, it was ruled out. The second criterion was that the case scenarios should be considered realistic and detailed enough to be interesting. The third and last criterion was that case scenarios should be ill-structured and ambiguous enough to meet the requirements of what constitute the raw material of strategic issues (e.g. Dutton, Fahey, and Narayanan 1983). This was ensured by explaining to the members of the panel that the case scenarios should allow for different interpretations by different managers along dimensions such as cause(s), magnitude, effect(s) and so on. In addition to these general criteria, the report to the expert panel included specific requirements for each of the five case scenarios to be used to measure three of the dependent constructs. These specific requirements will be discussed under the heading of each construct in the next chapter

At the first meeting in the expert panel, different suggestions to topics for case scenarios were discussed and tested against the general and specific criteria. After deciding on five scenario topics, drafts were made and later checked and refined by the panel members.

5.5 Sampling and data collection

In order to increase the number of respondents and to check the organizational and group measures for within-group-organization agreement, it was decided to try to get more than one respondent from each newspaper firm. Thus, the population constitutes members of top management teams in Norwegian newspaper firms that are members of NAL. Members of the top management team is operationally defined as the newspaper's president, editor or "single manager" (i.e. managers that have editorial as well as managerial responsibility), and executives who report directly to the president, editor or single manager and at the same time are involved in strategic analysis and decision making.

Since it would be extremely difficult to get a list of sampling units (i.e. all top management team members in the 154 newspapers), the initial selection was based on firm level data provided by a list of all 154 newspaper members of NAL (NAL 1997). According to managers at NAL and other industry experts, very small newspapers often do not operate with top management teams. Therefore, managers in newspapers with a circulation of less than 5000 were excluded from the population. This a priori based restriction resulted in a final population of top management team members of 106 newspaper firms. Since this is a relatively small number of firms and because surveying top managers typically produces low rate of responses (e.g. Snow and Thomas 1994), managers from all the firms in the population (given that they operated with top management teams) were invited to participate in the investigation. Furthermore, once developed and tested in cooperation with industry expertise, the survey instrument cannot be applied in another industry. Not only the content of the case scenarios, but also the language and jargon is industry specific. Hence, to get the most out of the invested resources, it was decided to try to collect data from managers from a large number of organizations compared to the total number of organizations in the industry.

A request letter from NAL together with a one-page description of the study were mailed to the president, editor or single manager of all 106 newspaper firms. The description contained general information about the study including participant requirements, i.e. that three to five respondents from each firm were desired and that the president, editor or single manager preferably should be represented among these. As an incentive to participate, firms that completed and returned at least three questionnaires were promised a report comparing their responses to the rest of the sample. In order not to exclude too many firms, single respondents from firms were also accepted. Firms that completed one or two questionnaires were pledged a general report from the study. The managers were informed that if their firm decided to participate in the study, they should prepare names and positions of top management team members.

After less than a week each firm was contacted by telephone to determine participation and obtain the names and positions of top management team members. In addition, checks were made to establish whether firms in fact operated with top

management teams in strategic analysis and decision making. Thirty-one firms agreed to participate with more than one manager and provided names and positions of top management team members. All of these managers were then mailed questionnaires individually. Thirty firms agreed to participate with at least one respondent and perhaps more than one. The president, editor or single manager of these firms was mailed between two and five questionnaires to be distributed within their top management teams. Seventeen firms agreed to participate with the president, editor or single manager only, and fifteen firms were rather doubtful but agreed to receive one or two questionnaires to have a closer look. Finally, eleven firms did not want to participate and two firms were excluded because they did not operate with top management teams. In sum, a total of 231 questionnaires were distributed to 93 newspaper firms.

Two mail prompts and a telephone follow-up, generated 162 usable questionnaires representing 73 newspaper firms, a response rate of approximately 70 percent. The number of respondents per firm ranged from 1 to 5 with an average of 2.22. In 46 of the 73 firms, two or more managers completed and returned the questionnaire, leaving 27 single informant responses. About half the respondents held top positions in their firms (36 presidents, 21 editors and 23 single managers), while the remaining 82 respondents held lower managerial positions. The respondents' average age was 44 years and 87 percent were males.

Non-response bias was analyzed with regard to competitive posture and circulation size, based on available data from NAL[3] (NAL 1997). As far as circulation size is concerned, non-responding firms are generally smaller than responding firms, with group means of 13,834 and 29,276 respectively. However, excluding the three largest newspapers in the response sample gives a group mean of 18,438, while excluding the six largest newspapers produce a group mean of 15,392. Thus, with regard to circulation size, one can conclude that the majority of respondents are employed in firms not very different from the non-responding firms.

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[3]Data were missing for two of the non-responding firms.

Table 5.1: Competitive posture of the response and non-response samples

Competitive posture	Response sample		Non-response sample	
	Frequency	Percent	Frequency	Percent
Number one newspaper	15	20.50	2	6.50
Number two newspaper	9	12.30	5	16.10
No local competitors	43	58.90	21	67.70
Niche newspapers	4	5.50	3	9.70
Non-subscribe newspapers	2	2.70	0	0.00
Total	73	100.00	31	100.00

Table 5.1 displays competitive posture of the response and non-response samples. The main difference between the two samples is that the percentage of number one newspapers[4] is about three times larger for the response sample than for the non-response sample. Besides this factor, the distribution of competitive posture in the two samples does not differ very much. Thus, the sample of 162 top management team members from 73 newspaper firms appears to be representative of the population.

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[4] A number one newspaper is the one with the largest circulation of two newspapers competing in the same geographical market.

MEASUREMENT

This chapter empirically explores the reliability and validity of each measure, starting with the dependent variables. Since all variables are treated at an interval level of measurement and considered reflective as opposed to formative, coefficient alpha (Cronbach 1951) is used to estimate the reliability of the measures. Moreover, factor analyses of the multidimensional constructs are conducted as a proximation to convergent and discriminant validity (e.g. Carmines and Zeller 1979; Dess and Beard 1984; Nunnally and Bernstein 1994). At the end of the chapter, the procedures applied to construct variables based on the questions asked in the questionnaire and descriptive statistics for all variables are reported.

6.1 Dependent variables

All dependent variables are individual level perceptual variables since they are developed to empirically establish individual managers' strategic issue diagnosis. To strengthen conformity between the conceptual and empirical level, all questions used to measure dependent variables directed respondents attention to their individual perceptions of the case scenarios (e.g. Klein, Dansereau, and Hall 1994).

6.1.1 Effect valence

Most studies that have measured threat and opportunity have treated them as two ends of a single dimension (e.g. Fombrun and Zajac 1987; Ginsberg and Venkatraman 1992; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990). Jackson and Dutton (1988) and Denison et al. (1996), in contrast, suggest that threat and opportunity represent distinct dimensions relevant to issue interpretation. In order to address this concern, respondents were presented with two case scenarios and 9 questions to each scenario based on the questionnaire used by Jackson and Dutton (1988). The two case scenarios were designed to signal an environmental threat and an environmental opportunity. The threat scenario contained threat-consistent and opportunity-discrepant information, while the opportunity scenario contained opportunity-consistent and threat-discrepant information. Interviews with panel members were conducted to refine and cross-check the text as well as to check the

manipulation of the case scenarios. This procedure was followed for all case-scenarios.

Jackson and Dutton (1988) demonstrated that opportunity and threat labels were differentiated by three strategic interpretation dimensions: (1) whether decision makers evaluate an issue in positive or negative terms, (2) whether they see it as representing potential gain or loss for their organization, and (3) whether they see it as controllable or uncontrollable, often referred to as capability perception. Thomas and McDaniel (1990) and others (e.g. Thomas, Clark, and Gioia 1993) have later verified the relevance of these labels for describing strategic issues but also noted that the positive-negative and gain-loss dimensions are operationally indistinguishable and highly correlated, and therefore should be collapsed into a single positive-gain and a negative-loss dimension. Thus, ten items (five for each scenario) were posed to assess the extent to which managers would see the scenarios in positive-gain/negative-loss terms. For example, after the respondents had read the opportunity and threat scenarios, they were asked: «To what extent would you see the situation as having positive implications for the future of your company?» and for the threat case scenario: "To what extent would you see the situation as having negative implications for the future of your company?».

To assess the controllability and uncontrollability dimensions, respondents were promted two items for each of the scenarios. For the opportunity scenario, they were asked: "To what extent do you feel that your company has the necessary resources to effectively capitalize on the situation?" and "To what extent do you feel that your company can effectively capitalize on the situation without much effort?" For the threat scenario, they were asked: "To what extent do you feel that your company lack the necessary resources to satisfactorily manage the situation?" and "To what extent do you feel that your company can only satisfactorily manage the situation with much effort?"

To assess extremity in effect valence, two items for each of the scenarios contained questions about the magnitude of the situations compared to other firms. For the opportunity scenario, managers were asked: "To what extent do you feel that that the situation will have more positive implications for your company than for other

newspaper companies?" and "To what extent do you see the situation as a strategic opportunity that is particularly important for your company?" For the threat scenario, they were asked: "To what extent do you feel that the situation will have more negative implications for your company than for other newspaper companies?" and "To what extent do you see the situation as a strategic opportunity that is particularly important for your company?". Managers responded on a 7-point Likert scale with anchors ranging from "very little extent" to "very great extent".

If positive-gain/negative loss, controllability-uncontrollability and extremity represents are three distinct dimensions of opportunity and threat interpretations, the scales for each dimensions should demonstrate internal consistency. In other words, items positively associated with the same dimension should be positively correlated with one another.

Furthermore, items associated with one dimension should in factor analytical terms load on that dimension or factor only. In order to empirically explore these assumptions, a principal component analysis (PCA) with three factors for each case scenario was conducted. PCA was applied since the interest was to determine the minimum number of factors needed to account for maximum portion of the variance represented in the data (Hair et al. 1992). Furthermore, an oblique rotation was used since the dimensions were assumed to be correlated with each other (Hair et al. 1992). This procedures were followed for all variables. Tables 6.1 and 6.2 present the results of the factor analyses for effect valence.

The results reveal that perceptions of positive-gain/negative-loss, controllability-uncontrollability and extremity should be viewed as distinct dimensions. The fact that items load significantly on one factor only is taken as an indication of convergent and discriminant validity. The relatively low coefficient alpha for uncontrollability (for the threat situation) must be seen in relation to the small number of items used to assess the dimension. The inter-item correlation between the two items is .37, suggesting that a small increase in the number of items would have resulted in a substantial increase in coefficient alpha (Carmines and Zeller 1979; Van de Ven and Ferry 1980). Furthermore, given that limited reliability is not the major reason

limiting test validity (Nunnally and Bernstein 1994) and that the two items can be said to be conceptually related to each other, the scale was kept for further analysis.

Table 6.1: Effect valence opportunity, PCA with oblimin rotation[5]

Items	Factors		
	1	2	3
Positive-gain			
2. Future significantly easier	**.90**	-.20	.01
4. Very positive	**.82**	.02	.12
1. Provide benefits	**.78**	.26	-.10
3. Potential gain	**.74**	.22	.05
7. Very high probability of large gains	**.50**	.10	.46
Controllability			
9. Easy to capitalize	.03	**.89**	-.01
8. Capability to capitalize	.01	**.87**	.08
Extremity			
5. More positive implications	-.06	.07	**.88**
6. More significant strategic opportunity	.07	-.05	**.87**
Eigenvalue	5.00	1.15	.89
Pct. of variance	55.60	12.80	9.90
Coefficient alpha	.90	.81	.73

Table 6.2: Effect valence threat, PCA with oblimin rotation

Items	Factors		
	1	2	3
Negative-loss			
1. Provide disadvantage	**.90**	-.15	-.01
3. Potential loss	**.86**	-.08	.06
2. Future significantly more difficult	**.81**	.12	.08
4. Very negative	**.75**	.16	.04
7. Very high probability of large loss	**.67**	.32	.00
Extremity			
5. More negative implications	-.12	**.90**	.14
6. More significant strategic threat	.29	**.75**	-.11
Uncontrollability			
8. Lack the capability to manage	-.07	.04	**.93**
9. Difficult to manage	.29	-.02	**.59**
Eigenvalue	4.63	1.10	.93
Pct. of variance	51.40	12.30	10.30
Coefficient alpha	.90	.70	.54

6.1.2 Issue sorting

To measure issue sorting, two case scenarios containing descriptions of two different organizational problems were presented to the respondents. The scenarios varied with respect to problem structure. The first scenario (denoted scenario S) described a structured organizational problem with a single explicitly mentioned cause and where the solution was relatively straight forward compared to the problem in the second scenario. The latter (scenario U) described an unstructured problem with uncertain

[5]The formulation of items is shortened due to limited space. For the exact wording of items see appendix A.

and multiple potential causes, effects and solutions. To balance the two scenarios, additional identical facts about the "case-organization" were included in both case scenarios.

Nine items based on previous research (Dutton, Stumpf, and Wagner 1990; Jackson and Dutton 1988) were used to identify the extent to which the two situations were considered important for the organization (six items) and to what extent they were seen as unfeasible or difficult to understand and manage (three items). Managers responded on a 7-point Likert scale with anchors ranging from "very little extent" to "very great extent". Since these two types of perception should form positively related but distinct dimensions (Dutton, Stumpf, and Wagner 1990; Jackson and Dutton 1988), they were treated as separate dependent variables.

Table 6.3: Issue sorting, PCA with oblimin rotation

Items	Factors			
	1	2	3	4
Importance scenario U				
3. An urgent issue	.87	.13	.01	-.15
4. Placed high on the issue agenda	.87	.07	-.07	-.14
1. An important issue	.83	-.09	-.04	.02
2. Future will be changed	.78	.07	.06	.05
5. A routine issue[a]	.55	-.09	-.14	.07
9. Invest further resources in exploration	.39	-.12	.11	.42
Unfeasibility scenario S				
7. Sufficient knowledge to understand[a]	.08	.93	.01	-.03
8. Sufficient resources to manage[a]	-.06	.84	-.09	.09
6. Easy to understand cause-effect relationships[a]	.01	.72	-.13	-.03
Importance scenario S				
4. Placed high on the issue agenda	.08	.00	-.78	-.19
3. An urgent issue	.02	.07	-.77	-.20
2. Future will be changed	-.05	.08	-.72	.15
1. An important issue	.08	-.14	-.70	-.01
5. A routine issue[a]	-.03	.05	-.56	.01
9. Invest further resources in exploration	.07	.11	-.49	.19
Unfeasibility Scenario U				
6. Easy to understand cause-effect relationships[a]	-.06	-.20	-.17	.76
7. Sufficient knowledge to understand[a]	.03	.35	.19	.69
8. Sufficient resources to manage[a]	-.06	.36	.09	.69
Eigenvalue	4.06	2.88	2.51	1.34
Pct. of variance	22.50	16.00	14.00	7.40
Coefficient alpha	.86	.82	.77	.70

[a]Reversed

If importance and unfeasibility are two distinct dimensions of issue perception, the scales for each dimensions should demonstrate internal consistency and the items should load on one dimension only. In order to empirically explore these assumptions, a principal component analysis (PCA) with four factors was conducted (since respondents rated importance and unfeasibility of two different case scenarios).

The results reveal that perceptions of importance and unfeasibility of the two case descriptions in fact form four dimensions. The only exception is item 9 for case scenario U, since it loads on both importance and unfeasibility. Thus, item 9 was deleted from further analysis for both case scenarios.

In general, the PCA indicate that the respondents saw the two problems as different in terms of the two different perceptual dimensions of importance and unfeasibility. To assess issue sorting, i.e. which of the issues that were perceived as most important and most unfeasible, a new scale was made simply by dividing the respondents score on each of the U-items on the S-items. This scale gives a score of the relative weight of problem U as compared to problem S, where scorings greater than one indicates that the unstructured problem is perceived as more important or more unfeasible than the structured problem. To provide some evidence of discriminant and convergent validity of this new scale, a PCA with two factors and oblique rotation was performed. However, due to low factor loadings for item 2 and 5, and because three factors had eigenvalues greater than one, the analysis indicated that three factors might give a better representation of the data when it comes to comparing the importance and unfeasibility of the two problems. As can be seen from table 6.4 the three factor solution makes a distinction between what can be interpreted as "operational" versus "strategic" importance of problem U relative to problem S. The term "operational" is applied since the perception of the issue is based on the short term importance assessed by the urgency and agenda setting items. "Strategic" importance on the other hand is related to the long term effect of the issues and the inverse of being routine issues. Since all three unfeasibility items load significantly on the third factor only, the unfeasibility dimension behave as hypothesized.

The low coefficient alpha of strategic importance of U relative to S must be seen in relation to the small number of items used to assess the dimension. Besides, the two items seem to be conceptually related to each other as well as to strategic importance. In general, since all items load significantly[6] on one factor only in a conceptually

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[6]Using .40 as a rough rule of thumb for a significant loading of an item on a factor (e.g. Hair et al. 1992; Van de Ven and Ferry 1980).

reasonable pattern, this is interpreted as some evidence of convergent and discriminant validity of the three measures.

Table 6.4: Issue sorting, PCA with oblimin rotation

Items	Factors		
	1	2	3
Operational importance (of U relative to S)			
3. An urgent issue	.92	.01	-.05
4. Placed high on the issue agenda	.85	.07	.00
1. An important issue	.72	-.02	.11
Unfeasibility (of U relative to S)			
7. Sufficient knowledge to understand[a]	-.02	.89	.05
8. Sufficient resources to manage[a]	-.12	.88	.08
6. Easy to understand cause-effect relationships[a]	.21	.66	-.08
Strategic importance of (U relative to S)			
5. A routine issue[a]	-.13	.13	.87
2. Future will be changed	.27	-.11	.76
Eigenvalue	2.86	1.74	1.10
Pct. of variance	35.80	21.80	13.80
Coefficient alpha	.79	.72	.57

[a]Reversed

6.1.3 Nuances in causal understanding

To measure nuances in causal understanding, respondents were presented with 23 cause-effect statements that varied in how nuanced they were. All the information used to develop the statements were taken from industry relevant sources like newspapers and industry magazines and they were typically in the form of quotations. Eighteen of the statements were extremely unnuanced, for instance "The fact that a newspaper is free, is equivalent with lower degrees of editorial independence". Five statements were designed to be nuanced, e.g. "It is difficult to point to unambiguous and universal causes to positive and negative changes in the circulation size". Managers indicated the degree of truth of the statements on a three point scale ranging from "true", "can be both true and false" and "false". The extremely unnuanced statements were scored so that "true" was given a score of 1, "can be both true and false" was given a score of 2, and "false" was given a score of 3. For the nuanced statements the scoring was reversed.

The content of the statements was related to four different domains, free papers, governmental regulations, market and competition and attribution of newspaper success. Thus, the scale was expected to be four dimensional. However, factor analyses revealed that only statements related to free papers "behaved" as one dimension and that it was impossible to give meaningful interpretation and names to

more than two dimensions. Additionally, the second dimension included statements related to both the market and competition and attribution of success domains and was given the rather long name "issues related to market, competition and attribution of success". The result of the PCA with two factors and oblique rotation is shown in table 6.5.

Table 6.5: Causal understanding, PCA with oblimin rotation

	Factors	
Items	1	2
Free papers		
2..Several reasons to believe that increased distribution of FP will have both positive and negative...	.70	.11
3. FP exclusively a threat to the industry[a]	.68	.05
1. Increased distribution of FP and a less differentiated press structure[a]	.62	-.10
5. FP and lower degrees of editorial independence[a]	.59	.06
6. Several reasons to believe that increased distribution will have both...	.57	.04
4. Increased distribution of FP and lower consumption of traditional newspapers[a]	.43	-.20
Issues related to market, competition and attribution of success		
22. Increased industry concentration exclusively negative[a]	-.01	.66
8. Internet can be written off as serious competitor[a]	-.03	.60
14. The main reason to reduction in circulation size will always be...[a]	.22	.51
20. DM written off as a competitor to newspaper adds[a]	.12	.50
13. The main reason to growth in circulation size will always be...[a]	-.07	.48
23. Several reasons to believe that increased industry concentration will have both...	.04	.47
7. Unambiguous positive relationship between editorial quality and profit[a]	-.09	.43
17. Credibility as a necessary condition for survival[a]	-.25	.40
Eigenvalue	2.44	2.07
Pct. of variance	17.44	14.75
Coefficient alpha	.66	.58

[a]Reversed

As can be seen from the table, coefficient alphas are relatively low and the second factor contains statements across different domains. Except from the fact that the items related to free papers loaded on the same factor, it is difficult to provide any support for validity for these measures. However, due to the explorative nature of this study, and this construct in particular, both scales were kept for further analysis.

6.1.4 Data search

To measure data search, yet another short case scenario was presented to the respondents. The scenario described a problem where two major advertisers had signaled a significant decrease in the purchase of advertisement from the newspaper. There were no clear cut information telling why this was happening, but several possible reasons were mentioned. However, the case contained information that both advertisers recently had become customers of an advertising agency known for their efforts in direct marketing and radio advertisement.

After reading the case scenario, managers were asked to indicate the extent to which he or she would use each of fourteen different pieces of data to clarify and define the strategic situation presented in the case scenario. These pieces of data were constructed as items that varied in how closely they were related to the presented problem and how effortful the gathering of the information would be. Five items assessed core data that were strongly related to the problem in that they dealt directly with the two advertisers and the advertising agency. Three items contained questions about additional data on the advertising market not as closely related to the problem, and six items were related to search and gathering of new data. To make the task more realistic, subjects were reminded that data gathering in real situations is costly in terms of time and effort (Dukerich and Nichols 1991). Managers responded on a 7-point Likert scale with anchors ranging from "very little extent" to "very great extent".

Table 6.6: Data search, PCA with oblimin rotation

Items	Factors 1	2	3
New data			
13. Methods and costs of doing advertising effect measurement	.82	-.01	-.02
14. Future strategies of advertisers	.78	.02	.01
12. New segments of possible advertisers	.68	-.10	-.19
11. Future development of the advertising market	.67	-.11	-.30
9. Other existing customers relationships with Beta	.64	.15	.12
Core data			
3. Existing information about the two advertisers	-.16	.70	-.36
2. The strategy and services offered by Beta	.36	.69	.31
1. Meeting with the two advertisers	-.08	.65	-.01
4. Last statistical report on advertising in different media	.36	.44	-.17
5. Existing report comparing effects of different advertising media	.19	.44	-.32
Additional			
6. Historical internal information on advertiser satisfaction	-.01	.19	-.74
8. Historical internal information on new and quitting customers	.11	.03	-.72
10. Historical information about possible structural market changes	.33	-.06	-.61
Eigenvalue	4.87	1.40	1.18
Pct. of variance	37.48	10.79	9.07
Coefficient alpha	.81	.71	.70

To test the three-dimensionality of the data search, a PCA with three factors and oblique rotation was conducted. Except from one item (item 7) that was deleted from further analysis, the result of the factor analysis supports this idea. The scales demonstrate acceptable reliability and all remaining items have significant factor loadings, providing some evidence on convergent validity. However, some of the core data items have fairly high loadings on the additional data dimension, suggesting at least some lack of support for discriminant validity.

6.2 Independent variables

Two of the independent variables are conceptually treated as objective phenomena at the group and organizational levels of analysis. The data used to measure these variables are however collected from individual managers. Members of the top management team are assumed to be the most knowledgeable persons regarding an organization's information processing, and the individuals most responsible for taking actions intended to align the organization's strategy, structure, processes, and environment (Thomas, Clark, and Gioia 1993). Thus, top managers will be the best informants for gathering data on the independent as well as the dependent variables. To strengthen the conformity between the conceptual and empirical level, questions directed respondents' attention to the group and organizational level respectively.

6.2.1 Organizational scanning

Organizational scanning has been defined as a two-dimensional construct consisting of information acquisition frequency (IAF) and information availability and use (IAU). Even though these dimensions can be expected to be interrelated, the frequency of information acquisition on one side, and how and whether information is available and used in strategic analysis, planning and forecasting on the other, were treated as two distinct organizational processes. This distinction is supported by empirical studies that indicate that organizations are usually not successful in having their informational input integrated into the strategic management process (e.g. Diffenbach 1983; Jain 1984; Lenz and Engledow 1986a; Stubbart 1982).

The 18-item IAF scale was designed to measure how frequently organizations collect information from different environmental sectors. The classification of sectors was influenced by previous organizational scanning research, but refined and "translated" into a newspaper industry context. This classification resulted in the following environmental sectors; customers (readers and advertisers), direct competition (other newspapers), indirect competition (other media than newspapers), sub suppliers, regulatory (governmental policy and court rulings) and economic sectors. Since several studies indicate that scanning frequency or intensity and scope are related (e.g. Jain 1984; Jennings and Lumpkin 1989; Lenz and Engledow 1986a; Reid 1984), IAF

was treated as an unidimensional "dimension" of scanning, meaning that frequency of information acquisition can be measured across environmental sectors. IAF was measured using frequency questions similar to those used by Hambrick (1982), Culnan (1983) and Daft et al. (1988), where managers responded to the questions by indicating how often the organization systematically collect different kind of information on a six point frequency scale with anchors ranging from "very rare or never" to "more than weekly".

The 20-item information availability and use (IAU) scale consisted of eight questions about the use of information in strategic analysis, planning and forecasting, and twelve questions about how easily available different kinds of information are for managers in the newspaper. These items were related to the same sectors as the IAF items and the IAU dimension was also assumed to be unidimensional. This implies that availability and use of information is hypothesized to be positively related, a notion that is empirically supported both at the managerial (Culnan 1983; O'Reilly 1982) and organizational (Goldstein and Zack 1989) level. It also implies that different levels of availability and use is fairly consistent across different sources of information and different kinds of use of information, which is indirectly supported by the above cited studies that indicate a positive relationship between frequency and scope of scanning. Managers responded to the IAU-items on a 7-point Likert scale with anchors ranging from "very little extent" to "very great extent".

In order to empirically explore these assumptions, a principal component analysis with two factors was conducted. The results reveal that no IAF items loaded significantly on the IAU factor, thus providing some support for the distinction between the two dimensions. However, five of the eight IAU items that are related to use of information had higher loadings on the IAF factor than on the IAU factor. Therefore, a factor analysis with three factors was performed to determine whether the information use items would load on a single factor.

As table 6.7 shows, this is not the case. All information use items (except item 1u) load on the first factor together with the IAF items related to market information on readers and advertising market information, the two most important customer segments for any newspaper (Fink 1988). Hence, the first factor might be

meaningfully named "customer information acquisition frequency and use". Since this factor includes the *use* of information in strategic analysis, planning and forecasting, it can conceptually be differentiated from the two other factors as a measure of more developed or sophisticated organizational scanning (e.g. Jain 1984; Lenz and Engledow 1986a).

Table 6.7: Organizational scanning, PCA with oblimin rotation

Items	Factors		
	1	2	3
Customer information acquisition frequency and use			
2af. Characteristics of existing readers such as attitudes and buying habits	.77	-.06	.01
7u. Demographic characteristics of readers in communication with advertisers	.74	.07	.01
13u. Attitudes and buying behavior of readers in communication with advertisers	.70	.19	.02
19u. Readers to develop scenarios and marketing plans	.68	.15	-.11
4af. Reading habits of the population	.67	-.14	.26
6u. Advertising market to meet the need of existing and potential advertisers	.67	.35	-.09
12af. Demographic characteristics of existing readers	.66	-.21	.34
14af. Existing readers attitudes against the newspaper	.66	-.11	.21
8af. Potential readers' attitudes against the newspaper	.58	-.18	.24
16u. Media market to detect future threats and opportunities	.54	.35	.03
17u. Advertisers to develop plans about how to serve the advertising market	.49	.37	.07
11u. Advertising market to detect future threats and opportunities	.48	.34	.06
1af. How other newspapers cover the advertising market	.46	-.08	.31
Information availability			
3a. Materials and operation-techniques	-.13	.77	.03
2a. Updated key figures of the national economic development	.00	.70	-.05
12a. Management magazines	.21	.66	-.05
9a. Scientific and popular journals	-.16	.66	.17
10a. Sub suppliers	-.12	.63	.24
5a. Advertising market	.42	.62	-.26
14a. Reports from researchers and consultants	.14	.59	.17
18a. Public and governmental reports and newsletters	-.02	.57	.28
4a. Attitudes of readers	.48	.50	-.22
20a. Reports and magazines from the trade union	.06	.46	.18
8a. Competitors	.32	.45	-.02
General information acquisition frequency			
17af. Governmental policy and plans concerning the media market	.01	.09	.74
6af. Changes in other newspapers image or profile	.08	-.06	.64
9af. Tactics and strategies of other media than newspapers	.28	-.03	.58
3af. Court rulings related to newspaper production	.05	.11	.56
13af. Alternative sub suppliers	.04	.12	.56
5af. Development of new materials and operation-techniques	-.16	.12	.55
11af. Tactics and strategies of competing or comparable newspapers	.25	.07	.54
10af. How other media than newspapers cover the advertising market	.41	.01	.50
15af. Key figures of the national economic development	.05	.32	.49
7af. The consumption of other media than newspapers in the population	.31	.06	.47
18af. Reader profiles of other newspapers	.35	-.06	.43
Eigenvalue	11.88	3.36	2.21
Pct. of variance	33.95	9.60	6.31
Coefficient alpha	.91	.88	.87
Eta squared	.55	.26	.40
Eta squared organizational position	.01	.01	.00

"af" denotes information acquisition frequency items, "a" information availability items and "u" information use items.

The second factor consists of all availability items (except one) and was simply named information availability. Item 15a, which did not load significantly on any of the factors, was excluded from further analysis. This item was related to what extent managers have their own access to the Internet, which seems to be relatively

independent of the three organizational scanning dimensions extracted by the factor analysis.

The rest of the IAF items loaded on the third factor. These items are related to information segments other than the customer sector, i.e. the competition, sub supplier, regulatory, and economic sectors. Accordingly, the factor was named general information acquisition frequency. One item (16af) about attitudes and satisfaction of advertisers and one information use item (1u) were deleted because they conceptually fitted the first factor rather than the third.

A few items do have fairly high loadings on more than one factor. This suggests that the measures of the three dimensions of organizational scanning lack support for discriminant validity. However, they demonstrate high internal consistency with coefficient alphas ranging from .87 to .91 and average inter-item correlations ranging from .39 to .46. Moreover, using .40 as a rough rule of thumb for a significant loading of an item on a factor (e.g. Hair et al. 1992; Van de Ven and Ferry 1980), all included items can be considered significant. Combined with a conceptually reasonable pattern of factor loadings, this can be interpreted as some evidence of convergent validity of the measures.

Since the organizational scanning variables are measures of organizational phenomena, members of the same organizations should demonstrate high levels of agreement in rating these variables. To test this assumption, the extent of agreement (or reliability) among managers from the same organization were assessed by contrasting within- and between organization variance (e.g. Klein, Dansereau, and Hall 1994). One-way analysis of variance of 31 organizations with three to five respondents in each (n = 105), showed that for customer information acquisition frequency and use (F = 2.98, p = .00) and general information acquisition frequency (F = 1.63, p = .05), the variance between organizations were significantly greater than within organizations. However, for information availability (F = .88, p = .64), there were no significant differences between organizations. In general, such disagreement in ratings may typically arise because managers hold different organizational positions and thus different perspectives on the same organizational phenomena (Kumar, Stern, and Anderson 1993). If organizational position explains more variance

in the organizational scanning variables than organizational membership, it would imply serious reliability and validity problems. However, a one-way anova analysis for organizational position showed no significant differences in the scanning variables between the 80 top managers and 82 middle managers. Moreover, comparing the eta squared values in table 6.7, indicate that organizational membership is a much better explanation of variance in all three organizational scanning variables than organizational position. Consequently, it is concluded that interrater reliability of these variables was acceptable.

6.2.2 Top management team information processing structure

The information processing structure of the top management team is a concept rooted in earlier work (e.g. Daft and Lengel 1986; Duncan 1973; Duncan 1974; Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991; Thomas, Shankster, and Mathieu 1994). The concept was measured on a 9-item mechanistic-organic scale, where "organicness" or "looseness" is defined by (1) the degree to which the team's members participate in strategic decision making, (2) the inverse degree to which strategic decision making is formalized, and (3) the degree of interaction among the team's members. Managers responded to the items on a 7-point Likert scale with anchors ranging from "very little extent" to "very great extent".

In previous research, the top management team information processing structure is, at least implicitly, treated as a unidimensional construct, and reported coefficient alphas usually vary between .70 to .90. However, in the present study the coefficient alpha is moderate (.61), which might indicate multidimensionality. Thus, to empirically explore the dimensionality of the three mechanistic-organicness dimensions, a PCA with three factors and oblique rotation was conducted. As can be seen from the table 6.8, three items load on the second factor, and all of these are flexibility items (i.e. the inverse of formality). One interaction item (4) and one participation item (8) load on the third factor and the remaining items load on the first factor. In other words, except from the flexibility dimension, the data do not support the theory.

As it was difficult to give a conceptually meaningful name to the third factor based on item 4 and 8, and because items 6 and 7 could be interpreted in terms of participation,

a second PCA with only two factors was conducted. From table 6.9 we can see that item 4 does not load significantly on any of the two factors and this item was thus omitted. This operation resulted in a 5-item participation scale and 3-item flexibility scale. However, due to relatively low corrected item-total correlation of item 2 in the flexibility scale (.28 as compared to .45 and .51 for items 5 and 9), this item was eliminated. Even though item selection based only upon the correlations between items and the total score can lead one to discard an item spuriously (Nunnally and Bernstein 1994), the increase in coefficient alpha from .60 to .68, and in average inter-item correlation from .33 to .51 was considered large enough to justify the deletion of the item. The alpha for this scale can still be considered somewhat low, but given the low number of remaining items the score of .68 should be acceptable (e.g. Carmines and Zeller 1979; Van de Ven and Ferry 1980).

Table 6.8: TMT information processing structure, PCA with oblimin rotation

Items	Factors		
	1	2	3
Participation			
1. All members participate in SP&DM on a regular basis	.78	-.18	.07
3. SP&DM characterized as a group activity	.84	-.15	-.10
8. One or two people dominate the handling of strategic issues[a]	.53	.17	-.67
Flexibility			
2. Group deviates from standardized procedures and agendas	.14	.54	.26
5. SP&DM characterized as rule-oriented[a]	-.26	.78	-.14
9. A single set of written rules and procedures followed[a]	-.01	.85	-.04
Interaction			
4. Informal interaction outside group settings	.25	.14	.75
6. Free and open exchange of ideas	.77	.00	.17
7. Possibility of mutual influence	.76	.17	-.05
Eigenvalue	2.93	1.74	1.13
Pct. of variance	32.50	19.30	12.60

[a]Reversed

Acceptable reliability coefficients and a pattern of factor loadings where items load significantly on one factor only, are taken as an indication of both convergent and discriminant validity. Tests of within-team agreement with one-way analysis of variance of the 31 organizations with three to five respondents in each (n = 105), showed that the variance between top management teams were significantly greater than within teams for participation (F = 2.07, p = .01), but not for flexibility (F = 1.03, p = .45). However, one-way anova analysis for organizational position showed no significant differences in neither participation nor flexibility between top managers and middle managers. Finally, comparing the eta squared values in table 6.9, indicate

that top management team membership yields a much better explanation of variance in both participation and flexibility than organizational position.

Table 6.9: TMT information processing structure, PCA with oblimin rotation

	Factors	
Items	1	2
Participation		
3. SP&DM characterized as a group activity	.82	-.20
7. Possibility of mutual influence	.78	.13
6. Free and open exchange of ideas	.77	-.05
1. All members participate in SP&DM on a regular basis	.76	-.24
8. One or two people dominate the handling of strategic issues[a]	.57	.26
Flexibility		
9. A single set of written rules and procedures followed[a]	.10	.86
5. SP&DM characterized as rule-oriented[a]	-.16	.83
Eigenvalue	2.87	1.54
Pct. of variance	40.95	22.05
Coefficient alpha	.79	.68
Eta squared	.47	.30
Eta squared organizational position	.01	.00

[a]Reversed

6.2.3 Cognitive styles; cognitive complexity and assimilation-exploration

Cognitive complexity has been defined as the extent to which individuals differentiate and integrate data and stimuli in perception and evaluation. Differentiation refers to the ability to perceive several dimensions in a stimulus array, and integration refers to the development of connections among the differentiated characteristics. Cognitive complexity is defined and measured in several ways and the problem of measurement has been raised many times in the literature (e.g. O'Keefe, Shepherd, and Streeter 1982; O'Keefe and Sypher 1981; Schneier 1979; Scott, Osgood, and Peterson 1979; Streufert and Driver 1967; Streufert and Streufert 1978; Vannoy 1965). A striking phenomenon is the fact that various measures seem to be more or less unrelated to each other, while at the same time producing similar results when more versus less cognitive complex individuals are compared on a variety of dependent variables (e.g. Streufert 1986; Streufert and Nogami 1989). One interpretation of such a finding is that most or all of the measures do not measure differentiation and integration characteristics correctly. However, the fact that many predictions based on these tests have produced significant results, do not support such an interpretation (e.g. Streufert and Driver 1967). Another interpretation is that different measures capture different aspects of cognitive complexity.

The most widely used instrument to measure cognitive complexity in research settings with little control over respondents has been different versions of the Role Concept Repertoire Test, that was originally developed by Kelly (Kelly 1955). While the REP test has demonstrated good reliability and validity (Schneier 1979), it has two important limitations. First, there appears to be little support for occasional claims that the test is able to measure integration (Streufert and Nogami 1989). The criticism is that most people are able to differentiate, i.e. to apply different and independent views of a person, object, idea, or a situation, but higher levels of cognitive complexity requires an ability to integrate different dimensions as well (e.g. Streufert and Swezey 1986). While this criticism might seem fundamental, the problem of measuring levels of integration seems to be quite general across all tests that can be used in situations with little control over respondents and with simple administration as in a mailed survey.

The second limitation of the REP test is that it is limited to the social domain. Although cognitive complexity theory is rooted in social and interpersonal perceptions (e.g. Asch 1946; Bieri 1966; Kelly 1955) and despite the assumption that cognitive complexity within the social domain should be important for managers, a purely domain specific measure might not capture essential cognitive characteristics possibly related to strategic issue diagnosis. Against this argument, cognitive complexity focuses on structural rather than content dimensions of human information processing. The emphasis is on how information is processed, not on the specific information content. *What* a person thinks likely differs greatly from one individual to another. However, *how* a person thinks can be compared to *how* another person thinks, irrelevant of the content of these thought (Streufert and Streufert 1978). Thus, cognitive complexity should be minimally affected by shifts in informational or task content over time (Streufert and Swezey 1986). However, although information processing is the focus of cognitive complexity, people processes information in relation to some information content, meaning that the measurement of processing will never be totally content free. As argued by Fiske (Fiske, Kinder, and Larter 1983), the distinction between content and process is of course imperfect. Cognitive theories are fundamentally process-representation pairs. However, although one cannot logically distinguish the effects of processing from the effects of content, one

can still attempt to formulate theories that emphasize the one or the other and that are useful empirically, in accounting for existing data and formulating new predictions (Fiske et al. 1983:383).

The question of domain-specific versus general cognitive complexity is usually treated as a methodological issue in the literature (e.g. Calori, Johnson, and Sarnin 1994; Planchon and James 1991; Wofford 1994). However, since information processing is most likely dependent on information content, the choice of domain free versus domain specific conceptualization of cognitive complexity should have important theoretical implications. Most researchers agree that levels of cognitive complexity within a person may be quite specific to particular domains (e.g. Scott, Osgood, and Peterson 1979; Streufert and Swezey 1986; Zinkhan and Martin 1983), and that complexity within any domain is likely to develop only where experience or communication has generated multidimensional differentiative or integrative thought processes (Streufert and Swezey 1986). On the other hand, and despite the lack of knowledge about the sources and development of cognitive complexity, there are reasons to believe that complexity might be transferred from one domain to another. Streufert and Swezey (1986) gives an example of a person who has achieved the ability to differentiate and integrate information about the political views of various political candidates and suggest that such a person is more likely to understand (or be trained to understand) potentially differentiated and integrated views of executives. Moreover, studies of personality development in children and adults suggests that people are often more or less high versus low complex not only within, but also across domains (see Bartunek et al. (1983) and Streufert and Streufert (1978) for reviews). To further complicate the debate over the existence or degrees of domain specific versus general cognitive complexity, the question of what should constitute a domain and how many domains that should be included in a particular study is far from self evident. Cognitive complexity theorists have usually made a distinction between social and non-social domains (e.g. Scott, Osgood, and Peterson 1979), while others have chosen more purely domain-specific approaches, for example in studying the perceived structure and dynamics of a particular industrial environment (e.g. Calori, Johnson, and Sarnin 1994).

Due to the uncertainty about the question of domain specific versus general cognitive complexity, the present study includes more than one domain and focuses on *general managerial* cognitive complexity. This conceptualization is partly domain specific in that it focuses on a broad domain or classes of subdomains that are likely to be more relevant for managers than other people. However, it is general in that it does not focus exclusively on a single industry or a single domain (or subdomain) like for example financial, technological, social or political domains. Such a conceptualization recognizes that experience and knowledge acquisition within particular domains are important for competent managerial performance (e.g. Day and Lord 1992), and that the same manager might demonstrate higher complexity within some domains and less within others (e.g. Linville 1982; Streufert and Swezey 1986). Furthermore, the interest in top managers and strategic issue diagnosis makes a partly general approach to cognitive complexity more appropriate than a purely domain-specific one. Top managers have survived the long process of weeding out those who are less competent, they are generally expert at dealing with their job, and they have relatively high levels of domain-specific knowledge as a result of years of experience (Streufert and Swezey 1986). In other words, top managers are general managers that must deal with an incredible array of issues across different domains (e.g. Hitt and Tyler 1991) ranging from social and political to financial and technological issues (e.g. Daft, Sormunen, and Parks 1988; Milliken, Dutton, and Beyer 1990). Then, an alternative approach studying managers' experience or knowledge content across potentially important "managerial domains" could be more appropriate than focusing on their cognitive complexity. The answer to that question is rooted in the assumption that high levels of knowledge content are not sufficient to be effective in strategic issue diagnosis and other ill-structured, complex and non-repetitive managerial tasks. As Streufert and Swezey (1986) suggest, most cases of mismanagement are not due to insufficient knowledge and experience, but to lack of differentiated and integrated use of knowledge.

The literature does not offer any ready-made measures that are appropriate for the present study. One instrument, the Driver-Streufert Complexity Index (DSCI) (Driver, Brousseau, and Hunsaker 1990; McGill 1989; McGill, Johnson, and Bantel 1994) was a promising candidate since it contains items across domains and since its simple format makes it suitable for a mailed survey. The DSCI consists of sixty self-

description items describing various points of view and ways of behaving in social and problemsolving situations. It has been used in studies of managers and decision makers to evaluate their comfort with complexity, differentiation and openness (McGill 1989; McGill, Johnson, and Bantel 1994) and their decision-making rolestyle (Driver, Brousseau, and Hunsaker 1990; Driver and Rowe 1979; Driver et al. 1996; McGill 1989). However, the DSCI is very extensive, and scoring instructions were not freely available due to copy right arrangements. Therefore, a pilot study was conducted in order to reduce the number of items and to develop a scoring key.

Since the majority of the DSCI-items are related to the social domain, the pilot study also included a cognitive style instrument (The Assimilator-Explorer Inventory (AEI)) on general preferences for task-oriented problem solving strategies (Kaufmann 1989; Martinsen and Kaufmann 1991). The cognitive style dimension is made between assimilator and explorer strategies in problem solving where preferences for novelty is central in discriminating between the strategies. Explorers are typically more open, flexible and novelty seeking, while assimilators are more conformist, rule bound, rigid and less open (Martinsen 1995). Since novelty and complexity are treated as conceptually independent aspects of the task environment in cognitive problem solving research (Kaufmann 1988), assimilation-exploration and cognitive complexity might constitute cognitive dimensions that supplement each other. The AEI version used in the pilot study consists of thirty self-description items (plus four lie indicator items) that relate to concepts like "pattern", "rule", "method", "instructions" etc., where respondents are invited to assess their own relationship to such concepts in a problem solving context. The DSCI and the AEI have similar instructions and both employ five-point Likert scales.

The pilot study

The DSCI was translated into Norwegian from the original American version and an official Swedish version. The translated version was then controlled by a senior professor in organizational psychology with expertise in cognitive psychology and psychometric theory. The AEI has been developed in Norway and thus existed in a Norwegian version.

The two indexes were mailed to about 210 employees at the Norwegian School of Management. 123 employees (59%) responded after one follow-up mailing. The average respondent age was 44, 66% of the respondents were males and 34% females, and 66% were faculty employees and 34% held administrative positions. Although the small ratio of subjects (n = 123) to items (n = 90) may cause instability of the factor loadings due to sampling error, the sample was assumed to be more representative for managers than a larger sample of students at the school.

The purpose of the pilot study was to identify a structure among the items of the original scales and to reduce the number of items from ninety to about twenty-five to thirty-five to be included in a new scale. An exploratory factor analysis was considered an appropriate statistical method to serve this purpose.

First, a principal component analysis without rotation was conducted to identify the appropriate number of factors to serve as a basis for the selection of items. PCA was used since the purpose was to determine the minimum number of factors needed to account for the maximum portion of the variance. Moreover, both indexes have been extensively tested and refined in the past suggesting that specific and error variance represent a relatively small proportion of the total variance. The factor analysis resulted in twenty-eight factors with eigenvalues greater than one accounting for about 80% the variance. Since this was a far too large number of factors to be assessed with twenty-five to thirty-five items, yet another PCA was performed. Using the a priori criterion (Hair et al. 1992), four factors were extracted to potentially identify the assimilation-exploration dimension of the AEI and comfort with complexity, differentiation and openness from the DSCI in the data. Again, an oblique rotation was used since it was assumed that the four dimensions were correlated.

The first factor contained twenty-seven of the thirty AEI-items, of which twenty-four had factor loadings greater than .4, along with some DSCI-items with acceptable loadings. Almost all items loading on the second factor were related to the social domain and was interpreted as social cognitive complexity (e.g. "In making friends, I prefer those who are quite dissimilar from me in values and opinions"). Most of the items that loaded on the third factor were items related to differentiation (e.g. "In considering problems and situations, I greatly enjoy to, and seek out problems that

require many points of view). While the first three factors could be interpreted in accordance with theory and the original indexes, it was difficult to interpret and name the fourth factor. Therefore, only three factors were kept for further investigation.

To reduce the number of items to account for these three factors a PCA with three factors and oblique rotation was conducted. As a first criteria for keeping items, the rather rigorous rule of thumb of keeping items with factor loadings greater than .4 was applied (Hair et al. 1992). This analysis resulted in forty-nine items, where twenty-seven loaded on the assimilation-exploration dimension, thirteen on the social complexity dimension and nine on the differentiation dimension. To further reduce the number of items, a second PCA with three factors and oblique rotation for the remaining forty-nine items was performed.

This analysis resulted in fifteen assimilation-exploration items. Four AE-items (AE3, AE22, AE29 and AE31) were omitted because their content and wording were judged as very similar with items with higher factor loadings, and two DS-items (DS6 and DS7) because they were difficult to interpret in terms of assimilation-exploration. Eleven social complexity items were kept, three deleted (DS15, DS22 and DS23) due to low factor loadings and one (DS56) because it was hard to relate to social complexity. Finally, to measure differentiation eight items were included and five omitted (DS4, DS14, DS36, DS39 and DS40) because they did not seem to relate to differentiation. The final result was a 34 item three dimensional measure of cognitive styles, including two cognitive complexity dimensions (social complexity and differentiation) and the assimilation-exploration dimension. Coefficient alphas for the three scales ranged from .75 to .89.

Due to the inclusion of the assimilation-exploration dimension and since different cognitive complexity dimensions are often classified as cognitive styles (e.g. Streufert and Nogami 1989), the general concept used to refer to all three cognitive dimensions included in the present investigation will be *cognitive style*. Thus, cognitive complexity, represented by social complexity and differentiation, will constitute one subgroup of cognitive style, while assimilation-exploration will constitute another. Cognitive style can be viewed as characteristic consistencies of information processing that are applied across a wide range of situations and tasks and that are not

subject to easy modification (Messick 1984). Moreover, like cognitive complexity, cognitive styles usually refer to the *way* individuals think, not *what* they think (e.g. Blaylock and Rees 1984). On the other hand, while cognitive style research is not occupied with *how well* people think, but their preferences, cognitive complexity researchers more often refer to different levels of complexity and individuals' ability in thinking.

Evaluation of the cognitive style measures

To provide some evidence of convergent and discriminant validity of the three cognitive style dimensions, a PCA with three factors and oblique rotation was conducted with the data from the newspaper managers.

Table 6.10: Cognitive styles, PCA with oblimin rotation

Items	Factors		
	1	2	3
Exploration[7]			
1. Prefer detailed work that requires neatness and precision[a]	.71	-.18	-.03
12. Prefer to have clear guidelines to stick to in work[a]	.70	.05	.04
9. Best suited for work which requires precision and a systematic approach[a]	.68	-.04	-.02
7. Prefer situations in which you have to work according to specific rules[a]	.68	.05	.18
6. Work best in situations which are clear and straightforward[a]	.65	.08	.30
4. Prefer working without any clear guidelines	.60	-.09	-.05
13. I work best in complex situations	.55	.16	.15
5. Like situations in which it is necessary to break with conventional wisdom	.54	.10	.12
10. Prefer to improvise in what I do	.44	.15	-.16
2. Like best to work without a prearranged plan	.41	-.14	-.11
Social complexity			
19. Prefer those who are similar to me in values and opinions[a]	.08	.71	.02
22. Similarity in values and opinions not being of great consequences for me	-.02	.70	-.13
26. Similarity in personality not being of great consequences to me	-.10	.66	-.12
24. Enjoy being with individuals quite dissimilar in personality	.13	.65	.04
23. Enjoy being with individuals somewhat like myself in personality[a]	.14	.64	-.14
20. Prefer those who are quite dissimilar from me in values and opinions	.08	.63	-.02
21. Prefer a mix of some similar and some dissimilar in values and opinions	-.11	.48	.23
18. Mixing individuals of vastly different make-ups	-.08	.42	.14
25. Enjoy being with some similar, some quite dissimilar	-.27	.42	.31
Differentiation			
28. Moderately attracted to problems that involve many points of view	.10	-.02	.65
29. Greatly enjoy problems that require many points of view	.09	.19	.62
15. Prefer a single problem with one possible solution[a]	.21	-.02	.57
27. Hesitate to solve problems that involve many points of view[a]	-.02	.02	.53
34. People should more often keep their views for themselves[a]	-.05	-.17	.52
31. Avoid discussing the situation with persons who have different points..[a]	-.04	.02	.46
Eigenvalue	4.35	3.45	1.94
Pct. of variance	17.41	13.79	7.75
Coefficient. alpha	.81	.78	.61

[a]Reversed

As table 6.10 shows, the overall pattern of factor loadings do support the three dimensionality of the cognitive style instrument. However, several exploration items (3, 8, 11 and 14) were related to both exploration and differentiation and were

removed from the scale. Furthermore, one exploration item (15) related only to differentiation and was "transferred" from the exploration scale to the differentiation scale since it was originally a DSCI-item and because it makes good sense as a differentiation item[8]. Thus, the modified exploration scale consists of ten items and has a coefficient alpha of .81 and an average inter-item correlation of .30.

The social complexity items functioned as expected. However, two items (16 and 17) were removed from the scale due to low factor loadings. The modified scale thus consists of 9 items and has a coefficient alpha of .78 and an average inter-item correlation of .29.

Three items (30, 31 and 32) were omitted from the differentiation scale due to low factor loadings. Including item 15 as a differentiation item gives a 6 item modified differentiation scale with a moderate coefficient alpha of .61 and an average inter-item correlation of .21. Although the coefficient alpha is only moderate when compared to the alpha values for the exploration and the social complexity scales, it might be considered acceptable given the theoretical and exploratory nature of this study (Nunnally and Bernstein 1994).

While the differentiation scale failed to demonstrate good reliability, the three modified scales consist of items that have high loadings on one factor only, providing some evidence of convergent and discriminant validity.

6.3 Descriptive statistics

In the last section of this chapter, the construction of variables is described and descriptive statistics for all variables are reported.

6.3.1 Dependent variables

Individual scores for the fourteen measures of the four strategic issue diagnosis constructs were computed by averaging the ratings across the items comprising a

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[7]The items are scored so that high values represent an explorative cognitive style.

measure. Table 6.11 below shows means, standard deviation, maximum and minimum values along with skewness and kurtosis indicators for all these variables. The number of items and coefficient alphas for all measures are also reported.

Table 6.11: Descriptive statistics for dependent variables

Constructs and variables	Mean	S.D.	Skewness	Kurtosis	Min	Max	# items	C.alpha
Effect valence								
Positive-gain	4.50	1.25	-.45	.14	1.00	7.00	5	.90
Controllability	4.72	1.31	-.63	.15	1.00	7.00	2	.81
Extremity (opportunity)	3.18	1.38	.31	-.66	1.00	6.50	2	.73
Negative-loss	4.26	1.24	-.45	-.02	1.00	7.00	5	.90
Uncontrollability	3.77	1.17	-.17	-.07	1.00	7.00	2	.70
Extremity (threat)	3.07	1.36	.19	-.75	1.00	6.50	2	.54
Issue sorting								
Operational importance (inversed)	.50	.08	.07	3.03	.24	.84	3	.79
Strategic importance (inversed)	.47	.10	-.66	1.65	.13	.77	2	.57
Unfeasibility (inversed)	.39	.10	-.09	-.72	.16	.65	3	.72
Causal understanding								
Free papers	1.91	.45	-.25	-.74	1.00	2.83	6	.66
Market, competition and attribution of success	2.21	.33	-.18	-.23	1.29	2.88	8	.58
Data search								
Core data (reflected and square root transf.)	1.52	.28	.31	.76	1.00	2.65	5	.71
Additional data	4.66	1.18	-.40	.03	1.00	7.00	3	.70
New data	4.91	1.11	-.37	.41	1.00	7.00	5	.81

From the maximum and minimum values, along with the standard deviation estimates, it seems that the variables capture differences between managers' strategic issue diagnosis. However, using skewness and kurtosis values less than +/- 1 as a rough indication of normality, four variables seemed to depart from normality assumptions. All issue sorting variables had high positive values of skewness and kurtosis, meaning that the distributions of the variables were skewed to the left and are too peaked. One data search variable, core data, was skewed to the right and was too peaked as indicated by negative skewness and positive kurtosis. Since transformation of nonnormally distributed variables are recommended unless there is some reason not do it (Tabachnick and Fidell 1996), these variables were transformed as a remedy for failures of normality. The issue sorting variables were inversed and core data were first reflected (since it was negatively skewed) and then square root transformed. As table 6.11 shows, the issue sorting variables operational importance and strategic importance have rather high values of kurtosis even after transformation. However, due to more loss of variance when dichotomizing variables (e.g. Tabachnick and Fidell 1996), they were kept for further analysis in transformed versions.

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[8]The exact wording is as follows: "I prefer situations where there is a single problem with one possible solution".

6.3.2 Independent variables and organizational size

Since the customer information acquisition frequency and use measure is based on different types of items (IAF- and IAU-items), the items were transformed to z-scores before the individual scores were computed by averaging the ratings across the items comprising the measure. For all other measures of dependent variables, individual scores were computed by averaging the raw ratings across the items comprising the measures. As table 6.12 shows, skewness and kurtosis values are below one for all independent variables, indicating that the sampling distribution of the variables are close to normal distributions. Maximum and minimum values and standard deviation estimates indicate that the variables capture differences in managers' cognitive styles and their perceptions of top management team information processing structure and organizational scanning.

Table 6.12: Descriptive statistics for independent variables and size

Constructs and variables	Mean	S.D.	Skewness	Kurtosis	Min	Max	# items	C.alpha
Organizational scanning								
Customer information acquisition frequency & use	0.00	1.00	-.34	.29	-2.89	2.39	13	.91
Information availability	4.70	1.00	-.64	.37	1.55	6.64	11	.88
General information acquisition frequency	3.11	.80	.30	.01	1.45	5.50	11	.87
TMT information processing structure								
Participation	5.04	1.02	-.54	.33	1.80	6.80	5	.79
Flexibility	4.17	1.37	.09	-.63	1.00	7.00	2	.68
Cognitive style								
Exploration	2.93	.52	.15	-.45	1.80	4.30	10	.81
Social complexity	3.34	.48	-.06	.12	2.00	4.78	9	.78
Differentiation	3.89	.44	-.27	.41	2.67	5.00	6	.61
Organizational size								
Circulation size (logarithmic transformation)	4.97	.53	.46	.60	3.76	6.40	-	-

Organizational size, which will be used as a control variable, was measured as the average weekly circulation size of newspapers in 1996 by multiplying the number of issues per week with the average daily circulation size. The distribution of the measure was skewed to the left and was very peaked, as indicated by high positive skewness and kurtosis values. Therefore, a logarithmic transformation was applied.

DATAANALYSIS AND RESULTS

In this chapter, the results of the data analyses are presented. First, the hypothesis testing are reported. Fourteen sets of regression models are presented, where each dependent variable is regressed onto the full set of independent variables. Next, the propositions about relative effects of contextual and cognitive variables respectively, and whether the effects of the cognitive variables are contingent on the level of the contextual variables, are explored.

7.1 Statistical methods

The present study includes covariation hypotheses with a number of continuous dependent and independent variables. Thus, canonical correlation or structural equation modeling could be appropriate statistical methods used in order to test the hypotheses. However, since the objective is not to analyze the dependent variables simultaneously, canonical correlation analysis was ruled out. Moreover, because of the large number of variables and number of items comprising each variable compared to the number of observations, structural equation modeling was not considered appropriate. Therefore, being guided by the principle of choosing the simplest possible method providing the possibility of a valid testing procedure, multiple regression analysis is used to test the hypotheses and propositions in the present investigation. This method requires that each dependent variable comprising a multidimensional construct be analyzed individually. Thus, the hypotheses were tested with a multiple regression procedure in which each dependent variable was regressed onto the full set of independent variables.

To explore the propositions about relative effects of contextual and cognitive variables respectively, hierarchical and regression was used. Finally, to explore whether the effects of the cognitive variables are contingent on the level of the contextual variables moderated regression analysis and subgroup analyses were used in tandem.

7.1.2 Controlling for organizational size

In order to reduce the risk of attributing explanatory power to independent variables that in fact are not the cause of the variation in the dependent variables, organizational size was included as a control variable. Although particular attention was paid to size in the construction of case scenarios and small and large newspaper firms are assumed to be quite similar in many ways (Fink 1988), organizational size might still influence the relationship between the independent and dependent variables.

Within the strategic issue diagnosis literature, Denison et al. (1996) found that larger firms were more likely to perceive the issue of local foreign investment as a threat, while smaller firms were more likely to perceive it as an opportunity. This finding is explained with reference to the assumption that increased size leads to internal complexity, which in turn leads managers to perceive change as threatening (e.g. Lant, Milliken, and Batra 1992). Moreover, large firms may generally pay less attention to environmental developments, trends or events due to complacency, inertia, insularity and resistance to adaptation (Aldrich and Auster 1986; Chen and Hambrick 1995; Hannan and Freeman 1984; March 1981). For small firms on the other hand, their structural simplicity can allow them to respond more quickly to changes in the environment (e.g. Ketchen, Thomas, and McDaniel 1996).

Another possibility is that managers in large organizations may in general be more sensitive to strategic issues due greater diversity (Thomas, Shankster, and Mathieu 1994) in terms of for instance more complex and voluminous activities. Furthermore, advantages usually associated with large size; economies of scale, experience, brand name recognition, market power and organizational slack (e.g. Bourgeois 1981; Chen and Hambrick 1995; Hambrick, MacMillan, and Day 1982; Woo and Cooper 1981) might influence strategic issue diagnosis. Nevertheless, although there are possible effects of size, existing evidence is not clear as to whether and how it influence the specific relationships between the independent and dependent variables included in the present investigation. Organizational size is an ambiguous organizational characteristic for several reasons. For instance, a variety of operational definitions has been used and conceptual discussions of the potential roles of different aspects of size

have been lacking (Kimberly 1976). Therefore, it will be controlled for organizational size, although it has not been formulated specific hypotheses about its potential effects.

To statistically control for organizational size, hierarchical regression analyses were used. Specifically, the regression models were analyzed with and without size followed by F-tests of changes in R^2 between the two models. Since preliminary analyses showed several instances were the direction of the relationship between dependent and independent variables were positive for larger firms and negative for smaller firms (and vice versa), the sample was split into large and small firms through a median split (e.g. Ketchen, Thomas, and McDaniel 1996; Miller, Kets de Vries, and Toulouse 1982). The heavily positively skewed and peaked distribution of organizational size would ideally suggest an exploration of alternative splitting procedures. However, the large number of independent variables (eight) and the given sample size of 162 managers (from 73 firms), ruled out alternative cut-off-points and use of more than two subsamples. As an indicator of improved estimation with a sample split over the total sample, average improvement in R^2 is reported for every regression model (e.g. Hambrick and Lei 1985).

Prior to analyses, the distribution for each variable in the two subsamples was checked for nonnormality. An inverse transformation was conducted for organizational size among large firms, while the distribution of size among small firms was close to a normal distribution. Except from organizational size, the distributional characteristics of the subsamples did not deviate much from the distributions in the total sample (see table 1 in appendix B). However, this implies that the variables that had too high skewness or kurtosis values when analyzing the total sample still seem to depart from normality assumptions. Appendix B reports the results of one-way analysis of variance of differences between the two samples, bivariate correlations among the dependent and independent variables for the total sample and the two subsamples, and full correlation matrixes between all included variables.

To assess pairwise and multiple variable collinearity, collinearity diagnostics in SPSS were run prior to analyses. The lowest tolerance value was .32 (for customer

information acquisition frequency and use in the total sample including size), that is considerably above the common cutoff threshold value of .10 (Hair et al. 1992).

7.2 Hypothesis testing

In the following, fourteen sets of regression models are presented, where each dependent variable is regressed onto the full set of independent variables, starting with the effect valence variables. Since significance levels suffer under limited number of observations (Mohr 1990), and analyses of the subsamples approximately halve the ratio of number of observations relative to the number of independent variables, results with significance levels lower than 15% are indicated in the tables. In similar studies, significant results are usually interpreted as those lower than 5% or 10%.

7.2.1 Effect valence

Tables 7.1 to 7.3 report the results of the regression analyses used to test hypotheses **H1$_{EV1}$** to **H3$_{EV1}$** about opportunity interpretation. Starting with positive-gain interpretation, hypotheses **H1a$_{EV1}$** to **H3a$_{EV1}$** posited a positive relationship with all independent variables. Table 7.1 shows that two variables, customer information acquisition frequency and use ($b_{SF,IS} = .43$, $p < .05$)[9] and differentiation ($b_{SF,IS} = .30$, $p < .05$), are positively related to positive-gain interpretation in the small firm subsample. Thus, the hypotheses **H1a$_{EV1}$** and **H3a$_{EV1}$** are partly supported while **H2a$_{EV1}$** is not supported.

The hypotheses **H1b$_{EV1}$** to **H3b$_{EV1}$** suggested that the organizational scanning and information processing structure variables would be positively related, and that the cognitive style variables would be negatively related to controllability interpretation. Regressing the total sample, table 7.2 shows that information availability is the only variable that is significantly related to controllability when size is included in the model ($b_{AF,IS} = .23$, $p < .05$). This finding is also significant for small firms ($b_{SF,IS} = .28$, $p < .10$) and marginally significant for large firms ($b_{LF,IS} = .22$, $p < .15$). In the

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[9] The subscripts "SF", "LF" and "AF" denote small firms, large firms and all firms respectively, and "IS" including size.

large firm sample, participation is significantly related to controllability in the hypothesized direction ($b_{LF,IS}$ = .23, p < .10). Thus, hypotheses **H1b$_{EV1}$** and **H2b$_{EV1}$** are partly supported since information availability is positively related to controllability and since participation is positively related to controllability interpretation for large firms. **H3b$_{EV1}$** is not supported. Social complexity is marginally, but significantly positively related to controllability in the small firm sample ($b_{SF,IS}$ = .18, p < .15), while the cognitive style variables were expected to be negatively related to controllability. Finally, in the total sample and the small firm sample, size adds significantly to the level of explained variance ($\Delta R^2_{AF,IS}$ = .04, p < .01, $\Delta R^2_{SF,IS}$ = .07, p < .05), while this is not the case for large firms ($\Delta R^2_{LF,IS}$ = .02, p > .15).

Table 7.1: Positive-gain interpretation by organizational scanning, TMT-IPS, and cognitive style

	Positive-gain					
	Total sample (n = 158)		Small firms (n = 77)		Large firms (n = 81)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.27**	.16	.48***	.43**	.05	.00
Information availability	.08	.10	-.01	.04	.11	.11
General information acquisition frequency	-.03	-.01	-.06	-.08	.07	.10
TMT information processing structure						
Participation	-.10	-.08	-.12	-.15	.02	.01
Flexibility	-.06	-.06	.06	.07	-.17	-.15
Cognitive style						
Exploration	.00	-.01	.07	.08	-.05	-.06
Social complexity	-.01	-.01	.05	.04	-.13	-.12
Differentiation	.12†	.10	.30**	.30**	-.07	-.06
Circulation size (log./not transformed/inv.)		.16*		.16		-.14
Overall model						
F	2.46**	2.54**	2.90***	2.84***	.68	.75
R^2	.117	.134	.254	.276	.070	.086
Adjusted R^2	.069	.081	.166	.179	-.033	-.029
ΔF		2.95*		2.01		1.30
[10]Average improvement in R^2 with sample spilt		.05				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

The hypotheses **H1c$_{EV1}$** to **H3c$_{EV1}$** suggested that the organizational scanning variables would be positively related and that the information processing structure and cognitive style variables would be negatively related to extremity. As can be seen from table 7.3, customer information acquisition frequency and use is significantly and positively related to extremity in the total sample ($b_{AF,IS}$ = .27, p < .05) and the small firm sample (b_{SF} = .47, p < .01), providing some support for **H1c$_{EV1}$**. The only additional significant relationship is for differentiation in the small firm sample, but

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[10]Using regression models including size, e.g. ([(.276-.134) + (.086-.134)]) / 2.

this relationship is positive as opposed to what was hypothesized ($b_{SF} = .30$, $p < .05$). Thus, **H2c$_{EV1}$** and **H3c$_{EV1}$** are not supported. Again, organizational size adds significantly to the level of explained variance for the total sample ($\Delta R^2_{AF,IS} = .02$, $p < .05$), and among large firms ($\Delta R^2_{LF,IS} = .07$, $p < .05$).

Table 7.2: Controllability interpretation by organizational scanning, TMT-IPS, and cognitive style

Independent variables	Total sample (n = 158) 1[a]	Total sample (n = 158) 2[b]	Small firms (n = 77) 1[a]	Small firms (n = 77) 2[b]	Large firms (n = 81) 1[a]	Large firms (n = 81) 2[b]
Controllability						
Organizational scanning						
Customer information acquisition frequency/use	.20*	.04	.23	.14	.10	.04
Information availability	.20*	.23**	.20	.28*	.22†	.22†
General information acquisition frequency	-.05	-.02	-.02	-.05	.00	.02
TMT information processing structure						
Participation	.12	.13†	.09	.03	.25**	.23*
Flexibility	.02	.03	.15	.17	-.14	-.12
Cognitive style						
Exploration	.02	.00	.09	.10	-.05	-.06
Social complexity	.09	.09	.18†	.18†	-.05	-.04
Differentiation	.02	-.01	.02	.02	-.01	.00
Circulation size (log./not transformed/inv.)		.24***		.29**		-.15
Overall model						
F	3.78***	4.28***	2.09**	2.67**	2.16**	2.13**
R²	.169	.206	.197	.264	.193	.212
Adjusted R²	.124	.158	.103	.165	.104	.112
ΔF		7.06***		6.09**		1.72
Average improvement in R² with sample spilt		.03				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Table 7.3: Opportunity-extremity interpretation by organizational scanning, TMT-IPS, and cognitive style

Independent variables	Total sample (n = 158) 1[a]	Total sample (n = 158) 2[b]	Small firms (n = 77) 1[a]	Small firms (n = 77) 2[b]	Large firms (n = 81) 1[a]	Large firms (n = 81) 2[b]
Opportunity-extremity						
Organizational scanning						
Customer information acquisition frequency/use	.39***	.27**	.47***	.48***	.25	.14
Information availability	.07	.10	-.04	-.05	.14	.14
General information acquisition frequency	-.08	-.06	-.11	-.11	-.01	.04
TMT information processing structure						
Participation	-.07	-.05	-.17	-.16	.06	.03
Flexibility	-.06	-.06	-.01	-.01	-.12	-.08
Cognitive style						
Exploration	.05	.04	.01	.01	.03	.02
Social complexity	-.04	-.03	-.12	-.12	-.02	-.01
Differentiation	.10	.08	.30**	.30**	-.06	-.03
Circulation size (log./not transformed/inv.)		.18**		-.03		-.28**
Overall model						
F	4.10***	4.15***	2.32**	2.04**	1.59†	2.16**
R²	.180	.202	.214	.215	.149	.215
Adjusted R²	.136	.153	.12	.11	.055	.116
ΔF		3.99**		.07		5.98**
Average improvement in R² with sample spilt		.01				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Tables 7.4 to 7.6 report the results of the regression analyses used to test hypotheses **H1$_{EV2}$** to **H3$_{EV2}$** about threat interpretation. As hypothesized in **H1a$_{EV2}$**, customer information acquisition frequency and use is significantly and positively related to negative-loss interpretation, at least in the total sample ($b_{AF} = .25$, $p < .05$) and

strongly for small firms (b_{SF} = .56, p < .01), providing some support for **H1a_EV2**. However, as shown in table 7.4, the relationship between general information acquisition frequency and negative-loss interpretation is significant and negative in the small firm sample (b_{SF} = -.24, p < .10). **H2a_EV2** suggested a negative relationship between information processing structure variables and negative-loss interpretation. In the total (b_{AF} = -.14, p < .15) and the small firm sample (b_{SF} = -.24, p < .10), flexibility behave as expected, but the relationship is not significant in the large firm sample (b_{LF} = -.12, p > .15). Besides, the regression model of the large firm sample is not significant (F_{LF} = 1.36, p > .15). However, the findings provide some support for **H2a_EV2**. Finally, **H3a_EV2** gains some support from the finding that exploration is positively related to negative-loss interpretation among small firms (b_{SF} = .27, p < .05). However, social complexity is negatively related to negative-loss interpretation in the large firm sample (b_{LF} = -.33, p < .05), while positively but not significantly in the small firm sample (b_{SF} = .10, p > .15). Organizational size does not add significantly to any of the models.

Table 7.4: Negative-loss interpretation by organizational scanning, TMT-IPS, and cognitive style

	Negative-loss					
	Total sample (n = 158)		Small firms (n = 77)		Large firms (n = 81)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.25**	.28**	.56***	.54***	.06	.03
Information availability	.01	.00	-.16	-.14	.16	.16
General information acquisition frequency	-.11	-.12	-.24*	-.25*	.02	.04
TMT information processing structure						
Participation	.08	.08	.08	.07	.07	.06
Flexibility	-.14†	-.14*	-.24*	-.24*	-.12	-.11
Cognitive style						
Exploration	.02	.03	.27**	.27**	-.07	-.07
Social complexity	-.10	-.11	.10	.10	-.33**	-.32**
Differentiation	.01	.02	-.03	-.03	.06	.07
Circulation size (log./not transformed/inv.)		-.05		.06		-.06
Overall model						
F	1.90*	1.71*	3.15***	2.79***	1.36	1.22
R^2	.093	.094	.270	.273	.131	.134
Adjusted R^2	.044	.039	.184	.175	.034	.025
ΔF		.23		.23		.28
Average improvement in R^2 with sample spilt		.11				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Hypothesis **H1b_EV2** to **H3b_EV2** suggested a negative relationship between all independent variables and uncontrollability interpretation. As can be seen from table 7.5, **H2b_EV2** is the hypothesis that is closest to be supported as flexibility is significantly and negatively related in all three samples (b_{AF} = -.25, < .01, $b_{SF,IS}$ = -.28, < .05, b_{LF} = -.23, < .10). However, the regression model of the large firm sample

is only marginally significant (F_{LF} = 1.76, p < .15). As for negative-loss interpretation and contrary to what was expected, customer information acquisition frequency and use is significantly and positively related to uncontrollability for small firms ($b_{SF,IS}$ = .46, < .01). Thus, although general information acquisition behave as hypothesized, at least for small firms ($b_{SF,IS}$ = -.30, < .05), **H1b$_{EV2}$** is not supported. Finally, **H3b$_{EV2}$** is not supported since both exploration ($b_{SF,IS}$ = .21, < .10) and social complexity ($b_{SF,IS}$ = .19, < .15) are positively related to uncontrollability in the small firm sample. In the large firm sample however, social complexity is significantly and negatively related to uncontrollability (b_{LF} = -.21, < .10). Again, organizational size does not add significantly to any of the models.

Table 7.5: Uncontrollability interpretation by organizational scanning, TMT-IPS, and cognitive style

	Uncontrollability					
	Total sample (n = 158)		Small firms (n = 77)		Large firms (n = 81)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.13	.18	.51***	.46***	-.11	-.09
Information availability	-.17†	-.18*	-.21	-.16	-.18	-.18
General information acquisition frequency	-.14	-.15	-.28*	-.30**	.00	-.01
TMT information processing structure						
Participation	.01	.01	-.02	-.06	.05	.05
Flexibility	-.25***	-.25***	-.29**	-.28**	-.23*	-.23*
Cognitive style						
Exploration	.11	.12	.20†	.21*	.15	.15
Social complexity	-.02	-.03	.19†	.19†	-.21*	-.21*
Differentiation	-.05	-.04	-.01	-.02	-.10	-.11
Circulation size (log./not transformed/inv.)		-.08		.16		.05
Overall model						
F	1.78*	1.64†	2.22**	2.19**	1.73†	1.54
R^2	.087	.091	.207	.227	.161	.163
Adjusted R^2	.038	.036	.114	.123	.068	.057
ΔF		.61		1.74		.15
Average improvement in R^2 with sample spilt		.10				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

As for uncontrollability interpretation, it was hypothesized in **H1c$_{EV2}$** to **H3c$_{EV2}$** that all independent variables would be negatively related to extremity. From table 7.6, we see that the pattern is very much the same as for uncontrollability interpretation. Again, flexibility behave as expected, although not significantly for small firms (b_{AF} = -.17, < .05, b_{SF} = -.13, > .15, b_{LF} = -.24, < .05), providing some support for **H2c$_{EV2}$**. As for the two other threat interpretation variables, and contrary to what was expected, customer information acquisition frequency and use is significantly and positively related to extremity for the total sample and for small firms ($b_{AF,IS}$ = .26, < .10, $b_{SF,IS}$ = .59, < .01). Thus, **H1c$_{EV2}$** is not supported, although general information acquisition frequency is negatively, and for the total sample and among small firms,

significantly related to extremity ($b_{AF} = -.20$, $< .10$, $b_{SF} = -.29$, $< .10$). Finally, some support for **H3c$_{EV2}$** is provided by the negative relationship between social complexity and extremity ($b_{AF} = -.14$, $< .15$, $b_{LF,IS} = -.24$, $< .10$), although the regression model for large firms is not significant ($F_{LF,IS} = 1.32$, $p > .15$). However, contrary to what was expected, exploration is positively and significantly related to extremity for small firms ($b_{SF,IS} = .21$, $< .10$). Organizational size does not add significantly to the level of explained variance for any of the models.

Table 7.6: Threat-extremity interpretation by organizational scanning, TMT-IPS, and cognitive style

Independent variables	Total sample (n = 158) 1[a]	2[b]	Small firms (n = 77) 1[a]	2[b]	Large firms (n = 81) 1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.32***	.26*	.55***	.59***	-.01	-.07
Information availability	.06	.07	.00	-.03	.17	.17
General information acquisition frequency	-.20*	-.19*	-.29*	-.27*	-.07	-.04
TMT information processing structure						
Participation	-.07	-.06	-.06	-.04	.01	-.01
Flexibility	-.17**	-.17**	-.13	-.14	-.26**	-.24**
Cognitive style						
Exploration	.07	.06	.21*	.21*	.02	.01
Social complexity	-.14†	-.14†	.00	.00	-.25*	-.24*
Differentiation	.02	.01	-.09	-.09	.10	.11
Circulation size (log./not transformed/inv.)		.08		-.12		-.15
Overall model						
F	2.76***	2.52**	2.38**	2.22**	1.27	1.32
R^2	.129	.133	.218	.229	.124	.143
Adjusted R^2	.082	.080	.127	.126	.026	.035
ΔF		.71		.95		1.63
Average improvement in R^2 with sample spilt		.05				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Brief comments on effect valence

Overall, the regression models suggest that organizational scanning seems to influence both opportunity and threat interpretations. Concerning opportunity interpretations, customer information acquisition frequency and use strongly enhances both positive-gain and extremity interpretations while information availability tends to increase controllability interpretation. However, when turning to threat interpretations, customer information acquisition frequency and use shows a generally strong positive influence with respect to both negative-loss, uncontrollability and extremity interpretations. Thus, at least this particular variable, does not seem to suppress the threat effect as expected and suggested in strategic issue diagnosis research (e.g. Dutton 1993a). Rather, it tends to increase both opportunity and threat interpretations. Finally, another organizational scanning variable, general information acquisition frequency, seems to reduce the magnitude of threat interpretations while it

is not significantly related to opportunity interpretations. The effects of organizational scanning variables on opportunity and threat interpretations are however strongly dependent on organizational size. The general pattern is that the two predictive scanning variables, customer information acquisition and use and general information acquisition frequency, are significant predictors of effect valence only among managers in small firms. For positive-gain, opportunity-extremity, and negative-loss interpretations, large and significant beta coefficients obtained in the small firm sample drop to small and insignificant in the large firm sample. For uncontrollability and threat-extremity, positive and significant beta coefficients for small firms change to negative but insignificant beta coefficients for large firms. Thus, organizational size seems to be an important moderator for the influence of organizational scanning on effect valence.

Turning to the effects of the top management team information processing structure on effect valence, the only significant effect of participation is on controllability interpretations among managers in large firms. As expected, participation increases controllability interpretation, which replicates the finding of Thomas and McDaniel (1990). Flexibility is not significantly related to any of the opportunity interpretation variables, but shows several significant and negative relationships with threat interpretation among managers in both small and large firms. Thus, although flexibility does not enhance opportunity frames, it seems to consistently reduce threat interpretations.

The effects of the cognitive style variables are strongly dependent on size and different for opportunity and threat interpretations. Starting with exploration, it has no effect among managers in large firms. However, among managers in small firms, it is positively and significantly related to all threat interpretation variables, while not related to any of the opportunity interpretation variables. Thus, exploration tends to increase the perception of threat, but only among managers in small firms. Differentiation seems to increase positive-gain and opportunity-extremity interpretations among managers in small firms, while it is not related to threat interpretations and has no effect among managers in large firms. While exploration and differentiation seem to be unimportant predictors among managers in large firms, social complexity is negatively and significantly related to all threat interpretations

among managers in large firms, while it is positively and marginally significantly related to both controllability and uncontrollability among managers in small firms. Thus, among managers in large firms, social complexity has no effects on opportunity interpretation, while it seems to strongly reduce the interpretation of threat.

In addition to the moderating effects of organizational size discussed above, size has direct and positive effects on opportunity interpretations, but not on threat interpretations. Thus, organizational size seems to increase opportunity interpretation, which contradicts the findings of Denison et al. (1996). When analyzing the subsamples, size increases controllability perception and this effect is stronger in the small firm sample than in the large firm sample. On the other hand, it is only among managers in large firms that size increases opportunity-extremity perception.

7.2.2 Issue sorting

The hypotheses $H1_{IS}$ to $H3_{IS}$ suggested that all independent variables would be positively related to the extent to which managers differentiate between developments, trends or events in terms of judgments of importance and feasibility. Tables 7.7 to 7.9 report the results of the regression analyses to test these hypotheses. Recall from the previous chapter that issue sorting in terms of importance were divided into operational and strategic importance. Table 7.7 shows that the only significant relationship using the full sample, is between differentiation and operational importance. However, this relationship is negative ($b_{AF} = 17$, $p < .05$), as opposed to what was suggested in $H3a_{IS}$. On the other hand, exploration behave as expected ($b_{LF} = -23$, $p < .10$), but only in the large firm sample. Thus $H3a_{IS}$ gains some support. Among small firms, the only predictive variable is size ($b_{SF,IS} = 30$, $p < .05$). Thus, $H1a_{IS}$ and $H2a_{IS}$ are not supported for operational importance. Besides, all three regression models are insignificant.

Table 7.8 reveals that exploration is positively and significantly related to differentiation of strategic importance in all three samples ($b_{AF,IS} = -21$, $p < .05$, $b_{SF} = -23$, $p < .10$, $b_{LF,IS} = -25$, $p < .05$), providing some support for $H3a_{IS}$. Additionally, among small firms, customer information acquisition frequency and use is positively and significantly ($b_{SF} = -29$, $p < .10$), and information availability positively and

marginally significantly (b_{SF} = -25, p < .15) related to strategic importance. These findings support **H1a_IS**. However, among large firms, customer information acquisition frequency and use is negatively and significantly ($b_{LF,IS}$ = 34, p < .10), while general information acquisition frequency is positively and significantly ($b_{LF,IS}$ = -33, p < .05) related to strategic importance. Thus, **H1a_IS** is partly supported for small firms, but not supported for large firms. **H2a_IS** is not supported since the only significant relationship, between flexibility and strategic importance is negative ($b_{LF,IS}$ = 24, p < .05). Finally, organizational size is negatively and marginally ($b_{LF,IS}$ = -17, p < .15) related to strategic importance for large firms.

Table 7.7: Operational importance by organizational scanning, TMT-IPS, and cognitive style

Independent variables	Operational importance[c]					
	Total sample (n = 156)		Small firms (n = 76)		Large firms (n = 80)	
	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.11	.10	-.16	-.07	.29†	.29†
Information availability	-.09	-.09	.07	-.02	-.17	-.17
General information acquisition frequency	-.10	-.10	-.07	-.04	-.17	-.17
TMT information processing structure						
Participation	.07	.07	.14	.21†	.05	.05
Flexibility	.11	.11	.02	.00	.13	.13
Cognitive style						
Exploration	-.13†	-.13†	.04	.02	-.23*	-.23*
Social complexity	-.08	-.08	.02	.03	-.12	-.12
Differentiation	.17**	.17*	.03	.03	.16	.16
Circulation size (log./not transformed/inv.)		.02		-.30**		.00
Overall model						
F	1.10	.97	.35	.93	1.38	1.21
R^2	.056	.057	.040	.113	.134	.134
Adjusted R^2	.005	-.002	-.074	-.008	.037	.023
ΔF		.03		5.39**		.00
Average improvement in R^2 with sample spilt		.07				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size; [c]reversed

Table 7.8: Strategic importance by organizational scanning, TMT-IPS, and cognitive style

Independent variables	Strategic importance[c]					
	Total sample (n = 156)		Small firms (n = 76)		Large firms (n = 80)	
	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.05	-.06	-.29*	-.30*	.41**	.34*
Information availability	-.16†	-.14	-.25†	-.24†	-.16	-.16
General information acquisition frequency	-.09	-.07	.15	.15	-.37**	-.33**
TMT information processing structure						
Participation	.10	.11	.19†	.18	-.04	-.05
Flexibility	.07	.08	-.04	-.03	.22*	.24**
Cognitive style						
Exploration	-.20**	-.21**	-.23*	-.23*	-.24**	-.25**
Social complexity	-.09	-.08	-.18	-.18	.03	.03
Differentiation	-.01	-.03	.05	.05	-.09	-.08
Circulation size (log./not transformed/inv.)		.16†		.05		-.17†
Overall model						
F	1.90*	2.00**	1.91*	1.69†	1.90*	1.96*
R^2	.094	.110	.185	.187	.176	.201
Adjusted R^2	.044	.055	.088	.077	.084	.099
ΔF		2.64†		.16		2.19†
Average improvement in R^2 with sample spilt		.08				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size; [c]reversed

H1b$_{IS}$ to **H3b$_{IS}$** hypothesized that all independent variables would be positively related to issue sorting in terms of feasibility. Table 7.9 shows that the only significant relationships are found in the regression model on the small firm sample (including size) and that the other two regression models are insignificant. Specifically, information availability (b$_{SF,IS}$ = -42, p < .05) and flexibility (b$_{SF,IS}$ = -24, p < .10) behave as expected, providing some support to **H1b$_{IS}$** and **H2b$_{IS}$**. **H3b$_{IS}$** is not supported since none of the cognitive style variables shows significant relationships. Finally, organizational size adds significantly to explained variance in the small firm sample ($\Delta R^2_{SF,IS}$ = .08, p < .10) in the positive direction (b$_{SF,IS}$ = -30, p < .10).

Table 7.9: Unfeasibility by organizational scanning, TMT-IPS, and cognitive style

	Unfeasibility[c]					
	Total sample (n = 156)		Small firms (n = 76)		Large firms (n = 80)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.07	.08	-.12	-.02	.21	.19
Information availability	-.15	-.16	-.32**	-.42**	.01	.01
General information acquisition frequency	-.01	-.02	.15	.18	-.18	-.17
TMT information processing structure						
Participation	.00	.00	.06	.13	-.08	-.09
Flexibility	-.13†	-.13†	-.22†	-.24*	-.06	-.05
Cognitive style						
Exploration	-.02	-.02	.01	.00	-.10	-.11
Social complexity	-.01	-.01	-.04	-.04	.06	.06
Differentiation	-.03	-.03	-.07	-.06	.01	.01
Circulation size (log./not transformed/inv.)		-.02		-.30**		-.06
Overall model						
F	.64	.57	1.31	1.96*	.37	.35
R²	.034	.034	.135	.211	.040	.043
Adjusted R²	-.019	-.025	.032	.104	-.068	-.080
ΔF		.06		6.38**		.20
Average improvement in R² with sample spilt		.09				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size; [c]reversed

Brief comments on issue sorting

Overall, the independent variables are not good predictors of issue sorting as defined and measured in this study. However, exploration has a positive effect on differentiation in terms of strategic importance across all three samples, and on operational importance among managers in large firms.

Two of the organizational scanning variables, customer information acquisition frequency and use and information availability, seem to increase the ability to differentiate between issues in terms of strategic importance and feasibility, but only for managers in small firms. For managers in large firms, customer information

acquisition frequency and use actually decreases this ability when it comes to judgments of operational and strategic importance.

The only significant finding for the two information processing structure variables, is that flexibility seems to increase differentiation in terms of unfeasibility among managers in small firms, while it decreases the ability to differentiate in terms of strategic importance among managers in large firms.

Finally, organizational size increases differentiation in terms of both operational importance and unfeasibility for managers in small firms. Size is a much less important predictor in the large firm sample, but it seems to decrease differentiation in terms of strategic importance.

7.2.3 Causal understanding

H1$_{CU}$ to H3$_{CU}$ hypothesized that all independent variables would be positively related to the extent to which managers are nuanced in causal understanding of development, trends or events. The results of causal understanding of free papers are reported in table 7.10 below. Regressing the total sample, general information acquisition frequency (b_{AF} = 22, p < .05) and differentiation (b_{AF} = 23, p < .01) are positively and significantly related to causal understanding. When analyzing the subsamples, general information acquisition frequency is only significant in the large firm sample (b_{LF} = 44, p < .01), providing some support for **H1$_{CU}$** for large firms only. However, in this sample and in contradiction to **H1$_{CU}$**, customer information acquisition frequency and use is negatively and significantly related to causal understanding (b_{LF} = -42, p < .01). Differentiation is a significant predictor in the large firm sample (b_{LF} = 22, p < .05), but becomes insignificant in the small firm sample (b_{SF} = 17, p = .21). Thus, **H3$_{CU}$** is partly supported. Finally, participation is positively related to causal understanding in the small firm sample (b_{SF} = 27, p < .05). However, since this regression model is not significant (F_{SF} = 1.08, p = .39), this should not be taken as strong support for **H2$_{CU}$**.

The results of the second causal understanding variable, market, competition and attribution of success, is reported in table 7.11. Regressing the full sample, flexibility ($b_{AF,IS}$ = 14, p < .10) and exploration ($b_{AF,IS}$ = 30, p < .01) are positively and

significantly related to causal understanding. Moreover, organizational size is a positive and significant predictor of causal understanding across all samples, although only marginally so among large firms ($b_{AF,IS}$ = 18, p < .10, $b_{SF,IS}$ = 23, p < .10, $b_{LF,IS}$ = -18, p < .15). But again, the regression model of the small firm sample is not significant ($F_{SF,IS}$ = 1.29, p > .15). Among large firms, exploration is positively and significantly related to causal understanding (b_{LF} = 35, p < .01).

Table 7.10: Causal understanding (i) by organizational scanning, TMT-IPS, and cognitive style

	Free papers					
	Total sample (n = 158)		Small firms (n = 77)		Large firms (n = 81)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	-.10	-.13	.06	.01	-.42**	-.41**
Information availability	-.07	-.06	-.12	-.15	.07	.07
General information acquisition frequency	.22**	.23**	.02	.03	.44***	.44***
TMT information processing structure						
Participation	.13†	.13†	.27**	.30**	.04	.04
Flexibility	-.01	-.01	-.05	-.06	.01	.01
Cognitive style						
Exploration	-.10	-.09	.02	.01	-.10	-.09
Social complexity	-.09	-.09	.00	.00	-.14	-.14
Differentiation	.23***	.22**	.17	.17	.22**	.22**
Circulation size (log./not transformed/inv.)		.05		-.12		.03
Overall model						
F	1.83*	1.65†	1.08	1.07	1.99*	1.76*
R^2	.090	.091	.113	.125	.181	.182
Adjusted R^2	.041	.036	.009	.008	.090	.078
ΔF change		.24		.93		.06
Average improvement in R^2 with sample spilt		.06				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Table 7.11: Causal understanding (ii) by organizational scanning, TMT-IPS, and cognitive style

	Market, competition and attribution of success					
	Total sample (n = 158)		Small firms (n = 77)		Large firms (n = 81)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.17†	.05	.04	-.03	.12	.05
Information availability	.06	.09	.17	.24†	.02	.01
General information acquisition frequency	-.11	-.08	-.16	-.18	-.03	.00
TMT information processing structure						
Participation	.05	.06	-.05	-.10	.15	.13
Flexibility	.14*	.14*	.16	.17	.09	.12
Cognitive style						
Exploration	.31***	.30***	.16	.18	.36***	.35***
Social complexity	-.05	-.05	-.12	-.12	-.02	-.01
Differentiation	.08	.05	.08	.07	.05	.06
Circulation size (log./not transformed/inv.)		.18*		.23*		-.18†
Overall model						
F	4.51***	4.52***	.99	1.29	3.09***	3.12***
R^2	.195	.216	.104	.148	.256	.283
Adjusted R^2	.152	.168	-.001	.033	.173	.192
ΔF		3.90*		3.39*		2.73†
Average improvement in R^2 with sample spilt		.00				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Seeing the two causal understanding variables together, $H3_{CU}$ is partly supported since differentiation and exploration are relatively strong and significant predictors of

each of the variables. $H2_{CU}$ is marginally supported, due to the relationships between participation and the first causal understanding variable for small firms, and between flexibility and the second causal understanding variable in the full sample. Finally, the empirical evidence regarding $H1_{CU}$ is mixed. However, the strong positive relation between general information acquisition frequency and causal understanding of free papers provides some support in the large firm sample.

Brief comments on causal understanding

Two of the cognitive style variables increase nuances of managers' causal understanding. Exploration seems to improve causal understanding of the market, competition and attribution of success, while differentiation enhances causal understanding of free papers. These findings are consistent across samples, but stronger and significant only among managers in large firms.

The effect of organizational scanning is mixed. None of the three variables seem to influence causal understanding of the market, competition and of success. On the other hand, two of the organizational scanning variables strongly influence managers' causal understanding of free papers, but only among managers in large firms. General information acquisition frequency strongly enhances nuances in causal understanding of free papers, while customer information acquisition frequency has an almost as strong effect but in the opposite direction.

The information processing structure variables do not seem to have strong effects on casual understanding. However, flexibility has some positive effects on managers' causal understanding of the market, competition and attribution of success, among small firms, while participation seems to positively influence managers' causal understanding of free papers, but only in small firms.

Finally, while organizational size does not have any direct effects on causal understanding of free papers, it seems to have a positive influence on nuances in managers' causal understanding of the market, competition and attribution of success.

7.2.4 Data search

The final set of hypotheses, **H1$_{DS}$** to **H3$_{DS}$** suggested that organizational scanning and information processing structure variables would be positively related to all three categories of data search and that the cognitive style variables would be positively related to search for additional and new data. Starting with core data, table 7.12 shows that customer information acquisition frequency and use is positively and significantly related to core data for the full sample (b_{AF} = -24, p < .10). However, although still positive, the relationship becomes insignificant in both subsamples (b_{SF} = -23, p > .15, $b_{LF,IS}$ = -17, p > .15). On the other hand, general information acquisition frequency is negatively related to core data in the total sample (b_{AF} = 23, p < .05), but the analyses of the subsamples show that this relationship is strong and significant only managers in small firms (b_{SF} = 37, p < .05, $b_{LF,IS}$ = 08, p > .15). Differentiation is positively and significantly related to core data in the small firm sample (b_{SF} = -22, p < .10), while social complexity is positively and marginally significant to core data in the large firm sample (b_{LF} = -19, p < .15). The regression models of the two subsamples are only marginally significant (F_{SF} = 1.65, p < .15, $F_{LF,IS}$ = 1.59, p < .15).

Table 7.12: Core data by organizational scanning, TMT-IPS, and cognitive style

Independent variables	Core data^c					
	Total sample (n = 157)		Small firms (n = 77)		Large firms (n = 80)	
	1^a	2^b	1^a	2^b	1^a	2^b
Organizational scanning						
Customer information acquisition frequency/use	-.24*	-.24*	-.24	-.24	-.11	-.17
Information availability	-.11	-.11	-.09	-.09	-.17	-.17
General information acquisition frequency	.23**	.23**	.37**	.37**	.05	.08
TMT information processing structure						
Participation	-.08	-.08	-.10	-.10	-.08	-.10
Flexibility	.05	.05	.04	.04	.07	.09
Cognitive style						
Exploration	.02	.02	.02	.02	.04	.03
Social complexity	-.11	-.11	-.01	-.01	-.20†	-.19†
Differentiation	-.15*	-.15*	-.22*	-.22*	-.07	-.05
Circulation size (log./not transformed/inv.)		.01		-.01		-.17
Overall model						
F	2.75***	2.43**	1.65†	1.45	1.53	1.59†
R^2	.129	.129	.163	.163	.147	.170
Adjusted R^2	.082	.076	.064	.050	.051	.063
ΔF		.01		.00		1.94
Average improvement in R^2 with sample spilt		.04				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
^{a}Original model; ^{b}including size; ^{c}reversed

Table 7.13 reveals that the only significant relationship of the regression for additional data, is that between differentiation and data search ($b_{AF,IS}$ = 19, p < .10, b_{LF} = 26, p < .10). However, the regression model for small firms is not significant

(F_{SF} = .84, p < .15), while only marginally significant for large firms (F_{LF} = 1.70, p < .15).

Table 7.13: Additional data by organizational scanning, TMT-IPS, and cognitive style

	Additional data					
	Total sample (n = 157)		Small firms (n = 77)		Large firms (n = 80)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.06	.16	.14	.18	.01	.03
Information availability	.04	.02	.05	.03	.06	.06
General information acquisition frequency	.08	.06	-.04	-.03	.16	.16
TMT information processing structure						
Participation	-.03	-.04	-.03	-.01	-.08	-.07
Flexibility	-.10	-.10	-.05	-.06	-.13	-.14
Cognitive style						
Exploration	-.12	-.11	-.16	-.16	-.06	-.06
Social complexity	.02	.02	-.07	-.07	.08	.08
Differentiation	.17**	.19**	.17	.17	.26**	.26**
Circulation size (log./not transformed/inv.)		-.14†		-.10		.05
Overall model						
F	1.79*	1.85*	.84	.81	1.70†	1.51
R^2	.088	.102	.090	.098	.161	.162
Adjusted R^2	.039	.047	-.017	-.023	.066	.055
ΔF		2.19†		.60		.15
Average improvement in R^2 with sample spilt		.03				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Table 7.14: New data by organizational scanning, TMT-IPS, and cognitive style

	New data					
	Total sample (n = 157)		Small firms (n = 77)		Large firms (n = 80)	
Independent variables	1[a]	2[b]	1[a]	2[b]	1[a]	2[b]
Organizational scanning						
Customer information acquisition frequency/use	.13	.22*	.31*	.36**	-.11	-.02
Information availability	-.01	-.03	-.07	-.11	.09	.09
General information acquisition frequency	-.01	-.03	-.22†	-.20	.19	.16
TMT information processing structure						
Participation	.02	.01	.11	.14	-.11	-.09
Flexibility	-.28***	-.28***	-.35***	-.35***	-.22*	-.25**
Cognitive style						
Exploration	-.04	-.03	.05	.04	-.03	-.01
Social complexity	.10	.10	.12	.12	.10	.08
Differentiation	.19**	.21**	.18†	.18†	.21*	.19*
Circulation size (log./not transformed/inv.)		-.13		-.16		.24**
Overall model						
F	4.03***	3.83***	3.29***	3.19***	1.75†	2.10**
R^2	.179	.190	.278	.300	.165	.213
Adjusted R^2	.134	.140	.194	.206	.070	.111
ΔF		2.02		2.03		4.27**
Average improvement in R^2 with sample spilt		.07				

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Original model; [b]including size

Finally, table 7.14 reports the results for the regression of search for new data. The table shows that customer information acquisition and use is positively and significantly related to new data for small firms ($b_{SF,IS}$ = 36, p < .05). The relationship between flexibility and new data is negative and significant across all samples ($b_{AF,IS}$ = -28, p < .01, $b_{SF,IS}$ = -35, p < .01, $b_{LF,IS}$ = -25, p < .05). Finally, differentiation is positively and significantly related to new data in the full sample and among

managers in large firms ($b_{AF,IS}$ = 21, p < .05, $b_{LF,IS}$ = 19, p < .10), while marginally significant among small firms ($b_{SF,IS}$ = 18, p < .15). In the large firm sample, organizational size is negatively and significantly related to search for new data ($b_{LF,IS}$ = 24, p < .05).

In conclusion, **H1$_{DS}$** is marginally supported for small firms, due to the relationships between customer information acquisition frequency and use and search for core data and particularly new data. **H2$_{DS}$** is clearly not supported, since the only significant relationship between information processing structure and data search variables is negative. Although **H3$_{DS}$** hypothesized a positive relationship between cognitive style and only two of the data search variables (additional and new data), and differentiation is positively related to all three data search variables, it is concluded that the hypothesis is partly supported. However, the support is generally stronger for large firms than for small firms.

Brief comments on data search

Customer information acquisition frequency and use seems to increase data search among managers in small firms, although not significantly so in terms of core data and additional data. On the other hand, general information acquisition frequency has the opposite effect for these managers, especially in terms of core data and new data. For large firms, organizational scanning variables do generally not seem to influence managers' search for data.

The top management team information processing structure variables are generally not important in predicting managers' search for data. However, flexibility seems to strongly and consistently reduce data search. This effect tends to be slightly stronger among managers in small firms than among those in large firms.

Turning to cognitive style, differentiation seems to enhance managers' search for all data search categories. For additional and new data, this effect is stronger for managers in large firms, while the positive effect of differentiation on core data is found only among managers in small firms.

Organizational size does not seem to directly influence managers' search for core and additional data, while it tends to decrease the search for new data among managers in large firms.

7.3 Relative effects of contextual and cognitive variables

Hierarchical regression was used to explore proposition **P1** and **P2** about relative effects of contextual and cognitive variables respectively (see paragraph 4.5). To analyze proposition **P1**, all cognitive style variables were entered into the model followed by the inclusion of all contextual variables including size. Differences in explained variance were tested using F-tests of changes in R^2 between the model including only the cognitive variables and the model including all independent variables. As shown in table 7.15, the contextual variables add significantly to explained variance of opportunity and threat interpretation, issue sorting in terms of unfeasibility and search for new data, for managers in small firms. For managers in large firms, the addition of contextual variables added significantly to explained variance for controllability and opportunity-extremity interpretations, issue sorting in terms of strategic importance and search for new data. Thus, proposition **P1** that organizational context would explain a significant amount of variance in managers' strategic issue diagnosis, above and beyond the variance explained by managers' cognitive style, is partly supported by the data. The strongest support is found for effect valence among managers in small firms and for managers' search for new data.

Table 7.15: Hierarchical regression models for exploring the organizational control proposition (P1)

Dependent variables	Small firms				Large firms			
	Cognitive style	Contextual variables[a]			Cognitive style	Contextual variables[a]		
	R^2	R^2	ΔR^2	ΔF	R^2	R^2	ΔR^2	ΔF
Positive-gain	.100	.276	.176	2.71**	.008	.086	.078	1.01
Controllability	.046	.264	.218	3.31***	.009	.212	.203	3.05**
Extremity-opportunity	.087	.215	.128	1.82†	.016	.215	.199	3.01**
Negative-loss	.019	.273	.254	3.89***	.068	.134	.066	.91
Uncontrollability	.018	.227	.209	3.02**	.062	.163	.101	1.43
Extremity-threat	.027	.229	.202	2.94**	.041	.143	.102	1.41
Operational importance	.006	.113	.107	1.32	.079	.134	.055	.74
Strategic importance	.063	.187	.124	1.69†	.053	.201	.148	2.17*
Unfeasibility	.013	.211	.198	2.77**	.009	.043	.034	.42
Causal understanding I	.033	.125	.092	1.18	.063	.182	.119	1.72†
Causal understanding II	.054	.148	.094	1.23	.204	.283	.079	1.31
Core data	.063	.163	.100	1.33	.080	.170	.090	1.26
Additional data	.063	.098	.035	.43	.107	.162	.055	.77
New data	.089	.300	.211	3.37***	.084	.213	.129	1.91*

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Including size

Table 7.16: Hierarchical regression models for exploring the strategic choice proposition (P3)

Dependent variables	Small firms				Larg firms			
	Contextual variables[a]	Cognitive style			Contextual variables[a]	Cognitive style		
	R^2	R^2	ΔR^2	ΔF	R^2	R^2	ΔR^2	ΔF
Positive-gain	.175	.276	.101	3.12**	.066	.086	.020	.53
Controllability	.222	.264	.042	1.28	.207	.212	.005	.15
Extremity-opportunity	.143	.215	.072	2.05†	.214	.215	.001	.04
Negative-loss	.205	.273	.068	2.07†	.040	.134	.094	2.57*
Uncontrollability	.159	.227	.068	1.96†	.102	.163	.061	1.73
Extremity-threat	.195	.229	.034	.98	.090	.143	.053	1.48
Operational importance	.110	.113	.003	.07	.053	.134	.081	2.19*
Strategic importance	.120	.187	.067	1.82	.144	.201	.057	1.69
Unfeasibility	.205	.211	.006	.16	.032	.043	.011	.27
Causal understanding I	.100	.125	.025	.65	.115	.182	.067	1.93†
Causal understanding II	.106	.148	.042	1.10	.177	.283	.106	3.50**
Core data	.121	.163	.042	1.12	.137	.170	.033	.91
Additional data	.064	.098	.034	.85	.091	.162	.071	1.98†
New data	.242	.300	.058	1.87†	.171	.213	.042	1.23

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Including size

The same procedure was used to analyze proposition **P2**. "The strategic choice proposition" stated that managers' cognitive style would explain a significant amount of variance in managers' strategic issue diagnosis, above and beyond the variance explained by organizational context. Table 7.16 shows that for managers in small firms, the only significant (p<.10) increase in explained variance was found for positive-gain interpretation. For managers in large firms, the addition of the cognitive variables added significantly to explained variance for negative-loss interpretation, issue sorting in terms operational importance and causal understanding of the market, competition and attribution of success. Thus, for some of the dependent variables, the addition of cognitive style variables increase the variance explained, but not to the same extent that contextual variables added to the cognitive variables.

7.4 Exploration of interaction effects

To explore proposition **P3**, that suggested the effects of the cognitive variables will be contingent on the level of the contextual variables (see paragraph 4.5), moderated regression analysis (e.g. Sharma, Durand, and Gurarie 1981) and subgroup analyses (e.g. Hunt, Osborn, and Larson 1975) were used in tandem.

First, the cross-product terms of the contextual variables and the cognitive variables were added to the full original regression models. Due to the importance of organizational size in the hypothesis testing, both in terms of direct effects and as a

moderator, it was included as a contextual independent variable and as a moderating variable. To identify significant interaction effects, F-tests of changes in R^2 between the original and the moderated model including the cross-product terms were performed (see tables 3 to 10 in appendix B).

Because the cross-product term is entered into the regression after the original model, this type of analysis yields a conservative estimate of the moderating effects of one variable on the relationship between two or more other variables (Darrow and Kahl 1983). Moreover, the relative low number of subjects due to the sample split and the addition of the cross-product term onto the full original regression models, increase the threshold for detecting significant interactions. To avoid the risk of multicollinearity problems due to the use of cross-product terms, all independent variables were centered by subtracting their means before computing the cross-product terms. Finally, using a subgroup analysis where significant moderator variables were split based on the median (e.g. Hunt, Osborn, and Larson 1975), the significant interaction effects were analyzed further in order to identify possible patterns in terms of the form of interactions. Given the explorative nature of this analysis, only two cognitive variables were investigated; exploration and differentiation.

Table 7.17: Subgroup analysis for exploration

Dependent variables	Moderators	Small firms					Large firms				
		ΔF	Before split Moderator	Eploration	After split Low	High	ΔF	Before split Moderator	Eploration	After split Low	High
Positive-gain	Information avail.	2.93*	.04	.08	.24	-.04					
	Flexibility						11.77***	-.15	-.06	.09	-.25
Opportunity-extr.	General IAF	2.87*	-.11	.01	-.39**	.31†	3.61*	.04	.02	-.01	-.11
	Participation						3.20*	.03	.02	.22	-.25
	Flexibility						2.59†	-.08	.02	.06	-.08
	Size[a]						2.73†	-.28**	.02	.09	-.06
Negative-loss	Information avail.	2.91*	-.14	.27**	.41**	.24					
	Participation	2.16†	.07	.27**	.36**	.28†					
	Flexibility						10.35***	-.11	-.07	.12	-.34*
Threat-extremity	Information avail.						3.27*	.17	.01	.10	-.14
	Participation						6.39**	-.01	.01	.24	-.25
	Flexibility	2.19†	-.14	.21*	.21	.04	2.40†	-.24**	.01	.02	-.19
Operational imp.[a]	General IAF	3.48*	-.04	.02	.14	-.19	4.08**	-.17	-.23*	-.44**	.02
Strategic imp.[a]	Customer IAF&U	5.62**	-.30*	-.23*	-.20	-.25					
	General IAF						5.29**	-.33**	-.25**	-.44**	.02
CU free papers	Information avail.	7.36***	-.15	.01	.38*	-.37*					
	Size	2.42†	-.12	.01	-.22	.15					
Core data[a]	Information avail.	3.19*	-.09	.02	.02	-.04					
Additional data	Information avail.	2.15†	.03	-.16	-.18	-.06					
	Size[a]						2.64†	.05	-.06	.05	-.14
New data	Participation						2.26†	-.09	-.01	.13	-.25

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a]Reversed

Table 7.17 and 7.18 show the results of the subgroup analysis with exploration and differentiation as the independent variables. The tables present F change statistics, standardized beta coefficients for the cognitive variables before the sample split and for high versus low values of moderators, and standardized beta coefficients for the moderators before the sample split.

Table 7.18: Subgroup analysis for differentiation

Dependent variables	Moderators	Small firms ΔF	Before split Moderator	Before split Differentiation	After split Low	After split High	Large firms ΔF	Before split Moderator	Before split Differentiation	After split Low	After split High
Positive-gain	Size[a]						2.42†	-.14	-.06	.01	-.08
Opportunity-extr.	Customer IAF&U	2.57†	.48***	.30**	-.15	.48***					
	Size[a]						5.45**	-.28**	-.03	.08	-.03
Negative-loss	Flexibility	2.22†	-.24*	-.03	.06	-.16					
Uncontrollability	Participation						3.72*	.05	-.11	.24	-.24†
Threat-extremity	Size[a]						3.52*	-.15	.11	.24†	-.19
Operational imp.[a]	Size	3.50*	-.30**	.03	-.13	.31†					
Strategic imp.[a]	Size[a]						2.54†	-.17†	-.08	-.18	-.06
Unfeasibility[a]	Size	11.39***	-.30**	-.06	-.63***	.42**					
CU free papers	Customer IAF&U	6.28**	.01	.17	.38†	-.05					
	General IAF	5.38**	.03	.17	.48**	-.17					
	Participation	2.86*	.30**	.17	.47**	-.16					
	Flexibility	2.81*	-.06	.17	-.21	.37*					
	Size[a]						2.38†	.03	.22**	.10	.34*
CU market, comp.	Customer IAF&U	6.35**	-.03	.07	.01	.24†					
	Information avail.	3.23*	.24†	.07	-.31	.25					
	General IAF	4.57**	-.18	.07	-.10	.30					
	Participation	4.97**	-.10	.07	-.28	.33*					
	Flexibility	4.87**	.17	.07	.20	-.13					
	Size	4.88**	.23*	.07	.40*	-.24					
Core data[a]	Participation						4.73**	-.10	-.05	-.34*	.23
	Size[a]						2.33†	-.17	-.05	-.16	.26†
Additional data	Flexibility						9.91***	-.14	.26**	-.07	.72***
New data	Participation	2.65†	.14	.18†	.23	.11					
	Flexibility						2.23†	-.25**	.19*	-.05	.42***

†: <.15; *: p<.10; **: p<.05; ***: p<.01
[a] Reversed

The tables reveal that eleven (small firms) and thirteen (large firms) significant interactions were found with exploration as the independent variable, while fifteen (small firms) and ten (large firms) significant interactions were found for differentiation. For each independent variable and subsample, the total possible number of significant interactions is of eighty-four (six contextual variables multiplied with fourteen dependent variables). Thus, only about 12 to 18 percent of the regression models produced significant interaction effects. On the other hand, given the method applied in order to detect moderating effects, those that have been found must, by implication, be very strong. Darrow and Kahl (1983) state that studies finding a moderating effect using this method can be concluded to contain strong evidence that the moderating effect does exist. Besides, for the large firm sample, a relatively clear pattern emerges. The relationships between exploration and the

dependent variables shifts from weak and positive to negative (four effect valence variables and search for additional and new data) or from strong and positive to weakly positive (operational and strategic importance) for low versus high values of organizational information processing and organizational size. A similar pattern is found for the relationships between differentiation and effect valence, strategic importance search for core data.

In sum, for twenty out of twenty-three significant moderating effects found in the large firm sample, exploration and differentiation are negatively related (or not related at all) to the dependent variables for high levels of organizational information processing and size, while positively (although mostly not significantly) related to the dependent variables for low levels of organizational information processing and size. Thus, it seems that high levels of organizational information processing produces an effect of the cognitive variables in a negative direction. This pattern, along with the rest of the results, will be more thoroughly discussed in the next and final chapter.

DISCUSSION AND IMPLICATIONS

In this chapter the results from the data analysis are discussed and their implications highlighted. First, the results of the hypotheses testing are commented. Second, some speculations about the relative effects of contextual and cognitive variables and the moderating effects of the contextual variables are made. Then, implications for theory and practice and the validity of the findings are considered. Finally, suggestions and opportunities for further research are discussed.

8.1 Organizational scanning and strategic issue diagnosis

Table 8.1 presents an overview of the significant findings for the relationship between organizational scanning and strategic issue diagnosis.

Table 8.1: Overview of significant findings for organizational scanning

	Customer information acquisition frequency and use			Information availability			General information acquisition frequency		
	All	Small	Large	All	Small	Large	All	Small	Large
Effect valence									
Positive-gain		+++							
Controllability				++	+	(+)			
Opportunity-extremity	++	+++							
Negative-loss	++	+++							-
Uncontrollability		+++		(-)					-
Threat-extremity	+++	+++							
Issue sorting									
Operational importance			(-)						
Strategic importance		+	-		(+)				++
Unfeasibility					++				
Causal understanding									
Free papers		--					+++		+++
Market, competition, ..					(+)				
Data search									
Core data	+						--	--	
Additional data									
New data		+						(-)	

(+/-): p < .15; +/-: p < .10; ++/--: p < .05; +++/---: p < .01
Shaded area: Significant findings in the hypothesized direction

The table reveals that there have been found a number of significant relationships between customer information acquisition frequency and use and managers' strategic issue diagnosis. In particular, customer information acquisition frequency and use is significantly related to several effect valence variables. Customer information acquisition frequency and use is strongly positively related to two of the three opportunity variables. However, these relationships are only found for managers in small firms, since there are no significant relationships between customer information

acquisition frequency and use and effect valence for managers in large firms. Thus, at least for small firms, the findings indicate that managers in organizations that frequently gather environmental information and use this information in strategic planning and analyses, are more likely to see opportunities as more positive and more as potential gains, as well as more positive for their own organizations compared to other organizations (opportunity-extremity).

While it was hypothesized that the organizational scanning variables would be negatively related to uncontrollability and threat-extremity, customer information acquisition frequency and use is strongly positively related to all three threat variables. Thus, contrary to what was expected, customer information acquisition frequency and use does not seem to suppress the threat effect as implicitly suggested in strategic issue diagnosis research. While previous research indicates that managers more exposed to information are better equipped with knowledge and data needed to support positive framing (Dutton 1993a; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990), the data in the present study suggests that this particular kind of scanning tends to increase the strength of both opportunity and threat interpretations. A potential explanation is that customer information acquisition frequency and use increases managers' attention and awareness of all environmental changes and their potential consequences, as suggested by several of the articles reviewed in relation to organizational scanning (e.g. Ansoff 1980; Daft and Weick 1984; Dutton and Ottensmeyer 1987; Hedberg 1981; Meyer 1982; Milliken, Dutton, and Beyer 1990). Moreover, the positive relationships between customer information acquisition frequency and use and managers search for core data (although not significantly when the sample is split) and new data among managers in small firms, support the interpretation that customer information acquisition frequency and use increases managers' attention and awareness.

Due to findings that suggest that managers use less effortful cognitive processes in interpretation of positive events (Gooding and Kinicki 1995), and that less effortful processing increases the possibility of cognitive biases (Louis and Sutton 1991), combined with a link between information load and overly optimistic or positive evaluation, it was hypothesized that organizational scanning would increase the likelihood of positivity biases and thus opportunity-extremity interpretation. While

customer information acquisition frequency and use in fact is positively related to opportunity-extremity interpretation for managers in small firms, it is unlikely that this relationship can be attributed to a positivity bias. The fact that this scanning variable does not significantly increase managers' perception of their organizations capability to easily capitalize on opportunities (controllability), indicates that such scanning behavior does not seem to produce *overly* positive interpretations, at least not to an extent that managers assume that they can simply exploit opportunities without conducting extended analysis. On the other hand, the strong positive relationships between customer information acquisition frequency and use and all threat interpretation variables indicate that this scanning variable might produce threat biases for managers in small firms. If managers view a threat consistent event as having more negative and threatening implications for their organization than for other organizations (threat-extremity), and report that their organization lack the capability to deal with the event (uncontrollability), they might show a tendency to deal with the event in an overly rigid manner (e.g. Dutton 1986a; Lai 1994; Starbuck, Greve, and Hedberg 1978; Staw, Sandelands, and Dutton 1981; Turner 1976). A potential explanation for these results is that managers are found to be more sensitive to threats than opportunities (Jackson and Dutton 1988) and that customer information acquisition frequency and use actually might strengthen such a tendency. This in turn would imply that active opportunity construction as suggested by Dutton (1993a) might be necessary to avoid threat biases in times of threat consistent development, trends or events.

Support for some of the relationships between information availability and strategic issue diagnosis were also found. Particularly, information availability is strongly positively related to controllability and negatively (but weaker) related to uncontrollability interpretation. Consequently, the data suggests that simply having information available increases managers perception of their organizations capability to capitalize on opportunities and to manage threats. These findings support the idea that managers in organizations that have a wide range of information available, and use this information, feel less uncertain and more confident in their organization's ability to deal with strategic issues (Eisenhardt and Bourgeois 1988; Milliken 1990). However, the availability of information does not seem to influence any other dimensions of managers' positive or negative evaluations of developments, trends or

events. Moreover, no support was found for a positive relationship between information availability and data search. Hence, the findings do not support previous findings of a strong relationship between availability and use of data (Culnan 1983; Culnan 1984; O'Reilly 1982).

General information acquisition frequency was not related to any of the opportunity variables, but is consistently negatively related to threat interpretations among managers in small firms. Moreover, the negative relationship between general information acquisition frequency and information search for core and new data among managers in small firms, suggests that this scanning variable not only seems to suppress threats, but also reduce information search. On the basis of these findings, it appears that general information acquisition frequency creates a sense of mastery and control among managers (Eisenhardt 1989; Thomas and McDaniel 1990). Such an interpretation fit in with findings indicating that information overload creates increased confidence and satisfaction (e.g. O'Reilly 1980).

Turning to issue sorting and causal understanding, little support was found for the hypothesized positive links with customer information acquisition frequency and use. However, for small firms, customer information acquisition frequency and use is positively related to managers' ability to differentiate between developments, trends or events in terms of strategic importance. On the other hand, for large firms, customer information acquisition frequency and use is negatively related to both operational and strategic importance, as well as nuances in causal understanding of free papers. Consequently, the findings are mixed and do not constitute any clear pattern. The generally poor prediction of issue sorting in terms of operational importance and unfeasibility (as indicated by very low and insignificant R^2 values), might indicate that the two case scenarios were seen as roughly equally operationally important and unfeasible. However, for small firms, support was found for positive relationships between information availability and issue sorting in terms of strategic importance and unfeasibility and nuances of managers' causal understanding of the market, competition and attribution of newspaper success. Thus, for small firms, all significant findings are in the hypothesized direction. Finally, some support was found for positive relationships between general information acquisition frequency and both issue sorting and causal understanding. For large firms, general information

acquisition frequency is positively related to both operational importance and causal understanding of free papers. Table 8.2 provides an overview of all hypotheses between organizational scanning and strategic issue diagnosis.

Table 8.2: Hypotheses and results for organizational scanning and strategic issue diagnosis

Hypotheses	Organizational scanning	Strategic issue diagnosis	H	R	Sample and significance level
$H1a_{EV1}$	Customer Information AF&U	Positive-gain	+	+	Small firms***
	Information availability		+	0	
	General information AF		+	0	
$H1b_{EV1}$	Customer Information AF&U	Controllability	+	0	
	Information availability		+	+	Small* and large† firms
	General information AF		+	0	
$H1c_{EV1}$	Customer Information AF&U	Opportunity-extremity	+	+	Small firms***
	Information availability		+	0	
	General information AF		+	0	
$H1a_{EV2}$	Customer Information AF&U	Negative-loss	+	+	Small firms***
	Information availability		+	0	
	General information AF		+	-	Small firms*
$H1b_{EV2}$	Customer Information AF&U	Uncontrollability	-	+	Small firms***
	Information availability		-	-	Total sample only†
	General information AF		-	-	Small firms*
$H1c_{EV2}$	Customer Information AF&U	Threat-extremity	-	+	Small firms***
	Information availability		-	0	
	General information AF		-	-	Small firms*
$H1a_{IS}$	Customer Information AF&U	Operational importance	+	-	Large firms†
	Information availability		+	0	
	General information AF		+	0	
$H1b_{IS}$	Customer Information AF&U	Strategic importance	+	+/-	Small* (+), large* (-)
	Information availability		+	+	Small firms*
	General information AF		+	+	Large firms**
$H1c_{IS}$	Customer Information AF&U	Unfeasibility	+	0	
	Information availability		+	+	Small firms**
	General information AF		+	0	
$H1a_{CU}$	Customer Information AF&U	Free papers	+	-	Large firms**
	Information availability		+	0	
	General information AF		+	+	Large firms***
$H1b_{CU}$	Customer Information AF&U	Market, comptetion,...	+	0	
	Information availability		+	+	Small firms†
	General information AF		+	0	
$H1a_{DS}$	Customer Information AF&U	Core data	+	+	Total sample only*
	Information availability		+	0	
	General information AF		+	-	Small firms**
$H1b_{DS}$	Customer Information AF&U	Additional data	+	0	
	Information availability		+	0	
	General information AF		+	0	
$H1c_{DS}$	Customer Information AF&U	New data	+	+	Small firms*
	Information availability		+	0	
	General information AF		+	-	Small firms†

†: <.15; *: p<.10; **: p<.05; ***: p<.01
H: Hypothesized relationship, R: Results

Different forms of scanning and strategic issue diagnosis

The three organizational scanning variables seem to have rather different effects on managers' strategic issue diagnosis. Hence, a discussion about the main differences between the three types of scanning might provide further insight into the relationship between organizational scanning and strategic issue diagnosis. Although all three variables are seen as belonging more to a *viewing* or *monitoring* mode of scanning rather than a *searching* mode (e.g. Aguilar 1967; Auster and Choo 1994; Huber and

Daft 1987), information availability is closer to be categorized as belonging to a monitoring mode. Information availability covers scanning behavior without a specific need in mind other than having a broad set of different kinds of information available to managers. Customer information acquisition frequency and use on the other hand, is exclusively directed toward the reader and advertising markets and is also related to the *use* of scanned information in detecting future threats and opportunities and to develop scenarios and plans. Hence, this type of scanning comes closer to the searching mode of scanning, where the organization has a more specific purpose in mind. Finally, general information acquisition frequency covers information about a broader set of environmental sectors and is less oriented toward using the scanned information in strategic planning and analyses. Since it relates to the frequency of information gathering and not simply availability, it might be classified in between information availability and customer information acquisition frequency and use when applying the distinction between searching and monitoring.

Applying this categorization suggests that monitoring or viewing modes of scanning, as represented by information availability and general information acquisition frequency, increases managers' perception of controllability and reduces their threat interpretations and data search. Hence, while the main purpose of this kind of scanning might be to keep managers informed about the environment and it is not always clear when or if the information will be needed or useful (e.g. Huber and Daft 1987; O'Reilly 1980), it seems to fulfill the frequently mentioned purpose of organizational scanning, namely to reduce managers' uncertainty (e.g. Daft, Sormunen, and Parks 1988; Huber and Daft 1987). In the literature, the relationship between uncertainty reduction and information has been treated rather differently. On the one hand, the classic information theory approach has been to define uncertainty as the difference between the amount of information required to perform a task and the information already possessed by the organization (e.g. Galbraith 1977; Gifford, Bobbit, and Slocum 1979; Schmidt and Cummings 1976). Then, low environmental uncertainty would imply that organizational members have sufficient knowledge and understanding of the environment. On the other hand, managers might feel or perceive low environmental uncertainty because they lack the information required to acknowledge environmental complexity or "real uncertainty" (e.g. Leifer and Huber 1977). In addition to these two approaches, a third one rarely discussed in the

scanning literature is possible. Managers' environmental uncertainty might be reduced by simply knowing that information is available or that information acquisition is being taken care of and institutionalized. Given that information availability and general information acquisition frequency are not positively related to managers' search for data, it is possible that these kinds of scanning reduce uncertainty even if managers do not use the information. Thus, this mode of scanning might reduce managers' uncertainty without upgrading their understanding of the environment. Hence, a potential consequence will be that managers become overconfident in terms of their and their organizations' environmental knowledge and capability to capitalize on opportunities and to deal with threats. In turn, such confidence might maintain or reinforce managerial information processing referred to as limited capacity models (Lord and Maher 1990), including satisficing (Simon 1955) and adaptively or boundedly rational information processing (Cyert and March 1963; March and Simon 1993). These speculations are important in terms of different forms and functions of organizational scanning. However, they represent an adequate explanation only for the relationship between scanning on one side, and effect valence and data search on the other, since both information availability and general information acquisition frequency are positively related to issue sorting and causal understanding.

The variable closer to a searching mode of scanning, customer information acquisition frequency and use on the other hand, increases managers effect valence and data search. Hence, this kind of scanning seems to increase managers' attention and awareness and can be seen as a way to overcome some of the limitations in managerial information processing, which is an important assumption in an organizational information processing perspective (e.g. March and Simon 1993; O'Reilly 1983; Shank et al. 1988) and another important purpose of organizational scanning (e.g. Daft and Weick 1984; Stoffels 1994). Consequently, the findings suggest that to fulfill the purposes of reducing uncertainty and rationalizing and upgrading managerial thinking require different forms or modes of organizational scanning.

As can be seen from table 8.1, it is harder to recognize a pattern for the relationships between organizational scanning on one side and issue sorting and causal understanding on the other. However, while customer information acquisition

frequency and use produces mixed results, all significant relationships between the two other organizational scanning variables and both issue sorting and causal understanding variables are in the hypothesized positive direction. Information availability seems to be more important for small firms, while general information acquisition frequency appears to facilitate issue sorting and causal understanding in large firms. The logic behind the hypothesized positive relationship was that high levels of organizational scanning might provide an organizational context that facilitates the development of managers' domain-specific knowledge in terms of richer and more complete representations of the environment and multiple past experience against which to compare and contrast situations.

8.2 TMT-information processing structure and strategic issue diagnosis

Table 8.3 presents an overview of the significant findings for the relationship between top management team information processing structure and strategic issue diagnosis. Starting with effect valence, support for a positive link between participation and controllability was found, but only for managers in large firms. Other than that, participation was not significantly related to any of the effect valence variables or the data search variables. Consequently, on the basis of these findings, it appears that the level of participation in strategic decision making does not influence managers' opportunity-threat interpretation or data search, except that it appears to increase managers' perceptions of their organizations' capability to capitalize on opportunities.

The negative relationship between flexibility and the threat interpretation variables was supported, but flexibility was not significantly related to any of the opportunity variables. Moreover, flexibility was significantly negatively related to search for new data. Thus, the pattern is very much the same as for general information acquisition frequency, which supports the interpretation of an uncertainty reducing effect that might decrease managers' awareness of and attention to the environment.

To some extent, the findings that participation is positively related to controllability and flexibility is negatively related threat interpretation, echo the findings of Thomas

and McDaniel (1990;1991). Using neutral stimulus material, a single threat-opportunity scale and an aggregated measure of information processing structure, they found that rich information processing structures (i.e. high participation, flexibility and interaction) were positively related to opportunity interpretation. Thus, as suggested by Thomas and McDaniel (1990;1991), the explanation might be that rich information processing structures enhance team information capacities and hence reduce uncertainty (Duncan 1974) and information overload (Mintzberg 1983) and increase the ability to cope with stress and anxiety (Eisenhardt 1989). Additionally, participation in decision making has been found to be rather strongly related to team or group members' satisfaction (Black and Gregersen 1997; Miller and Monge 1986). Hence, an alternative explanation is that positive attitudes and emotions due to high levels of participation increase controllability.

Table 8.3: Overview of significant findings for TMT information processing structure

	Participation			Flexibility		
	All	Small	Large	All	Small	Large
Effect valence						
Positive-gain						
Controllability	(+)		+			
Opportunity-extremity						
Negative-loss				(-)	-	
Uncontrollability				-	-	-
Threat-extremity						-
Issue sorting						
Operational importance		(-)				
Strategic importance		(-)				--
Unfeasibility				(+)	+	
Causal understanding						
Free papers	(+)	++				
Market, competition, ..				+		
Data search						
Core data						
Additional data						
New data				---	---	--

(+/-): p < .15; +/-: p < .10; ++/--: p < .05; +++/---: p < .01
Shaded area: Significant findings in the hypothesized direction

While Thomas and McDaniel (1991) found rich information processing structures to be positively related to managers' data search, the data in the present study shows a negative relationship between flexibility and search for new data. Thus, even if rich information processing structures enhance team information capacities and that managers then can attend to more variables and consider each variable more fully during interpretation (Thomas and McDaniel 1990), they don't necessarily search for more information. On the contrary, high levels of flexibility might reduce managers' uncertainty to an extent that creates a sense of mastery and control and a feeling that they have processed the needed information. This might explain why flexibility as

well as general information acquisition frequency reduces both threat interpretations and data search. Finally, it is not possible to rule out an information overload explanation where rich information processing structures together with large flows of information may lead to increased confidence and satisfaction among managers (e.g. O'Reilly 1980).

Table 8.4: Hypotheses and results for TMT information processing structure and strategic issue diagnosis

Hypotheses	TMT IPS	Strategic issue diagnosis	H	R	Sample and significance level
H2a$_{EV1}$	Participation	Positive-gain	+	0	
	Flexibility		+	0	
H2b$_{EV1}$	Participation	Controllability	+	+	Large firms*
	Flexibility		+·	0	
H2c$_{EV1}$	Participation	Opportunity-extremity	-	0	
	Flexibility		-	0	
H2a$_{EV2}$	Participation	Negative-loss	-	0	
	Flexibility		-	-	Small firms*
H2b$_{EV2}$	Participation	Uncontrollability	-	0	
	Flexibility		-	-	Small** and large* firms
H2c$_{EV2}$	Participation	Threat-extremity	-	0	
	Flexibility		-	-	Small firms*
H2a$_{IS}$	Participation	Operational importance	+	-	Small firms†
	Flexibility		+	0	
H2b$_{IS}$	Participation	Strategic importance	+	-	Small firms†
	Flexibility		+	-	Large firms**
H2c$_{IS}$	Participation	Unfeasibility	+	0	
	Flexibility		+	+	Small firms*
H2a$_{CU}$	Participation	Free papers	+	+	Small firms**
	Flexibility		+	0	
H2b$_{CU}$	Participation	Market, competion,...	+	0	
	Flexibility		+	+	Total sample only*
H2a$_{DS}$	Participation	Core data	+	0	
	Flexibility		+	0	
H2b$_{DS}$	Participation	Additional data	+	0	
	Flexibility		+	0	
H2c$_{DS}$	Participation		+	0	
	Flexibility	New data	+	-	Small*** and large** firms

†: <.15; *: p<.10; **: p<.05; ***: p<.01
H: Hypothesized relationship, R: Results

No support was found for a positive relationship between neither participation nor flexibility and issue sorting terms of operational and strategic importance. Contrary to what was expected, participation was negatively related to issue sorting in terms of operational and strategic importance among managers in small firms, and flexibility is negatively related to strategic importance among managers in large firms. The only significant positive finding with regard to TMT information processing structure variables and issue sorting, is that between flexibility and unfeasibility among managers in large firms. With regard to causal understanding, support was found for a positive relationship between participation and causal understanding of free papers for small firms and between flexibility and causal understanding of the market, competition and attribution of newspaper success for the total sample. It is difficult to find a pattern in the relationships between information processing structure on one

side, and issue sorting and causal understanding on the other. However, while the results are mixed for issue sorting, the information processing structure variables appear to have positive effects on causal understanding, potentially because they equip managers with environmental knowledge and a wide set of cause-and-effect relationships. Table 8.4 sums up the testing of the hypotheses between top management team information processing structure and strategic issue diagnosis.

8.3 Cognitive style and strategic issue diagnosis

As can be seen from table 8.5, the three cognitive style variables produced several significant findings, although not exclusively in the hypothesized direction.

Table 8.5: Overview of significant findings for cognitive style

	Exploration			Social complexity			Differentiation		
	All	Small	Large	All	Small	Large	All	Small	Large
Effect valence									
Positive-gain								+ +	
Controllability					(+)				
Opportunity-extremity								+ +	
Negative-loss		+ +				- -			
Uncontrollability		(+)			(+)	-			
Threat-extremity		+			(-)	-			
Issue sorting									
Operational importance	(+)		+					- -	
Strategic importance	+ +	+	+ +						
Unfeasibility									
Causal understanding									
Free papers							+ + +		+ +
Market, competition, ..	+ + +		+ + +						
Data search									
Core data					(+)	+		+	
Additional data							+ +		+ +
New data							+ +	(+)	+

(+/-): p < .15; +/-: p < .10; ++/--: p < .05; +++/---: p < .01
Shaded area: Significant findings in the hypothesized direction

With regard to effect valence, it was expected that the cognitive style variables would be positively related to positive-gain and negative-loss interpretations, and negatively related to the rest of the effect valence variables. Exploration is significantly positively related to all the threat interpretation variables in the small firm sample, while differentiation is significantly positively related to positive-gain and opportunity-extremity interpretations in the same subsample. These finding might suggest that explorers and "differentiators" are more inclined to recognize a wider set of implications of issues than managers low on exploration and differentiation. However, while explorers demonstrate such issue sensitiveness for threats, differentiators are more sensitive to opportunities. The finding that these cognitive

style variables seem to be more important predictors of effect valence in small firms than in large firms, is in line with research that suggest that inertial forces like size reduce managerial discretion since managers in large firms operate under more severe constraints (e.g. Finkelstein and Hambrick 1996). However, for social complexity and for the remaining strategic issue diagnosis variables, this is not the case. While exploration and differentiation are significantly related to effect valence in the small firm sample, social complexity is negatively and significantly related to all threat interpretation variables in the large firm sample. Thus, the three cognitive style variables have rather different impact on effect valence.

Turning to issue sorting and causal understanding, support for a positive relationship between exploration and issue sorting in terms of operational importance (in the large firm sample) and strategic importance (in both subsamples) were found. Moreover, in the large firm sample, exploration is positively related to nuances in causal understanding of the market, competition and attribution of newspaper success. To some extent, the openness, flexibility and novelty seeking of explorers (Martinsen 1995) might explain why exploration seems to facilitate issue sorting and causal understanding. Being less bound by rules and existing schemas, managers with explorative cognitive styles might go beyond simple categories and surface characteristics of issues and engage in more mindful information processing than assimilators (those low on exploration). Consequently, they might be better able to recognize subtle differences between developments, trends or events in issue sorting and be open to multiple cause-effect relationships in causal understanding. Finally, the finding that differentiation is positively related to nuanced casual causal understanding of free papers, supports previous findings that cognitively complex managers are more likely to redefine problems rather than accept them exactly as presented (Lepsinger et al. 1989; Merron, Fisher, and Torbert 1987) and demonstrate more tolerance for ambiguity and diversity (Streufert, Streufert, and Castore 1968) than cognitively less complex managers.

Finally, differentiation is relatively strongly positively related to data search. Thus, the present investigation supports previous findings in the laboratory on the link between cognitive complexity and data search. Besides, differentiation seems to be a stronger predictor for additional data and new data than core data. Although this

picture is not very clear, the findings do not rule out the suggestion that cognitively complex managers not only search for more data, but also that they are more actively oriented and search for more novel data (e.g. Streufert and Swezey 1986).

Table 8.6: Hypotheses and results for cognitive style and strategic issue diagnosis

Hypotheses	Cognitive style	Strategic issue diagnosis	H	R	Sample and significance level
H3a$_{EV1}$	Exploration	Positive-gain	+	0	
	Social complexity		+	0	
	Differentiation		+	+	Small firms**
H3b$_{EV1}$	Exploration	Controllability	-	0	
	Social complexity		-	+	Small firms†
	Differentiation		-	0	
H3c$_{EV1}$	Exploration	Opportunity-extremity	-	0	
	Social complexity		-	0	
	Differentiation		-	+	Small firms**
H3a$_{EV2}$	Exploration	Negative-loss	+	+	Small firms**
	Social complexity		+	-	Large firms**
	Differentiation		+	0	
H3b$_{EV2}$	Exploration	Uncontrollability	-	+	Small firms†
	Social complexity		-	+/-	Small† (+), large* (-)
	Differentiation		-	0	
H3c$_{EV2}$	Exploration	Threat-extremity	-	+	Small firms*
	Social complexity		-	-	Large firms*
	Differentiation		-	0	
H3a$_{IS}$	Exploration	Operational importance	+	+	Large firms*
	Social complexity		+	0	
	Differentiation		+	0	
H3b$_{IS}$	Exploration	Strategic importance	+	+	Small* and large** firms
	Social complexity		+	0	
	Differentiation		+	0	
H3c$_{IS}$	Exploration	Unfeasability	+	0	
	Social complexity		+	0	
	Differentiation		+	0	
H3a$_{CU}$	Exploration	Free papers	+	0	
	Social complexity		+	0	
	Differentiation		+	+	Large firms**
H3b$_{CU}$	Exploration	Market, comptetion,...	+	+	Large firms***
	Social complexity		+	0	
	Differentiation		+	0	
H3a$_{DS}$	Exploration	Core data	0	0	
	Social complexity		0	+	Large firms†
	Differentiation		0	+	Small firms*
H3b$_{DS}$	Exploration	Additional data	+	0	
	Social complexity		+	0	
	Differentiation		+	+	Large firms**
H3c$_{DS}$	Exploration	New data	+	0	
	Social complexity		+	0	
	Differentiation		+	+	Small† and large* firms

†: <.15; *: p<.10; **: p<.05; ***: p<.01
H: Hypothesized relationship, R: Results

To summarize, while previous studies occupied with effect valence variables have found that individual characteristics do not play a significant role in strategic issue diagnosis (e.g. Schneider and DeMeyer 1991; Thomas, Clark, and Gioia 1993; Thomas, Shankster, and Mathieu 1994), the present study demonstrates that cognitive style might be related to effect valence as well as other forms of strategic issue diagnosis. Moreover, except from effect valence, most significant findings are in hypothesized direction. Thus, cognitive styles, particularly exploration and

differentiation, seem to be important predictors of strategic issue diagnosis. Furthermore, and contrary to what was suggested by Hitt and Tyler (1991), these findings indicate that selection and socialization processes for top management positions do not narrow individual cognitive differences between managers to an extent where "managers do not matter". Table 8.6 provides an overview of all hypotheses between cognitive styles and strategic issue diagnosis.

8.4 Relative and moderating effects

The results of the hierarchical regression analyses suggest that the contextual variables do a better job in predicting strategic issue diagnosis than the cognitive variables. Particularly, the contextual variables seem to be important predictors of effect valence for managers in small firms. But, the hypotheses testing of single independent variables demonstrated that two of the cognitive variables, exploration and differentiation, were good predictors of strategic issue diagnosis, particularly in relation to issue sorting, causal understanding and data search. Relatively weaker relationships between these two cognitive variables and effect valence might be explained by two related mechanisms. First, the "organizational lenses" provided by the organizational context might simply overshadow individual characteristics during strategic interpretation of opportunities and threats (Thomas, Shankster, and Mathieu 1994). Second, categorization of issues in terms of threats and opportunities might represent a relatively simpler cognitive task than issue sorting, causal understanding and data search do, and therefore be less influenced by variation in cognitive styles. Nevertheless, contrary to previous findings and assumptions, the present investigation clearly demonstrates that individual differences in terms of cognitive styles do play a significant role in strategic issue diagnosis.

Turning to the question of whether the effects of the cognitive variables are moderated by the level of the contextual variables, the moderated regression analysis suggests that such moderating effects exist. Besides, the subsample analysis revealed a relatively clear pattern in the large firm sample that calls for further speculation. Twenty out of twenty-three significant moderating effects found in the large firm sample suggested that high levels of organizational information processing had detrimental effects on the relationship between the cognitive variables on one side,

and effect valence and issue sorting on the other. This finding might suggest an information overload effect. Consequences of information overload include satisfaction, confidence, lack of accurate identification of relevant cues and loss of priorities (e.g. O'Reilly 1980; Schick, Gordon, and Haka 1990), which may be consistent with decreased and negative effect valence and reduced ability to differentiate between strategic issues.

In the large firm sample, all of the contextual variables, except from customer information acquisition frequency and use, seem to have the same effect on the relationship between the cognitive variables and strategic issue diagnosis. According to theory, it is not surprising that general information acquisition frequency and information availability might create information overload effects (e.g. Schneider 1988). However, existing theories suggest that high participation and flexibility in top management team information processing structures increase the team's capacity to process non-routine information (Duncan 1973; Duncan 1974; Galbraith 1973) and make the members of such teams less vulnerable to information overload (e.g. Mintzberg 1983). On the other hand, increased capacity to process information facilitates or impedes the use of data, stimuli, information and perspectives in strategic issue diagnosis (e.g. Daft and Lengel 1986; Thomas and McDaniel 1990; Thomas, McDaniel, and Anderson 1991). Thus, high flexibility and participation might create a context where the volume and differentiation of information exceeds managers' ability to effectively process that information.

Given that information overload is a possible explanation of the pattern obtained in the data, why would this be a problem for managers with high levels of exploration and differentiation? Early interactive complexity theory (Schroder, Driver, and Streufert 1967) assumed that more cognitively complex individuals will perform optimally at a higher level of information load than less complex individuals. Similarly, Streufert and Swezey (1986) suggested, that where the abilities, limitations, and styles of individuals match an organization's characteristics and needs, the liaison between person and organization will more likely be happy and productive. Hence, it would be expected that high levels of cognitive complexity and high levels of organizational information processing create an effective combination. However, the data in the present study suggest otherwise. In contexts characterized by high

information load, managers with high levels of differentiation might seek more information than they can effectively process. Supporting this assumption, the hypothesis testing demonstrated that differentiation was positively related to data search, and table 7.18 revealed that this relationship (for additional data and new data) was stronger for high levels of organizational information processing (flexibility). At the same time, high levels of organizational information processing seem to have a negative effect on these managers' effect valence and issue sorting. Thus, among large firms, managers with high levels of differentiation might experience information overload under conditions of high levels of the organizational information processing.

The tendency to seek more than optimal levels of information can not explain decreased effect valence, reduced ability to differentiate between strategic issues and reduced data search for high levels of organizational information processing among *explorers*. The finding that exploration is not significantly related to the data search variables and that explorers search for less data for high levels of organizational information processing, suggests an alternative explanation. A possible suggestion is that the uncertainty reducing effect of two of the scanning variables (information availability and general information acquisition frequency) and the information processing structures variables discussed earlier, reduces the openness, flexibility and novelty seeking behavior of explorers. Exploration is a cognitive style measure of *preferences* for problem solving, opening up for influence of other styles than the most preferred one. Perhaps conditions of high organizational information processing may lead to a shift away from an explorative style. Consequently, under such conditions explorers might have confidence in their organization's ability to deal with or control the environment and invest less cognitive effort in understanding strategic issues. This more subtle kind of information overload might have the same consequences as indicated above, i.e. lack of accurate identification of relevant cues and loss of priorities, in addition to restricted information processing behavior (Schneider 1988). An information overload effect based on variations in cognitive effort might correspond with previous findings that demonstrate that explorers do better for both practical (Martinsen 1993) and analytic insight problems (Martinsen 1994) when they have *less* rather than more relevant experience.

The interactive effects discussed here were found in the large firm sample and for all moderating variables except from customer information acquisition frequency and use. In the small firm sample, it is harder to find any clear pattern. Only fourteen out of twenty-six interactive effects show the same pattern as in the large firm sample, i.e. a decreasing effect of exploration and differentiation on the dependent variables for high values of the organizational information processing variables. It is possible that information overload effects might be less prominent among small firms since they scan the environment less extensively than large firms do. However, managers in small firms report higher levels of participation and roughly the same level of flexibility as managers in large firms (see table 1 in appendix B). Thus, one would expect that participation and flexibility moderates the relationships between the cognitive variables and dependent variables in the same pattern for small firms as for large firms. For both participation and exploration, this is the case for three out of four moderating effects. Thus, it is not unlikely that the interaction between the cognitive variables and the information processing structure variables have an information overload effect. Moreover, three out of four moderating effects of customer information acquisition frequency and use have the opposite effect on the relationship between the cognitive variables and the dependent variables. Thus, it is possible that the interaction between this scanning variable and the cognitive variables is less likely to produce information overload effect. Furthermore, information availability seems to be an important moderator for exploration in the small firm sample. First, the positive relationships between exploration and positive-gain and exploration and negative-loss are higher in the low information availability group than in the high information availability group. Second, the significant positive relationship between exploration and causal understanding of free papers in the low information availability group is significantly negative in the high information availability group. Thus, exploration seems to have positive effects on positive-gain, negative-loss and causal understanding of free papers for low levels of information availability, while these relationships turn negative or become weaker for high levels of information availability, thus supporting the information overload hypothesis. Finally, the relationship between differentiation and causal understanding is moderated by several contextual variables without providing any clear pattern.

In conclusion, except from customer information acquisition frequency and use, it seems that high levels of organizational information processing might have a negative impact on the effect of the cognitive variables on effect valence and issue sorting. This potential effect might be explained by information overload and seems most likely to take place in large firms.

8.5 Comments on organizational size

Organizational size was originally not included as an independent variable in the present investigation. However, due to its empirically demonstrated importance in relation to strategic issue diagnosis, the direct and moderating effects of organizational size are briefly summarized and discussed below.

As far as directs effects are concerned, organizational size seems to enhance opportunity interpretation (particularly controllability) and causal understanding of the market, competition and attribution of success. This finding may be explained by the advantages usually associated with large size, i.e. economies of scale, experience, diversity, brand name recognition, market power and organizational slack (e.g. Bourgeois 1981; Chen and Hambrick 1995; Hambrick, MacMillan, and Day 1982; Thomas, Shankster, and Mathieu 1994; Woo and Cooper 1981). Moreover, it contradicts the finding that that large firms are more likely to perceive threat and small firms more likely to perceive opportunity (Denison et al. 1996). Therefore, the results obtained in the present study also question the explanations that threat orientation can be traced to internal complexity (e.g. Lant, Milliken, and Batra 1992) and that opportunity orientation is enhanced by structural simplicity (e.g. Ketchen, Thomas, and McDaniel 1996).

Turning to moderating effects, a more complex picture emerges. First, the influence of organizational size on some strategic issue diagnosis variables appears to be different for small and large firms. For instance, size seems to positively influence issue sorting (operation importance and unfeasibility) for small firms, and negatively influence issue sorting (strategic importance) for large firms. Thus, for small firms, increasing size seems to enhance the ability to differentiate between issues in terms of operational importance and unfeasibility. For large firms, increasing size appears to

decrease this ability in terms of strategic importance. Hence, it seems that managers in medium sized firms are more selective in terms of sorting the wheat from the chaff in strategic issue diagnosis. Possibly, managers in very small firms to a greater extent see issues as equally (un)important and (un)feasible due to the resource constraints, workload and lack of strategic planning (e.g. Wilberg 1994a). Similarly, the same pattern may emerge in very large firms due to greater diversity in terms of the complexity and volume of their activities (e.g. Thomas, Shankster, and Mathieu 1994).

Furthermore, it appears to be a general pattern that the relationships between the scanning variables and strategic issue diagnosis (especially effect valence and data search) are much stronger for small firms than for large firms. A possible explanation for this pattern is that the level of organizational scanning is generally higher among large firms and that the variation in scanning between firms is smaller among large than small firms (see table 1 in appendix B). Another possibility is that large firms pay less attention to environmental developments, trends and events due to complacency, inertia, insularity and resistance to adaptation (Aldrich and Auster 1986; Chen and Hambrick 1995; Hannan and Freeman 1984; March 1981). However, the fact that managers in large firms report significantly higher levels of effect valence than managers in small firms (see table 1 in appendix B), and the direct effects of organizational size on opportunity interpretation, contradict such an explanation.

Finally, the detrimental influence of high levels on organizational information processing (except customer information acquisition and use) on the relationship between the cognitive variables and strategic issue diagnosis was consistent only in the large firm sample. This would suggest that information overload might be a problem mainly in large firms, possibly because it is in these firms that combinations of high levels of information processing and differentiators/explorers are found.

8.6 Implications for theory

In response to the general research question raised in the present study, the conclusion is that the cognitive styles of managers, the information processing structure of an

organization's top management team, and the organizational scanning of an organization, *each uniquely affect* managers' strategic issue diagnosis. This finding suggests that any attempt to explain or predict managers' strategic issue diagnosis is incomplete unless it addresses sources of influence from different levels of analysis. In addition to this general implication, the most important of the more specific contributions and implications are highlighted below.

The importance of cognitive styles in strategic issue diagnosis

Previous studies have established the importance of the organizational and group contexts on strategic issue diagnosis (e.g. Denison et al. 1996; Thomas and McDaniel 1990; Thomas, Shankster, and Mathieu 1994) but have not found any effects of individual characteristics. Hence, the present investigation contributes to strategic issue diagnosis research by empirically demonstrating the importance of cognitive variables. Specifically, it was found that the cognitive variables were relatively more important predictors of issue sorting, causal understanding and data search, than of effect valence. A potential explanation of this finding it that categorization of issues in terms of threats and opportunities represents a relatively simpler cognitive task than issue sorting, causal understanding and data search do, and therefore is less influenced by differences in cognitive styles.

Forms and functions of organizational scanning and strategic issue diagnosis

Previous scanning literature has mainly been occupied with individual and/or problem oriented modes of scanning, or to assess the state-of-the-art of organizational scanning among different organizations. Hence, the present study adds directly to this literature as well as to strategic issue diagnosis research by investigation institutionalized and monitoring modes of organizational scanning as an antecedent to strategic issue diagnosis. Overall, the main contribution is that the three organizational scanning variables seems to be important predictors of all the strategic issue diagnosis variables.

Descriptive as well as normative literature stress the importance of monitoring and analyzing the external environment in order to provide early warning signals from emerging developments, trends and events, to create a better understanding of the

environment, and to increase organizational responsiveness (e.g. Daft and Weick 1984; Stoffels 1994). However, the data in the present investigation suggests that not all forms of scanning fulfill these purposes. At least for two of the dependent variables, effect valence and data search, it seems that only the most directed and delimitated form of scanning has such an effect. On the other hand, the scanning variables related to broader information categories and to simply the availability of information seem to reduce managers' uncertainty about the environment. Thus, when Hambrick (1982) suggests that the significance of organizational scanning derives from the notion that managers can only interpret, disseminate and analyze data and stimuli that enter the organization, findings from the present study suggest the managers' environmental uncertainty might also be reduced by simply knowing that information is available or that information acquisition is being taken care of and institutionalized.

Moreover, the data analysis suggests that the uncertainty reducing effect might actually decrease managers' awareness and attention. This interpretation fit in with the negative relationships between general information acquisition frequency and the level of flexibility in the top management team on the one side, and threat interpretation and data search on the other. Additionally, the interactive effects of the two scanning variables related to broader information categories and to the availability of information and the two information processing structure variables on the relationship between cognitive style and effect valence and issue sorting, also lends support to such an effect of uncertainty reduction. Although these two quite different functions of organizational scanning (uncertainty reduction and attention) have been discussed in the literature (e.g. Huber and Daft 1987), an empirical study demonstrating different functions of different forms of scanning seems to be a novel contribution.

Interactions of cognitive and contextual variables and strategic issue diagnosis

In addition to demonstrating that antecedents at different levels of analysis influence strategic issue diagnosis, the present study contributes to the literature by exploring interactions between cognitive and contextual variables.

First, taken the conservative method applied in order to detect interactive effects into consideration, it might be concluded that the effect of the cognitive variables on strategic issue diagnosis is moderated by contextual variables at the group and organizational level. Second, at least for managers in large firms, there seem to be a consistent pattern in the nature of the moderating effects. Specifically, high levels of organizational information processing (with the exception of the most directed and delimitated scanning variable) tends to systematically detriment the effects of differentiation and exploration on effect valence and issue sorting. This finding may be explained by an information overload effect, which fit in with the uncertainty and attention reducing effects of two of the scanning variables and the information processing structure variables discussed above.

Extending previous conceptualizations of strategic issue diagnosis

The present study contributes to the issue interpretation literature by extending previous conceptualizations of strategic issue diagnosis. First, the examination of threat and opportunity as separate dimensions revealed asymmetric results with respect to several independent variables. Typically, while some independent variables predicted opportunity interpretation (information availability, participation and differentiation) others predicted threat interpretation (general information acquisition frequency, flexibility, exploration and social complexity). Thus, future researchers should include both scales in studying effect valence.

The inclusion of several strategic issue diagnosis dimensions adds to the existing literature by linking strategic issue diagnosis closer to effectiveness in strategic decision making. Particularly issue sorting and causal understanding are diagnosis dimensions that could be interpreted normatively, i.e. that it is important for managers to sort the wheat from the chaff in the fields of potential issues facing managers and that nuanced causal understanding in terms of being open to multiple cause-effect relationships will most likely be more effective than understanding issues in terms of universal, unambiguous or simple one-to-one causal relationships. Additionally, since the raw material of interest in strategic issue diagnosis is complex and unique environmental situations that are difficult to isolate and understand, it is reasonable to

assume that the use of large amounts and different types of data will improve strategic issue diagnosis.

8.7 Implications for practice

The findings of this research may also have implications for executives and decision-makers. First, since organizational and group contexts influence strategic issue diagnosis and both organizational scanning and the structure of the top management team are administrative controllable phenomena, top managers may benefit by consciously designing and adjusting these contexts. For instance, normative literature describes in detail frameworks for designing and managing environmental scanning systems to capture strategically valuable signals of changes early enough to gain advantage from them (e.g. Segev 1977; Stoffels 1994). More specifically, the present investigation suggests that directed scanning towards the customer sector increase managers' environmental awareness and attention. On the other hand, scanning related to broader information categories and to the availability of information, along with participation and flexibility, seems to reduce uncertainty in terms of increasing controllability interpretation and reducing threat interpretation. Thus, organizational scanning and the structure of top management teams might be adjusted according to different levels of environmental turbulence to search for a balance between environmental awareness and uncertainty reduction. However, it should be noted that directed scanning towards the customer sector is the only contextual variable that seems to increase managers' awareness and attention. Hence, to search for such a balance, top managers should pay particular attention to this kind of scanning, an implication that might be particularly relevant for small firms. Moreover, the strong indications of an uncertainty reducing effect of general information, information availability, participation and flexibility, with the possible implication of overconfidence, must be kept in mind. This is particularly important in an "information revolution age" where the Internet and different executive information systems (EIS) make almost unimaginable amounts of information available to managers.

Another implication of the finding that organizational and group contexts influence strategic issue diagnosis, is that top managers can consider the use of systematic

process aids (e.g. devil's advocacy and dialectical inquiry (Cosier and Schwenk 1990; Schweiger, Sandberg, and Rechner 1989)) to improve the level of independence of issue interpretation from the context in which managers are embedded (e.g. Denison, Hooijberg, and Quinn 1995).

Finally, the finding that differentiation and exploration predicts strategic issue diagnosis signal that recruitment, carrier development and training policies in organizations might pay more attention to cognitive styles. For instance, "differentiators" seems to be opportunity oriented, nuanced in causal understanding and have strong preferences for information, while explorers tends to be threat oriented, able to discriminate among issues and nuanced in causal understanding. Thus, a top management team consisting of some managers with high levels of exploration and some with high levels of differentiation might constitute a fruitful mix of information processing strategies. However, top managers of large firms should be aware of the possibility of an information overload effect under conditions of high levels of organizational information processing.

8.8 Validity of findings

This study has several limitations that should be considered when interpreting the results obtained. Below, these limitations are considered along four dimensions of validity; statistical conclusion validity, internal validity, construct validity of putative causes and effects, and external validity (Cook and Campbell 1979).

8.8.1 Statistical conclusion validity

Statistical conclusion validity refers to the approximate validity of results based on the sensitivity and statistical power of the performed analyses. Hence, it refers to inferences about whether it is reasonable to presume covariation between variables (Cook and Campbell 1979).

Among the threats to statistical conclusion validity discussed by Cook and Campbell (1979) is low statistical power. Given the number of respondents and the indication and discussion of findings with significance levels lower than 15%, the regression

analyses on the full sample should have sufficient statistical power[11] both in terms of testing R^2 and individual independent variables (Cohen and Cohen 1983; Tabachnick and Fidell 1996). However, based on a "critical-n-analysis", the splitting of the sample into small and large firms should substantially lower the power of the analyses. On the other hand, the sample split was conducted due to different relationships between some of the independent and dependent variables for different levels of organizational size. Thus, analyzing small and large firms separately made some of the bivariate relationships closer to the assumptions of linearity and generally improved estimation as indicated by improvements in R^2 as well as increasing the magnitude of several relationships.

Low reliability of measures is another threat to statistical conclusion validity since it inflates error variance and decreases the chance of obtaining true differences (Cook and Campbell 1979; Peter 1979). Although some of the measures suffered from less than ideal coefficient alphas, they were acceptable for explorative and theoretical purposes according to most conventions and standards.

Moreover, the selection of a homogeneous respondent population (the Norwegian newspaper industry) eliminated error variance due to industry characteristics. Thus, in conclusion, the likelihood of making Type II errors (making incorrect no-difference conclusions) should not be considered as a serious threat to statistical conclusion validity. Besides, in the discussion of the results, lack of empirical support for hypotheses has not been treated as *verification* of the null hypothesis or *falsification* of theoretical relationships.

Finally, another threat to statistical conclusion validity that should be discussed is the likelihood of falsely concluding that covariation exists when it does not (Type I error). In this respect, the indication and discussion of findings with significance levels lower than 15% and several instances of insignificant regression models clearly represent threats to statistical conclusion validity. On the other hand, the discussion of the results obtained has mainly focused on consistent patterns of findings, i.e. across the

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[11]As a rough indication; a power value of .95 for the F test of the significance of R^2 with eight independent variables requires a sample size of 138, given a significance criterion of .05 and a

two subsamples or consistent patterns for individual independent or dependent variables.

8.8.2 Internal validity

Although the hypotheses in the present study only predicted covariation between variables, the theoretical interest is in casual relationships. Internal validity refers to the approximate validity with which statements can be made about whether there is a causal relationship from one variable to another in the form in which the variables were manipulated or measured (Cook and Campbell 1979). Thus, having established that several of the independent and dependent variables covary, it remains to be discussed whether it can be inferred that the observed relationships are causal.

Generally, it is difficult to determine the internal validity of a cross sectional study. It does not permit formal test of causality since causes and effects are not separated in time and because all other factors can not be ruled out as rival explanations of observed associations between independent and dependent variables. Thus, the strongest proof of time order in the present study have to be based on previous theory and empirical research that posit an association between conceptually similar variables (e.g. Hitt and Tyler 1991; Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990; Thomas, Shankster, and Mathieu 1994). However, previous research does not rule out the possibility that strategic issue diagnosis influences organizational scanning, information processing structure of top management teams, and managers' cognitive styles. It simply provides arguments that the opposite direction of causal influence is more plausible.

An obvious threat to the internal validity of the present investigation is the clear limitations in terms of controlling for the possibility that relevant third variables may affect relations between independent and dependent variables. The single control variable included does not rule out the effects of known and unknown third variables that might be related to the relations under investigation. Hence, it must be concluded

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population effect size of .15 (Cohen and Cohen 1983).

that it cannot be unambiguously inferred that the observed relationships are causal in the hypothesized direction.

8.8.3 Construct validity of putative causes and effects

The construct validity of putative causes and effects refers to the approximate validity with which we can generalize from the employed research operations to the higher-order constructs of interest (Cook and Campbell 1979). Hence, the question of construct validity is not limited to the discussion of different methods for estimating degrees of validity after an instrument has been used to collect data. Rather, it is concerned with the whole research process from planning to data analyses and tests of measures (Cook and Campbell 1979).

Following established frameworks for the measurement process (Churchill 1979; Fredrickson 1986b), efforts were made at achieving high content validity. This is a qualitative type of validity where the domain of a construct is made clear and the analyst judges whether the measures fully represent the domain (Bollen 1989). Particularly, the measurement process aimed at combining input from theory and industry expertise in order to bridge the gap between theory and respondents (see paragraph 5.4), i.e. between research operations and the higher-order constructs of interest.

With respect to convergent and discriminant validity, which are important elements of construct validity (Cook and Campbell 1979), factor analyses and reliability analyses of the multidimensional constructs were conducted as a proximation to the assessment of these forms of validity. While reliability analysis does not assess the convergence of results across methods, it provides some evidence on convergent validity as it estimates convergence across different variations of the same method represented by items with different wordings tapping into different parts of the construct domains (Lines 1992). Furthermore, the patterns of factor loadings may be taken as indicators of whether items reflect different dimensions of constructs in a way which is postulated by theory (e.g. Carmines and Zeller 1979; Dess and Beard 1984; Nunnally and Bernstein 1994).

Despite the efforts described above, other threats to construct validity may be identified. First, since data on all (at different levels of analysis) variables were collected from the same respondents with the same questionnaire, there is a possibility of mono-method bias. Thus, collecting data using multiple measures from multiple respondents would probably have strengthened the study. On the other hand, to strengthen the conformity between the conceptual and empirical level when measuring organizational scanning and the information processing structure of top management team, questions directed respondents' attention to the group and organizational level respectively. Besides, the extent of agreement among managers from the same organizations and top management teams were assessed and found acceptable. It should also be noted that data on most of the dependent variables relied on questionnaire responses to hypothetical, though very realistic, cases, not through actually observing managers' strategic issue diagnosis. Moreover, since single case scenarios were used to measure several dependent variables and the content of the case scenarios might have influenced managers' responses, mono-operation bias may threaten the construct validity. Hence, using several case scenarios to measure each strategic issue diagnosis variable would have strengthened the present research. However, due to the already heavy demand placed on respondents in terms of time needed to complete the questionnaire (see appendix A), this option was ruled out.

As a general conclusion on problems related to variance attributable to measurement methods and operations rather than the variables of interest in self-report questionnaires, resent research suggests that percept-percept inflation may be more the exception than the rule (Crampton and Wagner 1994; Spector 1987).

8.8.4 External validity

External validity refers to the approximate validity with which conclusions can be drawn about the generalizability of the inferred relationships to and across populations of persons, settings, and times (Cook and Campbell 1979).

The first question is whether the results obtained can be generalized *to* Norwegian newspaper managers. Since respondents from 73 out of 106 newspaper firms with a circulation of more than 5000 were included, and the non-responding newspaper firms

did not differ much from the responding firms with regard to size and competitive posture, the results should be representative for managers employed in Norwegian newspaper with a circulation of more than 5000. Since some of the case scenarios are of current interest, and due the changes in information technology combined with the interest in organizational information processing in the present investigation, the generalizability across time is more questionable. Nevertheless, the reason to conduct a single-industry study was not to be able to generalize to that particular industry, but rather to improve statistical conclusion validity (by eliminating error variance due to industry characteristics) and construct validity of putative causes and effects (by improving measurement).

The most interesting question, however, is to what extent the results can be generalized to managers *across* industries. Unfortunately, this question is difficult to answer. The newspaper industry is an intriguing industry and it is difficult to rule out the possibility that the investigated relationships may differ in other types of industries as well as in other countries. Thus, future studies should use the present findings to guide research conducted in several industries to test generalizability.

Finally, relationships and mechanisms between strategic issue diagnosis and different contextual variables have previously been found for managers in different industries and contexts like hospitals (Thomas, Clark, and Gioia 1993; Thomas and McDaniel 1990), colleges and universities (e.g. Gioia and Thomas 1996; Thomas, Shankster, and Mathieu 1994), as well as across industries (e.g. Denison et al. 1996). In this respect, the present study contributes to the generalizability of the field of strategic issue diagnosis research.

8.9 Suggestions and opportunities for further research

Finally, some suggestions and opportunities are discussed that may provide some directions for future attempts at building a richer or a more precise understanding of strategic issue diagnosis.

First, cognitive variables were found to be important predictors of strategic issue diagnosis. An implication of this finding is that future strategic issue diagnosis

research should not replace cognitive variables with demographic variables – or at least not conclude that individual characteristics do not matter if only demographic variables are examined. Moreover, an interesting topic for future studies on the relative influence of individual and contextual variables is to include different dimensions of strategic issue diagnosis that vary in terms of the cognitive load they place on managers. Hence, the proposition that cognitive variables are relatively more important predictors for complex strategic issue diagnosis than less complex forms of sensemaking could be more thoroughly explored.

The present study did not measure cognitive integration, which is considered the most promising candidate in predicting an ill-structured managerial task like strategic issue diagnosis. The most appropriate measure of integration as well as differentiation, known as the "Sentence Completion Test" or "Paragraph Completion Test", is sensitive to test time limitations and should only be used when the researcher has control over respondents (Streufert and Nogami 1989). Thus, smaller scale studies using this instrument is needed to improve the knowledge of potential effects of managers' cognitive complexity on strategic issue diagnosis.

The data analysis suggests that the uncertainty reducing effects of broader and less directed organizational scanning and "organic" information processing structures decrease managerial awareness and attention. Since these findings and speculations seem most appropriate for only two of the dependent variables (effect valence and data search), further studies on the relationship between organizational scanning, strategic issue diagnosis and measures of environmental awareness and attention should be conducted before any firm conclusion can be drawn on this matter. Moreover, including organizational responsiveness and action in such studies would increase our understanding of the effects of organizational scanning as well as the implications of strategic issue diagnosis.

The possibility of an interactive information overload effect has important implications for cognitive style and complexity research. Specifically, the explorative findings in the present study might contradict the typical assumption that cognitively complex individuals perform better at higher levels of information load than less complex individuals. Hence, further studies on the joint effects of cognitive style and

complexity variables and information load should be conducted. Given the complexity of the nature and study of interactive effects, studies where different levels of load are manipulated experimentally might be particularly interesting in this regard.

The data analysis did not make clear whether the effect valence extremity variables really captured *overly* positive or *overly* negative interpretations and in consequent represent counterproductive dimensions of strategic issue diagnosis. Hence, an interesting topic for further investigations would be to keep trying to link research on positivity biases (e.g. Dunegan 1994; Gooding and Kinicki 1995), threat-rigidity effects (e.g. Fitzpatrick and Carroll 1991; Staw 1981) and the influence of positive versus negative affective states (e.g. Kaufmann and Vosburg 1997) to strategic issue diagnosis. In general, issue interpretation research would benefit from the development of "new" dimensions of strategic issue diagnosis and their links to individual, group and organizational variables. Finally, of critical importance is going deeper into the question of how different antecedents to strategic issue diagnosis, as well as different diagnosis dimensions, affect effectiveness in strategic decision making and organizational performance.

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Appendix A

Letter from NAL

Cover letter

Questionnaire

NAL

NORSKE AVISERS LANDSFORENING

Til: Bedriftsledelsen

Deres ref.:   Vår ref.: 039.0 - OT   Oslo, 7. februar 1997

Doktorgradsprosjekt: *Strategisk analyse i norske avisbedrifter*

Bård Kuvaas ved Handelshøyskolen BI har valgt avisene som arena for sin doktorgradsavhandling. Vi vurderer prosjektet som meget interessant, og håper du og noen av dine medarbeidere kan avsette en times tid til å besvare de senere tilsendte spørreskjema.

Hver avis som deltar i prosjektet vil få et sammendrag av undersøkelsen, som vi tror vil kunne gi ny kunnskap om organisering, strategisk ledelse og tenking i avisbedrifter.

Kuvaas vil som beskrevet i den vedlagte orientering ta telefonisk kontakt i løpet av de nærmeste dager for å avklare deltagelse i prosjektet, og hvilke ledere som eventuelt kan besvare spørreskjema.

Forespørselen om å delta i forskningsprosjektet er sendt alle NALs medlemsaviser med opplag på 5.000 eller mer.

Vedlegg.

Med vennlig hilsen
Norske Avisers Landsforening

Odd Teien

Bård Kuvaas
Handelshøyskolen BI
Postboks 580
1301 SANDVIKA
Tlf.: 67 57 09 00, fax.: 67 57 08 54, e-mail: bard.kuvaas@bi.no

«AVIS»
«KTIT» «KNavn»
«ADRESSE»
«POST» «STED»

Sandvika, 20. februar 1997

Kjære «KNavn»

Jeg viser til vår telefonsamtale, og takker for at du har sagt deg villig til å delta i forskningsprosjektet "Strategisk analyse i norske avisbedrifter". Prosjektet inngår som en del av min doktorgradsavhandling ved Norges Handelshøyskole i samarbeid med Handelshøyskolen BI. Norske Avisers Landsforening ved opplæringsleder Odd Teien deltar som samarbeidspartner i prosjektet.

Temaet for prosjektet er lederes vurderinger, oppfatninger og tanker omkring såkalte strategiske situasjoner. Strategiske situasjoner kan forstås som begivenheter, hendelser, trender og fenomener som vil kunne ha betydning for en bedrifts mål og visjoner, dens posisjon i markedet eller dens lønnsomhet på kort eller lang sikt. Hensikten med prosjektet er blant annet å få økt kunnskap om hvorfor ledere i samme bransje har ulike oppfatninger om like strategiske situasjoner.

Forskningsprosjektets verdi avhenger av ditt og dine kollegers samarbeid. Du yter ditt bidrag til at prosjektet blir vellykket ved å fylle ut det vedlagte spørreskjemaet. Utprøving og testing av skjemaet har vist at det tar mellom 40 og 50 minutter å besvare alle spørsmålene.

Alle enkeltpersoner som deltar vil få tilsendt et sammendrag av undersøkelsen. *I tillegg vil bedrifter hvor minst 3 personer returnerer skjemaet i utfylt stand, få tilsendt en rapport som sammenstiller data fra den aktuelle bedriften med gjennomsnittsdata fra alle bedriftene i utvalget.* På den måten kan undersøkelsen lettere komme til nytte i strategiarbeidet i din bedrift.

Spørreskjemaet du har fått er nummerert. Dette er gjort fordi jeg trenger informasjon om hvilke bedrifter de som svarer representerer. Det er imidlertid viktig å påpeke at alle opplysninger vil bli behandlet strengt konfidensielt og anonymt og publiseres kun i summarisk statistisk form. Det vil med andre ord ikke være mulig å identifisere deg eller den bedrift du representerer ved å studere resultatene fra undersøkelsen.

Det er fint om du kan returnere det utfylte skjemaet i den vedlagte frankerte svarkonvolutten <u>innen én uke</u>. Vær vennlig å returnere skjemaet selv om du ikke kan eller vil svare på enkelte spørsmål. Dersom du har spørsmål eller kommentarer omkring spørreskjemaet eller forskningsprosjektet, står jeg selvfølgelig til disposisjon.

Med vennlig hilsen

Bård Kuvaas
Doktorgradsstipendiat

STRATEGISK ANALYSE I NORSKE AVISBEDRIFTER:

ET FORSKNINGSPROSJEKT OM HVORDAN LEDERE I NORSKE AVISBEDRIFTER OPPFATTER OG VURDERER STRATEGISKE SITUASJONER

Gjennomført av

Bård Kuvaas, Handelshøyskolen BI og Norges Handelshøyskole

i samarbeid med

Norske Avisers Landsforening

ORIENTERING OG INSTRUKSJONER

- Denne undersøkelsen har som formål å belyse ulike sider ved hvordan ledere i norske avisbedrifter vurderer og oppfatter ulike strategiske situasjoner.

- Svarene som avgis i skjemaet vil bli analysert under ett. På denne måten vil det sikres full konfidensialitet.

- Vær vennlig å fyll ut spørreskjemaet i henhold til de instruksjoner som blir gitt underveis. En hovedregel når du fyller ut, er at den umiddelbare reaksjonen på spørsmålene er den riktigste. Det skal ikke være nødvendig å skaffe til veie andre opplysinger enn dem man "har i hodet" for å svare på spørsmålene.

- Spørreskjemaet er basert på eksisterende internasjonal forskning og alle spørsmålene er på forhånd testet ut blant flere norske avisledere. Fordi du skal svare ved hjelp av faste svaralternativer, vil du allikevel kunne oppleve at det for noen spørsmål er vanskelig å finne et alternativ som stemmer helt overens med din oppfatning eller situasjon. I slike tilfeller er det viktig at du prøver å velge det svaralternativet som ligger nærmest det du mener er det riktige svaret for deg, og at du ikke unnlater å svare. Du kan dessuten, dersom du ønsker det, gi kommentarer eller utfyllende opplysninger på spørreskjemaets siste side.

- Når skjemaet er ferdig utfylt, vær vennlig å returnere det i den vedlagte frankerte svarkonvolutten. Om du skulle miste denne, vær vennlig å returnere skjemaet til:

  Bård Kuvaas
  Handelshøyskolen BI
  Postboks 580
  1301 SANDVIKA

- Dersom du har spørsmål angående undersøkelsen, ta gjerne kontakt på telefon nr. 67 57 09 00, på fax nr. 67 57 08 54 eller ved hjelp av e-mail adressen "bard.kuvaas@bi.no".

Aller først ønsker vi at du svarer på spørsmål om din stilling, arbeidserfaring, utdannelse, alder og kjønn. Du svarer ved å sett kryss i den ruta som er riktig eller som passer best og fyller ut for antall år der det spørres om det.

1. Nåværende stilling? (Sett bare ett kryss)

☐ Ansvarlig redaktør eller sjefredaktør

☐ Administrerende direktør eller disponent

☐ Enleder

☐ Redaksjonell stilling som ikke er ansvarlig redaktør eller sjefredaktør

☐ Lederstilling som ikke er administrerende direktør eller disponent

☐ Annet, spesifiser stilling:_____

2. Arbeidserfaring?

a) Antall år i nåværende stilling: ☐☐ år

b) Antall år i nåværende bedrift: ☐☐ år

c) Antall år i mediebransjen (trykte medier, TV/radio, reklame, informasjon): ☐☐ år

d) Arbeidserfaring fra andre bransjer enn mediebransjen med varighet på minst ett år?

Spesifiser bransje og antall år:_____ ☐☐ år

Spesifiser bransje og antall år:_____ ☐☐ år

Spesifiser bransje og antall år:_____ ☐☐ år

3. Høyeste fullførte utdanning? (Sett bare ett kryss).

☐ 9-årig grunnskole, real- eller middelskole eller kortere

☐ Ett eller to-årig videregående skole

☐ 3-årig videregående skole (gymnas, handelsskole eller yrkesskole)

☐ Fullført utdanning ved høyskole eller universitet av 1-2 års normert varighet

☐ Fullført utdanning ved høyskole eller universitet av 3-4 års normert varighet

☐ Fullført utdanning ved høyskole eller universitet av minst 5-6 års normert varighet

4. Faglig eller tematisk spesialisering på høyeste fullførte utdanning?

☐ Journalistikk

☐ Grafisk

☐ Samfunnsfag (f.eks. statsvitenskap, sosiologi, historie, sosialøkonomi, jus)

☐ Bedriftsøkonomi, ledelse eller markedsføring

☐ Ingeniørfaglig eller naturvitenskapelig

☐ Annet, spesifiser spesialisering:_____

5. Kjønn: Mann ☐ Kvinne ☐   **6. Alder:** ☐☐ år

Denne delen inneholder 34 utsagn som beskriver forskjellige oppfatninger, preferanser og atferdsmåter i arbeid og fritid. Noen av utsagnene vil du umiddelbart oppfatte som meget gode beskrivelser av dine oppfatninger, preferanser eller atferd. Andre vil være meget lite beskrivende og ikke passe i det hele tatt. Atter andre vil oppfattes som moderat gode eller dårlige beskrivelser. Når du skal ta stilling til utsagene, prøv å tenke deg hvilke oppfatninger, preferanser og atferdsmåter du **pleier** å ha. Du skal altså vurdere om hver av setningene nedenfor MEST TYPISK eller TIL VANLIG beskriver dine oppfatninger, preferanser og atferd. Sett en sirkel rundt det ene tallet som står i den kolonnen som passer best for deg. Det er viktig at du besvarer alle spørsmålene.

	Passer svært dårlig	Passer dårlig	Nøytral	Passer godt	Passer svært godt
1. Jeg foretrekker detaljearbeide som krever god orden	1	2	3	4	5
2. Jeg liker best å arbeide uten å ha en på forhånd fastsatt plan	1	2	3	4	5
3. Jeg prøver meg ofte frem uten å planlegge systematisk	1	2	3	4	5
4. Jeg foretrekker å arbeide uten å ha klare retningslinjer å holde meg til	1	2	3	4	5
5. Jeg liker godt situasjoner hvor det er nødvendig å bryte med aksepterte oppfatninger	1	2	3	4	5
6. Jeg kommer best til min rett i situasjoner som er ordnede og oversiktlige	1	2	3	4	5
7. Jeg foretrekker situasjoner hvor en må arbeide etter bestemte regler	1	2	3	4	5
8. Jeg foretrekker å planlegge og strukturere det jeg skal gjøre	1	2	3	4	5
9. Jeg egner meg best til arbeid som krever systematikk og nøyaktighet	1	2	3	4	5
10. Jeg foretrekker å improvisere i forhold til mine gjøremål	1	2	3	4	5
11. Jeg foretrekker arbeid med faste rutiner	1	2	3	4	5
12. Jeg foretrekker å ha klare retningslinjer å holde meg til i arbeidet	1	2	3	4	5
13. Jeg kommer best til min rett i uoversiktlige situasjoner	1	2	3	4	5
14. Jeg liker best å utforske nytt terreng	1	2	3	4	5
15. Jeg foretrekker situasjoner hvor det finnes ett problem med én mulig løsning	1	2	3	4	5
16. I sosiale aktiviteter, ved tilstelninger og på jobben, liker jeg å omgås en person om gangen, og helst en person som er lik meg selv	1	2	3	4	5
17. I sosiale aktiviteter, ved tilstelninger og på jobben, liker jeg å prøve å blande sammen noe forskjellige personer	1	2	3	4	5
18. I sosiale aktiviteter, ved tilstelninger og på jobben, liker jeg å blande sammen helt forskjellige personer	1	2	3	4	5
19. Som grunnlag for vennskap, foretrekker jeg personer som likner meg selv i verdier og oppfatninger	1	2	3	4	5
20. Som grunnlag for vennskap, foretrekker jeg personer som er klart forskjellig fra meg selv i verdier og oppfatninger	1	2	3	4	5
21. Som grunnlag for vennskap, foretrekker jeg en blanding av personer hvor noen er like og andre ulike meg selv i verdier og oppfatninger	1	2	3	4	5
22. Som grunnlag for vennskap, bruker jeg flere kriterier, hvor likhet i verdier og oppfatninger ikke er spesielt betydningsfullt for meg	1	2	3	4	5

	Passer svært dårlig	Passer dårlig	Nøytral	Passer godt	Passer svært godt
23. I valg av omgangskrets, trives jeg sammen med personer som er ganske lik meg og min egen personlighet	1	2	3	4	5
24. I valg av omgangskrets, trives jeg sammen med personer med klart forskjellige personligheter	1	2	3	4	5
25. I valg av omgangskrets, trives jeg sammen med noen som er like og noen som er helt ulike	1	2	3	4	5
26. I valg av omgangskrets, bruker jeg mange kriterier, hvor likhet i personlighet ikke er spesielt betydningsfullt for meg	1	2	3	4	5
27. Stilt overfor problemer og situasjoner, hender det ganske ofte at jeg nøler med å løse problemer som omfatter flere ulike synspunkter	1	2	3	4	5
28. Stilt overfor problemer og situasjoner, foretrekker jeg ganske ofte problemer som omfatter flere ulike synspunkter	1	2	3	4	5
29. Stilt overfor problemer og situasjoner, liker jeg meget godt problemer som krever flere ulike synspunkter	1	2	3	4	5
30. I forvirrende og usikre situasjoner, betrakter jeg mange sider ved problemet, og kommer deretter fram til en foreløpig beslutning som godt kan bli endret når jeg betrakter problemet på nytt	1	2	3	4	5
31. Når jeg står overfor en ny eller endret situasjon, unngår jeg vanligvis å diskutere situasjonen med personer som har andre oppfatninger, siden dette bare bidrar til å gjøre saken mer uklar	1	2	3	4	5
32. Når jeg står overfor en ny eller endret situasjon, søker jeg ulike oppfatninger og foretar som regel flere ulike vurderinger som eventuelt kan endre mitt opprinnelige syn på saken	1	2	3	4	5
33. Når betydelige mengder ny og tilsynelatende motstridende informasjon kommer frem i en sak hvor jeg har sterke meninger, bruker jeg informasjonen til å utvikle enda flere synspunkter om saken, som igjen kan føre til at jeg vil se saken i et annet lys	1	2	3	4	5
34. Jeg synes det er helt i orden at forskjellige mennesker har ulike oppfatninger. Jeg synes imidlertid at de oftere burde holde oppfatningene sine for seg selv og ikke bry andre med dem	1	2	3	4	5

Denne delen inneholder korte beskrivelser av fire tenkte situasjoner og 9 spørsmål til hver av situasjonene. Spørsmålene har til hensikt å avdekke din vurdering av hvordan de ulike situasjonene vil ha betydning for din bedrift. Det finnes med andre ord ingen "riktige" eller "gale" svar.

Vi ønsker at du først leser beskrivelsen av situasjon A og svarer på spørsmålene som følger umiddelbart etter situasjonsbeskrivelsen - og deretter gjør det samme for situasjon B, C og D. For alle spørsmålene benyttes det en skala som går fra 1 til 7, hvor 1 betyr "i meget liten grad", og 7 betyr "i meget stor grad".

Eksempel: I spørsmål 1 under, spørres det om i hvilken grad du tror det vil komme noe fordelaktig ut av situasjon A for din bedrift. Dersom du tror det i *meget stor* grad vil komme noe fordelaktig ut av situasjonen for din bedrift, sett en sirkel rundt tallet 7, dersom du tror det i *stor* grad vil komme noe fordelaktig ut av situasjonen, sett en sirkel rundt tallet 6, og dersom du tror det i *noe stor* grad vil komme noe fordelaktig ut av situasjonen, sett en sirkel rundt tallet 5. Dersom du er usikker på om det i *noe stor* eller *noe liten* grad vil komme noe fordelaktig ut av situasjonen, sett en sirkel rundt tallet 4, osv.

Situasjon A

Tenk deg følgende situasjon. Stortinget har nylig vedtatt avgiftsreduksjoner på bil og privateiendom. For biler vil avgiftsreduksjonen tilsvare ca. 12.000 kr. for en gjennomsnittsbil. For privateiendom er det vedtatt at dokumentavgiften til staten skal reduseres fra 2,5 % av eiendommens omsetningsverdi til 1,5 %. De fleste eksperter er enige om at avgiftsreduksjonene vil gi klare økninger i omsetningen av biler og privateiendom, og dermed for volumet av annonser for tilsvarende produkter. I tillegg er hovedkonklusjonene i de siste rapportene fra Norges Bank og OECD at norsk økonomi vil oppleve en jevn og stabil positiv konjunkturutvikling de nærmeste årene.

For hvert av de 9 spørsmålene under, sett en sirkel rundt det ene tallet som best indikerer din vurdering av hvordan situasjon A vil ha betydning for din bedrift. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad						I meget stor grad

I hvilken grad....

1. tror du det vil komme noe fordelaktig ut av situasjon A for din bedrift?	1	2	3	4	5	6	7
2. tror du at fremtiden for din bedrift vil bli betydelig enklere som følge av situasjon A?	1	2	3	4	5	6	7
3. ser du situasjon A som en kilde til potensiell gevinst for din bedrift?	1	2	3	4	5	6	7
4. ser du situasjon A som noe svært positivt for din bedrift?	1	2	3	4	5	6	7
5. tror du situasjon A vil ha mer positive implikasjoner for din bedrift enn for andre avisbedrifter?	1	2	3	4	5	6	7
6. ser du situasjon A som en strategisk mulighet som er særlig viktig for akkurat din bedrift?	1	2	3	4	5	6	7
7. tror du det er meget høy sannsynlighet for store gevinster for din bedrift som følge av situasjon A?	1	2	3	4	5	6	7
8. mener du at din bedrift har de nødvendige ressurser til å utnytte situasjon A på en effektiv måte?	1	2	3	4	5	6	7
9. mener du at din bedrift kan utnytte situasjon A på en effektiv måte uten store anstrengelser?	1	2	3	4	5	6	7

Tenk deg følgende situasjon. Landets største eiendomsmeglere og bilforhandlere (som til sammen utgjør ca. 70 % av den totale årlige omsetningen av bil og privateiendom) har nylig etablert en landsomspennende annonsesammenslutning for salg og kjøp av biler og privat eiendom. Hensikten med etableringen har vært å danne en organisasjon for elektronisk formidling av biler og eiendom. Det forventes at de vil ha en Internett-løsning klar allerede om et par måneder. Samtidig arbeider de med fellessystemer tilrettelagt for tekst-TV og lokal-TV. Nyvalgt leder for annonsesammenslutningen har uttalt at målet på lengre sikt er å erstatte annonser i avisene. I en prøveperiode vil det imidlertid i hovedsak fungere som et tillegg til avisannonser. Sammenslutningen har også som målsetning å inkludere formidling av andre varer og tjenester, hvor stillingsannonser fremheves som spesielt interessant.

For hvert av de 9 spørsmålene under, sett en sirkel rundt det ene tallet som best indikerer din vurdering av hvordan situasjon B vil ha betydning for din bedrift. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad						I meget stor grad

I hvilken grad....

1. tror du det vil komme noe ufordelaktig ut av situasjon B for din bedrift?	1	2	3	4	5	6	7
2. tror du at fremtiden for din bedrift vil bli betydelig vanskeligere som følge av situasjon B?	1	2	3	4	5	6	7
3. ser du situasjon B som kilde til et potensielt tap for din bedrift?	1	2	3	4	5	6	7
4. ser du situasjon B som noe svært negativt for din bedrift?	1	2	3	4	5	6	7
5. tror du situasjon B vil ha mer negative implikasjoner for din bedrift enn for andre avisbedrifter?	1	2	3	4	5	6	7
6. ser du situasjon B som en strategisk trussel som er særlig viktig for akkurat din bedrift?	1	2	3	4	5	6	7
7. tror du det er meget høy sannsynlighet for store tap for din bedrift som følge av situasjon B?	1	2	3	4	5	6	7
8. mener du at din bedrift mangler de nødvendige ressurser til å håndtere situasjon B på en tilfredsstillende måte?	1	2	3	4	5	6	7
9. mener du at din bedrift bare kan håndtere situasjon B på en tilfredsstillende måte med meget store anstrengelser?	1	2	3	4	5	6	7

Tenk deg at du nettopp har mottatt økonomiske nøkkeltall for siste halvår for din bedrift. Her fremgår det at driftsresultatet er hele 12 prosent lavere enn hva som var budsjettert for perioden. En av styrets representanter har tydelig uttrykt misnøye med dette resultatet. Han har derfor foreslått strammere budsjettfokusering, hyppigere rapportering til eierne om avisens økonomi og noen konkrete rasjonaliseringstiltak. En nærmere analyse av nøkkeltallene viser at nesten hele budsjettsprekken skyldes en kraftig økning i kostnader til overtid og vikarer, noe man ikke forutså på budsjetteringstidspunktet. Ellers har opplagsutviklingen for de siste tre årene vært positiv, og vist en jevn årlig økning på omtrent samme størrelse som for sammenliknbare aviser. Annonseutviklingen har også vært positiv, og lønnsomheten er god. Tidligere og nåværende diskusjoner om kostnadskutt og rasjonalisering har imidlertid fått flere i avisen, både blant grafisk og redaksjonelt ansatte, til å murre. Misnøyen kommer i hovedsak til uttrykk på to måter. For det første er det et uttalt ønske fra de ansatte om å få en større andel av bedriftens overskudd. For det andre hevder flere at en for sterk sparekultur vil kunne gå utover avisens redaksjonelle kvalitet.

For hvert av de 9 spørsmålene under, sett en sirkel rundt det <u>ene</u> tallet som <u>best</u> indikerer din vurdering av hvordan situasjon C vil ha betydning for din bedrift. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad					I meget stor grad	

I hvilken grad....

1. ser du situasjon C som en viktig sak for din bedrift?	1	2	3	4	5	6	7
2. tror du fremtiden for din bedrift blir endret som følge av situasjon C?	1	2	3	4	5	6	7
3. ser du situasjon C som en hastesak for din bedrift?	1	2	3	4	5	6	7
4. bør situasjon C plasseres høyt på bedriftens dagsorden?	1	2	3	4	5	6	7
5. vil du beskrive situasjon C som en rutinesak for din bedrift?	1	2	3	4	5	6	7
6. betrakter du årsakssammenhengene i situasjon C som oversiktlige?	1	2	3	4	5	6	7
7. besitter din bedrift tilstrekkelig kunnskap til å forstå situasjon C?	1	2	3	4	5	6	7
8. mener du at din bedrift har de nødvendige ressurser til å håndtere situasjon C på en effektiv måte?	1	2	3	4	5	6	7
9. bør bedriften investere ressurser i nærmere undersøkelse av situasjon C?	1	2	3	4	5	6	7

Tenk deg at du nettopp har mottatt resultatene fra en markedsundersøkelse foretatt for din avis. En av flere konklusjoner er at lesernes tillit til avisen er noe redusert. Mer konkret innebærer dette at tallet for de som har krysset av for høy eller meget høy tillit til avisen er 12 prosentpoeng lavere i dag enn for to år siden. Det er usikkert om dette er et generelt fenomen for aviser flest. Du har ingen faste holdepunkter som gir klare indikasjoner på om tillitsendringen er tilfeldig, om det er en trend eller om den har med forhold knyttet til tidspunktet for markedsundersøkelsen å gjøre. Videre er det vanskelig å peke på klare årsaker til endringen. Det er også uklart hvilke implikasjoner denne endringen vil ha, om noen i det hele tatt. Opplagsutviklingen for de siste tre årene har vært positiv, og vist en jevn årlig økning på omtrent samme størrelse som for sammenliknbare aviser. Annonseutviklingen har også vært positiv, og lønnsomheten er god.

For hvert av de 9 spørsmålene under, sett en sirkel rundt det ene tallet som best indikerer din vurdering av hvordan situasjon D vil ha betydning for din bedrift. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad						I meget stor grad
I hvilken grad....							
1. ser du situasjon D som en viktig sak for din bedrift?	1	2	3	4	5	6	7
2. tror du fremtiden for din bedrift blir endret som følge av situasjon D?	1	2	3	4	5	6	7
3. ser du situasjon D som en hastesak for din bedrift?	1	2	3	4	5	6	7
4. bør situasjon D plasseres høyt på bedriftens dagsorden?	1	2	3	4	5	6	7
5. vil du beskrive situasjon D som en rutinesak for din bedrift?	1	2	3	4	5	6	7
6. betrakter du årsakssammenhengene i situasjon D som oversiktlige?	1	2	3	4	5	6	7
7. besitter din bedrift tilstrekkelig kunnskap til å forstå situasjon D?	1	2	3	4	5	6	7
8. mener du at din bedrift har de nødvendige ressurser til å håndtere situasjon D på en effektiv måte?	1	2	3	4	5	6	7
9. bør bedriften investere ressurser i nærmere undersøkelse av situasjon D?	1	2	3	4	5	6	7

Denne delen inneholder en kort beskrivelse av en tenkt situasjon og 14 spørsmål som lister opp ulike informasjonskilder som kan være relevante i forbindelse med situasjonen. Les først situasjonsbeskrivelsen. Indiker deretter i hvilken grad du tror du ville ha søkt og innhentet informasjon fra de ulike kildene for bedre å forstå og definere situasjonen. Også nå benyttes det en skala som går fra 1 til 7, hvor 1 betyr i meget liten grad, og 7 betyr i meget stor grad.

Situasjonsbeskrivelse

Tenk deg følgende situasjon. I løpet av de siste månedene har to relativt store annonsører varslet en kraftig reduksjon i kjøp av annonseplass i din avis. Annonseansvarlig i avisen har gitt uttrykk for at den ene annonsøren er i ferd med å evaluere sin salgs- og markedsføringsprofil, men at den kanskje kommer sterkere tilbake senere. Du har ingen informasjon om hvorfor den andre annonsøren har valgt å kutte ned på annonseringen. Du har heller ikke mottatt informasjon som tilsier at de to kundene har klaget eller på annen måte gitt uttrykk for manglende service eller kvalitet ved de tjenester din avis har levert. Det du vet, er imidlertid at begge de to annonsørene relativt nylig har blitt kunder hos reklamebyrået Beta, som er kjent for sin satsing på direktereklame og produksjon av radioreklame.

Ellers har det i løpt av det siste året vært brukbar tilgang på nye annonsører, noe som sannsynligvis skyldes den økte satsningen på markedsføring av avisen som annonseorgan. Det har imidlertid vært noe høyere avgang enn tilgang, slik at de totale annonseinntektene fra forretningsdrivende og offentlige annonsører er noe lavere enn for et år siden.

For hvert av spørsmålene under, sett en sirkel rundt det ene tallet som best indikerer i hvilken grad du tror du ville søkt og innhentet informasjon fra de ulike kildene. Husk på at søking og innhenting av informasjon i virkelige situasjoner er ressurskrevende i form av tid og penger. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad						I meget stor grad
I hvilken grad tror du at du ville ha....							
1. sørget for et møte med de to annonsørene?	1	2	3	4	5	6	7
2. søkt etter mer informasjon om reklamebyrået Betas strategi, produkter og tjenester?	1	2	3	4	5	6	7
3. undersøkt historisk informasjon som finnes internt i din bedrift om de to annonsørenes oppfatning av service, levering, pris og liknende ved annonsering i din avis?	1	2	3	4	5	6	7
4. skaffet til veie de siste statistikkene fra mediebyråene om fordeling av reklameformidling mellom avis, radio og TV?	1	2	3	4	5	6	7
5. skaffet til veie en eksisterende rapport fra en markedsundersøkelse som har sammenliknet hva annonsører får igjen ved bruk av henholdsvis avisannonser, kundeavis som innstikk i avis og kundeavis i postkassen?	1	2	3	4	5	6	7
6. undersøkt historisk informasjon som finnes internt i din bedrift om øvrige forretningsdrivende og offentlige annonsørers oppfatning av service, levering, pris og liknende ved annonsering i din avis?	1	2	3	4	5	6	7
7. sørget for at det ble iverksatt en ny undersøkelse av gruppen forretningsdrivende og offentlige annonsørers oppfatning av service, levering, pris og liknende ved annonsering i din avis?	1	2	3	4	5	6	7

	I meget liten grad						I meget stor grad

I hvilken grad tror du at du ville ha....

8. undersøkt historisk informasjon som finnes internt i din bedrift om avgang og tilgang blant forretningsdrivende og offentlige annonsører de siste årene?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

9. forsøkt å skaffe til veie informasjon om flere av de forretningsdrivende og offentlige annonsørene har opprettet eller har planer om å opprette nærmere relasjoner til reklamebyrået Beta?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

10. skaffet til veie historisk informasjon om mulige strukturelle endringer i annonsemarkedet?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

11. søkt etter informasjon om fremtidige mulige utviklingstrekk i annonsemarkedet?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

12. søkt etter informasjon om mulige kundegrupper i annonsemarkedet som avisen i dag ikke dekker?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

13. skaffet til veie informasjon om måter og kostnader ved å gjennomføre effektmålinger av annonser i deres avis?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

14. forsøkt å skaffe til veie informasjon om forretningsdrivende og offentlige annonsørers planer for fremtidig markedsførings- og annonseringsmix?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Denne delen inneholder 23 påstander om interne og eksterne forhold som kan være relevante for avisbedrifter. Vi ønsker at du leser hver påstand, og for hver av dem setter en sirkel rundt den ene bokstaven som best indikerer hvor riktig du mener påstanden er.

Det benyttes nå en skala som går fra A til D, hvor A betyr at du mener at påstanden er riktig, B betyr at du mener at påstanden kan være både riktig og uriktig, C betyr at du mener at påstanden er uriktig og D betyr at du ikke har noen mening om hvorvidt påstanden er riktig eller ikke. Sett sirkel rundt D bare når du er helt sikker på at du ikke har noen mening om påstandens riktighet. Det er viktig at du tar stilling til alle påstandene.

| | | PÅSTANDEN | | |
	er riktig	kan være både riktig og uriktig	er uriktig	Har ingen mening
1. Økt utbredelse av gratisaviser i Norge vil helt klart føre til en mindre differensiert pressestruktur enn i dag	A	B	C	D
2. Det finnes flere grunner til at økt utbredelse av gratisaviser i Norge vil kunne slå både positivt og negativt ut i forhold til en differensiert pressestruktur	A	B	C	D
3. Gratisaviser representerer utelukkende en trusel for norsk dagspresse	A	B	C	D
4. Økt utbredelse av gratisaviser vil helt klart føre til lavere konsum av tradisjonelle aviser	A	B	C	D
5. Det at en avis er gratis, er ensbetydende med lavere grad av redaksjonell uavhengighet	A	B	C	D
6. Det finnes flere grunner til at det at en avis er gratis, vil kunne ha både positive og negative implikasjoner for avisens redaksjonelle uavhengighet	A	B	C	D
7. Det er en klar og relativt entydig positiv sammenheng mellom et godt redaksjonelt produkt og lønnsomhet i avisdrift	A	B	C	D
8. Internett kan allerede i dag avskrives som en seriøs konkurrent til aviser	A	B	C	D
9. Det er allerede i dag klart at Internett vil bli avisenes viktigste konkurrent i løpet av noen få år	A	B	C	D
10. Pressestøtten er helt klart hovedårsaken til at vi fortsatt har dagspressekonkurranse i Norge i dag	A	B	C	D
11. Økt konkurranse mellom aviser er helt klart negativt i forhold til en mangfoldig dagspresse	A	B	C	D
12. Økt konkurranse mellom aviser vil ha både positive og negative effekter i forhold til en mangfoldig dagspresse	A	B	C	D
13. Hvis en avis opplever opplagsøkning vil hovedårsaken alltid være at avisproduktet er blitt bedre	A	B	C	D
14. Den viktigste årsaken til opplagsnedgang for en avis vil alltid være negative endringer i eksterne rammebetingelser	A	B	C	D
15. Det er vanskelig å peke på entydige og allmenngyldige årsaker til positive og negative endringer i avisopplag	A	B	C	D

	PÅSTANDEN			
	er riktig	kan være både riktig og uriktig	er uriktig	Har ingen mening
16. At det norske folk oppfatter aviser som det mest troverdige mediet er et entydig bevis på kvaliteten til norske aviser	A	B	C	D
17. At en avis oppfattes som troverdig blant sine lesere er en absolutt forutsetning for avisens overlevelse på sikt	A	B	C	D
18. Et statlig oppnevnt medieombud vil helt klart føre til politisk styring av pressen	A	B	C	D
19. Dagens ordning med Pressens Faglige Utvalg er absolutt den beste måten å fremme den etiske og faglige standard i norsk presse på	A	B	C	D
20. Direktereklame har for dårlig markedsføringseffekt til at det noen gang vil utgjøre noen seriøs konkurrent til aviser som annonsemedium	A	B	C	D
21. Den økende eierkonsentrasjonen i norsk avisbransje er utelukkende positivt for bransjen	A	B	C	D
22. Den økende eierkonsentrasjonen i norsk avisbransje er utelukkende negativt for bransjen	A	B	C	D
23. Det finnes flere grunner til at den økende eierkonsentrasjonen i avisbransjen har både positive og negative effekter	A	B	C	D

Denne delen inneholder spørsmål om bedriftens innsamling, tilgjengelighet og bruk av informasjon om bedriftens eksterne omgivelser som for eksempel markedsinformasjon og informasjon om konkurrenter. Først stilles 18 spørsmål om bedriftens innsamling av informasjon, deretter følger 20 spørsmål om tilgjengelighet og bruk av slik informasjon.

A: Bedriftens innsamling av informasjon

Det er vanlig å samle inn informasjon om forhold utenfor bedriften for å planlegge for fremtiden eller for å være oppdatert om forhold som kan være relevant for bedriften. Her ønsker vi å avdekke den delen av slik informasjonsinnsamling som foretas på en systematisk eller formalisert måte. Det er ikke av betydning om det er bedriften selv eller andre som står for informasjonsinnsamlingen. Den kan like gjerne skje i samarbeid eller i regi av andre aktører, som for eksempel andre aviser, reklamebyråer, bransjeorganisasjoner, konsulenter etc., som av bedriften selv. Innsamling av informasjon som er rettet mot håndtering av konkrete problemer eller spesielle situasjoner, skal imidlertid ikke skal tas med når du svarer på spørsmålene under.

Mange bedrifter skaffer mesteparten av slik informasjon på mer uformelle måter enn det som søkes avdekket gjennom spørsmålene under. Det er derfor ikke uten videre gitt at bedrifter som samler inn mye informasjon på en systematisk eller formalisert måte er bedre informert eller oppdatert enn andre.

Skalaen som benyttes nå går fra 1 til 6, hvor 1 betyr at bedriften "meget sjeldent eller aldri" samler inn den type informasjon det spørres om, og 6 betyr at bedriften samler inne den aktuelle informasjonen "ukentlig eller oftere". Les hvert utsagn og sett en sirkel rundt det ene tallet som best beskriver hvor ofte din bedrift samler inn ulike typer av informasjon. Det er viktig at du besvarer alle spørsmålene.

	HVOR OFTE?					
	Meget sjeldent eller aldri	Mindre enn en gang i året	Omtrent en gang i året	Noen få ganger i året	Omtrent en gang i måned-en	Ukent-lig eller oftere
Vår bedrift samler systematisk inn informasjon om....						
1. hvordan andre aviser dekker annonsemarkedet	1	2	3	4	5	6
2. egenskaper ved eksisterende lesere så som holdninger og kjøpevaner	1	2	3	4	5	6
3. rettsavgjørelser som kan være relevante i forbindelse med avisdrift	1	2	3	4	5	6
4. befolkningens lesevaner	1	2	3	4	5	6
5. utviklingen av nye materialer, produksjonsteknikker og metoder knyttet til avisproduksjon	1	2	3	4	5	6
6. endringer i andre avisers image eller profil	1	2	3	4	5	6
7. befolkningens forbruk av andre medier enn aviser	1	2	3	4	5	6
8. potensielle leseres holdning til avisen vår	1	2	3	4	5	6
9. taktikk og strategi til andre medieaktører enn avisbedrifter	1	2	3	4	5	6
10. hvordan andre medier enn aviser dekker annonsemarkedet	1	2	3	4	5	6
11. konkurrerende eller sammenliknbare avisbedrifters taktikk og strategi	1	2	3	4	5	6
12. eksisterende leseres demografiske egenskaper (f.eks. alder, inntekt, utdanning etc.)	1	2	3	4	5	6
13. alternativer til eksisterende underleverandører av varer og tjenester	1	2	3	4	5	6

	HVOR OFTE?					
	Meget sjeldent eller aldri	Mindre enn en gang i året	Omtrent en gang i året	Noen få ganger i året	Omtrent en gang i måneden	Ukentlig eller oftere

Vår bedrift samler _systematisk_ inn informasjon om....

14. eksisterende leseres holdning til avisen vår	1	2	3	4	5	6
15. nøkkeltall for utviklingen av norsk økonomi	1	2	3	4	5	6
16. våre annonsørers holdninger og tilfredshet	1	2	3	4	5	6
17. offentlige myndigheters planer og politikk for mediemarkedet	1	2	3	4	5	6
18. andre avisers leserprofiler	1	2	3	4	5	6

B: Tilgjengelighet og bruk av informasjon

Under stilles 20 spørsmål som har til hensikt å avdekke tilgjengelighet og bruk av informasjon i bedriften. Informasjon som først og fremst har med journalistisk virksomhet å gjøre skal ikke tas med.

Nå benyttes det igjen en skala som går fra 1 til 7, hvor 1 betyr i meget liten grad, og 7 betyr i meget stor grad. Les hvert utsagn og sett en sirkel rundt ene tallet som best beskriver tilgjengelighet og bruk av informasjon i bedriften. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad						I meget stor grad

I hvilken grad....

1. brukes systematisk innsamlet informasjon om eller fra eksisterende underleverandører for å øke forståelsen av underleverandørmarkedet og dets utvikling?

   1   2   3   4   5   6   7

2. er oppdaterte nøkkeltall for norsk økonomi lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

3. er informasjon om nye materialer, produksjonsteknikker og metoder knyttet til avisproduksjon lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

4. er informasjon om avisleseres egenskaper og holdninger lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

5. er informasjon om annonsemarkedet lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

6. brukes systematisk innsamlet informasjon om annonsemarkedet for å møte eksisterende og potensielle annonsørers ønsker og behov?

   1   2   3   4   5   6   7

7. brukes systematisk innsamlet informasjon om lesernes demografiske egenskaper (f.eks. alder, inntekt, utdanning etc.) i kommunikasjon med eksisterende og potensielle annonsører?

   1   2   3   4   5   6   7

8. er informasjon om konkurrenter lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

9. er vitenskapelige og populærvitenskapelige tidsskrifter lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

10. er informasjon om underleverandører lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

11. brukes systematisk innsamlet informasjon om annonsemarkedet for å avdekke fremtidige trusler og muligheter?

   1   2   3   4   5   6   7

12. er generelle økonomi og ledelsestidsskrifter (som f.eks. Økonomisk Rapport, Kampanje, Kapital, Fortune, The Economist, Business Week etc.) lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

13. brukes systematisk innsamlet informasjon om egenskaper ved leserne så som holdninger og kjøpevaner i kommunikasjon med eksisterende og potensielle annonsører?

   1   2   3   4   5   6   7

14. er tidsskrifter, nyhetsskriv, forsknings- og utredningsrapporter fra konsulenter/konsulentbyråer, forsknings- og utrednings-institutter lett tilgjengelig for ledelsen i din bedrift?

   1   2   3   4   5   6   7

	I meget liten grad						I meget stor grad

I hvilken grad....

15. har de ansatte i ledelsen i din bedrift egen tilgang til Internett? 1 2 3 4 5 6 7

16. brukes systematisk innsamlet informasjon om utviklingen av mediemarkedet for å møte fremtidige trusler og muligheter? 1 2 3 4 5 6 7

17. brukes systematisk innsamlet informasjon om avisens annonsører til å utvikle planer for hvordan annonsemarkedet skal betjenes i fremtiden? 1 2 3 4 5 6 7

18. er tidsskrifter, nyhetsskriv, forsknings- og utredningsrapporter i regi av offentlige myndigheter lett tilgjengelig for ledelsen i din bedrift? 1 2 3 4 5 6 7

19. brukes systematisk innsamlet informasjon om avisens lesere til å utvikle scenarier og markedsplaner? 1 2 3 4 5 6 7

20. er bransjetidsskrifter og rapporter fra bransjeorganisasjoner (som f.eks. Dagspressen, Pressens Tidning, Dansk Presse etc.) lett tilgjengelig for ledelsen i din bedrift? 1 2 3 4 5 6 7

Denne delen inneholder 9 spørsmål som omhandler ulike sider ved hvordan "ledergrupper" behandler strategiske situasjoner. Med strategiske situasjoner menes begivenheter, hendelser, trender og fenomener som vil kunne ha betydning for bedriftens posisjon i markedet, bedriftens lønnsomhet, eller som kan være viktig i forhold til bedriftens mål og visjoner. Med ledergruppe menes de personer som rapporterer direkte til avisens redaktør eller disponent og som vanligvis er involvert i behandling av strategiske spørsmål.

Også nå benyttes det en skala som går fra 1 til 7, hvor 1 betyr i meget liten grad, og 7 betyr i meget stor grad. Les hvert spørsmål og sett en sirkel rundt ene tallet som best beskriver hvordan ledergruppen i din bedrift behandler strategiske situasjoner. Det er viktig at du besvarer alle spørsmålene.

	I meget liten grad						I meget stor grad

I hvilken grad....

1. er det vanlig at alle gruppemedlemmene deltar aktivt i strategisk planlegging og beslutningstaking?	1	2	3	4	5	6	7
2. hender det at man avviker fra fast opplagte prosedyrer og møteplaner når gruppen behandler strategiske spørsmål?	1	2	3	4	5	6	7
3. kan strategisk planlegging og beslutningstaking i gruppen karakteriseres som en reell gruppeaktivitet?	1	2	3	4	5	6	7
4. er det uformell kontakt mellom gruppemedlemmene utenfor møtesituasjoner?	1	2	3	4	5	6	7
5. kan strategisk planlegging og beslutningstaking i gruppen karakteriseres som regelbundet?	1	2	3	4	5	6	7
6. er det fri og åpen utveksling av idéer mellom gruppemedlemmene når strategiske spørsmål behandles?	1	2	3	4	5	6	7
7. er det karakteristisk for gruppen at gruppemedlemmene har mulighet til å påvirke hverandre gjensidig?	1	2	3	4	5	6	7
8. er det karakteristisk for gruppen at ett eller to gruppemedlemmer dominerer behandlingen av strategiske spørsmål?	1	2	3	4	5	6	7
9. følges ett bestemt sett av møteprosedyrer og regler når gruppen behandler strategiske spørsmål?	1	2	3	4	5	6	7

Dersom du ønsker å gi utfyllende opplysninger til noen av spørsmålene eller eventuelt har andre kommentarer til undersøkelsen, kan du bruke den ledige plassen under eller eget ark.

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Tusen takk for hjelpen. Vennligst returner skjemaet i den vedlagte frankerte svarkonvolutten.

Appendix B

Descriptive statistics and univariate differences for the subsamples

Correlation matrixes

Moderated regression analyses

Table 1: Descriptive statistics and univariate differences for the subsamples

	Mean		S.D.		Skewness		Kurtosis		Univariate
	Small	Large	Small	Large	Small	Large	Small	Large	diff [F(sig.)]
Effect valence									
Positive-gain	4.30	4.69	1.26	1.22	-.47	-.44	.28	.03	3.91*
Controllability	4.54	4.90	1.28	1.32	-.34	-.95	-.05	.76	3.08*
Extremity (opportunity)	2.87	3.48	1.29	1.40	.47	.14	-.46	-.72	8.55***
Negative-loss	4.29	4.24	1.28	1.20	-.47	-.43	-.11	.15	.05
Uncontrollability	3.81	3.73	1.10	1.25	-.51	.08	.28	-.24	.19
Extremity (threat)	2.85	3.30	1.26	1.42	.32	.03	-.42	-.92	4.40**
Issue sorting									
Operational importance (inversed)	.50	.51	.06	.09	-.47	.16	1.75	2.68	.75
Strategic importance (inversed)	.48	.47	.09	.10	-1.12	-.30	1.48	1.99	.40
Unfeasibility (inversed)	.39	.39	.10	.10	-.26	.08	-.67	-.75	.01
Causal understanding									
Free papers	1.86	1.95	.45	.44	-.25	-.24	-.81	-.68	1.68
Market, competition and attribution of success	2.13	2.28	.31	.33	-.21	-.28	.11	-.38	8.25***
Data search									
Core data (reflected and square root transf.)	1.55	1.50	.31	.25	.38	-.02	1.01	-.45	1.65
Additional data	4.69	4.63	1.16	1.21	-.47	-.34	.42	-.22	.11
New data	4.87	4.94	1.19	1.03	-.40	-.29	.67	-.15	.16
Organizational scanning									
Customer information acquisition frequency & use	-.46	.45	.93	.85	-.67	.07	-.19	-.37	41.32***
Information availability	4.58	4.82	1.07	.90	-.49	-.75	-.07	1.06	2.48
General information acquisition frequency	2.91	3.30	.79	.78	.48	.20	.60	-.22	9.57***
TMT information processing structure									
Participation	5.10	5.00	1.03	1.00	-.53	-.56	.18	.62	.42
Flexibility	4.13	4.21	1.39	1.35	.14	.03	-.60	-.62	.12
Cognitive style									
Exploration	2.80	3.06	.46	.55	.18	-.06	-.42	-.48	10.32***
Social complexity	3.39	3.29	.51	.43	-.06	-.20	.41	-.58	1.89
Differentiation	3.80	3.99	.47	.38	-.25	.05	.32	-.17	8.46***
Organizational size									
Circulation size small firms	43'		22'		.22		-.85		-
Circulation size large firms (inversed)		.05		.03		-.26		-.98	-

*: p<.10; **: p<.05;***: p<.01

Table 2: Bivariate correlations among dependent and independent variables

All firms (n = 162)	CIAF&U	IA	GIAF	PART	FLEX	EXPL	SC	DIFF	SIZE[a]
Positive-gain	.28**	.21**	.17*	.02	-.10	.06	.00	.19*	.27**
Controllability	.31**	.34**	.19*	.26**	-.04	.08	.12	.12	.30**
Extremity (opportunity)	.39**	.25**	.21**	.09	-.09	.13	-.03	.16*	.34**
Negative-loss	.21**	.15	.06	.14	-.14	.01	-.10	.05	.09
Uncontrollability	.00	-.13	-.08	.00	-.19*	.03	-.05	-.06	-.03
Extremity (threat)	.23**	.15	.02	.03	-.15	.04	-.16*	.05	.20*
Operational imp. (inv.)	.01	-.04	-.07	.04	.07	-.07	-.08	.11	.03
Strategic imp. (inv.)	-.12	-.17*	-.18*	.01	.05	-.20*	-.13	-.11	.03
Unfeasibility (inv.)	-.04	-.11	-.05	-.04	-.11	-.06	-.04	-.04	-.03
Causal understanding 1	.06	.07	.15	.10	-.07	-.05	.00	.22**	.06
Causal understanding 2	.22**	.14	.08	.09	.20*	.37**	-.04	.14	.27**
Core data (inv.)	-.19*	-.25**	-.03	-.19*	.10	.01	-.12	-.21**	-.10
Additional data	.14	.16*	.14	.06	-.17*	-.10	.07	.18*	-.03
New data	.16*	.18*	.13	.13	-.33**	-.07	.16*	.24**	.00

Small firms (n = 80)	CIAF&U	IA	GIAF	PART	FLEX	EXPL	SC	DIFF	SIZE
Positive-gain	.35**	.27*	.21	.04	-.05	.12	.07	.32**	.23*
Controllability	.28*	.34**	.20	.22*	.01	.09	.19	.13	.30**
Extremity (opportunity)	.34**	.20	.16	.03	-.10	.03	-.08	.20	.01
Negative-loss	.36**	.16	.11	.22	-.21	.11	.01	.05	.18
Uncontrollability	.25*	.02	.04	.13	-.23*	.07	.10	.03	.17
Extremity (threat)	.34**	.19	.06	.10	-.10	.08	-.11	-.05	-.01
Operational imp. (inv.)	-.10	-.02	-.08	.07	.03	.02	.06	.05	-.29*
Strategic imp. (inv.)	-.21	-.23*	-.10	.05	-.07	-.22	-.13	-.08	.04
Unfeasibility (inv.)	-.13	-.23*	-.02	-.04	-.13	-.04	-.08	-.08	-.21
Causal understanding 1	.11	.11	.08	.25*	-.15	-.02	.05	.21	.01
Causal understanding 2	-.03	.07	-.11	-.09	.21	.18	-.10	.07	.11
Core data (inv.)	-.11	-.20	.12	-.19	.11	.09	-.05	-.24*	-.02
Additional data	.18	.21	.09	.13	-.18	-.18	-.02	.11	-.08
New data	.25*	.25*	.08	.31**	-.41**	-.10	.15	.25*	-.03

Large firms (n = 82)	CIAF&U	IA	GIAF	PART	FLEX	EXPL	SC	DIFF	SIZE[b]
Positive-gain	.11	.11	.06	.02	-.16	-.06	-.06	-.06	-.18
Controllability	.27*	.33**	.12	.33**	-.11	.02	.09	.05	-.26*
Extremity (opportunity)	.33**	.27*	.16	.17	-.10	.11	.07	.01	-.37**
Negative-loss	.12	.15	.02	.05	-.07	-.08	-.24*	.05	-.12
Uncontrollability	-.20	-.27*	-.18	-.12	-.16	.02	-.21	-.15	.06
Extremity (threat)	.02	.08	-.08	-.02	-.21	-.06	-.17	.07	-.18
Operational imp. (inv.)	.03	-.08	-.11	.02	.11	-.16	-.18	.13	-.01
Strategic imp. (inv.)	-.02	-.09	-.23*	-.04	.16	-.17	-.14	-.12	-.16
Unfeasibility (inv.)	.04	.02	-.08	-.04	-.09	-.09	.01	.00	-.08
Causal understanding 1	-.10	-.01	.19	-.04	.01	-.12	-.03	.21	.12
Causal understanding 2	.29**	.18	.15	.28*	.19	.45**	.07	.12	-.25*
Core data (inv.)	-.24*	-.29**	-.17	-.21	.10	-.04	-.27*	-.13	-.06
Additional data	.15	.12	.21	.00	-.17	-.03	.18	.29**	.02
New data	.06	.08	.18	-.06	-.25*	-.05	.19	.22*	.21

*: p<.05; **: p<.01 (2-tailed)
[a]Logarithmic transformation
[b]Inversed

Correlations among variables, all firms (n = 162)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1. Positive-gain	-																						
2. Controllability	.52	-																					
3. Extremity (opportunity)	.62	.38	-																				
4. Negative-loss	.32	.28	.24	-																			
5. Uncontrollability	.11	-.09	.10	.51	-																		
6. Extremity (threat)	.22	.18	.45	.51	.34	-																	
7. Operational imp. (inv.)	.05	.06	-.08	.06	-.17	-.02	-																
8. Strategic imp. (inv.)	-.07	-.14	-.14	-.02	-.12	-.07	.53	-															
9. Unfeasibility (inv.)	.01	-.11	-.03	-.03	.01	.05	.19	.26	-														
10. Core data (inv.)	-.05	-.08	-.11	-.09	-.07	-.14	.03	.12	-.04	-													
11. Additional data	-.01	-.03	.13	.04	.04	.21	-.04	-.05	.00	-.50	-												
12. New data	.17	.00	.17	.19	.15	.28	-.08	-.11	.06	-.51	.55	-											
13. Causal understanding 1	.26	.08	.18	.09	.02	.16	.11	.01	.10	-.03	-.05	.13	-										
14. Causal understanding 2	.01	.13	.09	.09	-.07	-.05	-.08	-.12	-.19	.08	-.13	-.18	-.08	-									
15. Customer IAF&U	.28	.31	.39	.21	.00	.23	.01	-.12	-.04	-.19	.14	.16	.06	.22	-								
16. Information availability	.21	.34	.25	.15	-.13	.15	-.04	-.17	-.11	-.25	.16	.18	.07	.14	.57	-							
17. General IAF	.17	.19	.21	.06	-.08	.02	-.08	-.18	-.05	-.03	.14	.13	.15	.08	.65	.44	-						
18. Participation	.02	.26	.09	.14	.00	.03	.04	.01	-.05	-.19	.06	.13	.10	.09	.32	.38	.18	-					
19. Flexibility	-.10	-.04	-.09	-.14	-.19	-.15	.07	.05	-.11	.10	-.17	-.33	-.07	.20	-.13	-.14	-.16	-.13	-				
20. Exploration	.06	.08	.13	.01	.03	.04	-.07	-.20	-.06	.00	-.10	-.07	-.05	.37	.24	.02	.19	.01	.27	-			
21. Social complexity	.00	.12	-.03	-.10	-.05	-.16	-.08	-.13	-.04	-.12	.07	.16	.00	-.04	-.04	.12	.15	.17	-.11	.06	-		
22. Differentiation	.19	.12	.16	.05	-.06	.04	.11	-.11	-.04	-.21	.18	.24	.22	.14	.17	.25	.17	.08	-.09	.17	.22	-	
23. Circulation size (log)	.27	.30	.34	.09	-.03	.20	.03	.03	-.03	-.10	-.03	.00	.06	.27	.54	.20	.28	.07	-.05	.22	-.07	.18	-

.xx Correlation is significant at .01 level (2-tailed)

.xx Correlation is significant at .05 level (2-tailed)

Correlations among variables, small firms (n = 80)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1. Positive-gain	-																						
2. Controllability	.54	-																					
3. Extremity (opportunity)	.60	.28	-																				
4. Negative-loss	.31	.27	.28	-																			
5. Uncontrollability	.26	.07	.38	.70	-																		
6. Extremity (threat)	.16	.08	.55	.55	.56	-																	
7. Operational imp. (inv.)	-.05	-.19	-.22	-.14	-.26	-.17	-																
8. Strategic imp. (inv.)	-.13	-.28	-.11	-.14	-.15	-.04	.39	-															
9. Unfeasibility (inv.)	.11	-.30	.17	-.06	-.09	.11	.12	.27	-														
10. Core data (inv.)	-.10	-.08	-.12	-.15	-.14	-.24	-.04	.07	.03	-													
11. Additional data	-.08	-.10	.15	.02	.10	.28	-.11	-.04	-.06	-.57	-												
12. New data	.13	.10	.22	.24	.26	.33	-.13	-.10	.09	-.60	.63	-											
13. Causal understanding 1	.35	.11	.20	.10	.00	.01	.14	.10	.13	-.09	-.02	.14	-										
14. Causal understanding 2	.00	.10	-.04	.14	.06	-.11	-.08	-.16	-.18	.00	-.11	-.13	-.05	-									
15. Customer IAF&U	.35	.28	.34	.36	.25	.34	-.10	-.21	-.13	-.11	.18	.25	.11	-.03	-								
16. Information availability	.27	.34	.20	.16	.02	.19	-.02	-.23	-.23	-.20	.21	.25	.11	.07	.57	-							
17. General IAF	.21	.20	.16	.11	.04	.06	-.08	-.10	-.02	.12	.09	.08	.08	-.11	.63	.47	-						
18. Participation	.04	.22	.03	.22	.13	.10	.07	.05	-.04	-.19	.13	.31	.25	-.09	.41	.41	.24	-					
19. Flexibility	-.05	.01	-.10	-.21	-.23	-.10	.03	-.07	-.13	.11	-.18	-.41	-.15	.21	-.29	-.29	-.30	-.35	-				
20. Exploration	.12	.09	.03	.11	.07	.08	.02	-.22	-.04	.09	-.18	-.10	-.02	.18	-.06	-.14	.07	-.18	.34	-			
21. Social complexity	.07	.19	-.08	.01	.10	-.11	.06	.13	-.08	-.05	-.02	.15	.05	-.10	-.11	.09	.07	.11	-.06	.04	-		
22. Differentiation	.32	.13	.20	.05	.03	-.05	.05	-.08	-.08	-.24	.11	.25	.21	.07	.00	.30	.09	.07	-.17	.13	.34	-	
23. Circulation size	.23	.30	.01	.18	.17	-.01	-.29	-.21	-.21	-.02	-.08	-.03	.01	.11	.27	.06	.19	.25	-.18	-.07	-.02	.01	-

.xx Correlation is significant at .01 level (2-tailed)

.xx Correlation is significant at .05 level (2-tailed)

Correlations among variables, large firms (n = 82)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1. Positive-gain	-																						
2. Controllability	.48	-																					
3. Extremity (opportunity)	.61	.43	-																				
4. Negative-loss	.35	.29	.23	-																			
5. Uncontrollability	-.02	-.22	-.09	.35	-																		
6. Extremity (threat)	.23	.23	.34	.49	.19	-																	
7. Operational imp. (inv.)	.11	.22	-.02	.20	-.11	.05	-																
8. Strategic imp. (inv.)	.00	.00	-.14	.09	-.10	-.09	.64	-															
9. Unfeasibility (inv.)	-.09	.06	-.21	.01	-.05	-.01	.24	.26	-														
10. Core data (inv.)	.04	-.04	-.05	-.02	-.02	-.01	.11	.17	-.12	-													
11. Additional data	.06	.04	.13	.05	-.01	.15	.01	-.07	.05	-.44	-												
12. New data	.21	-.11	.12	.13	.05	-.22	-.05	-.12	.01	-.39	.46	-											
13. Causal understanding 1	.15	.01	.13	.08	.05	.26	.09	-.08	.06	.07	-.08	.11	-										
14. Causal understanding 2	-.05	.11	.12	.05	-.15	-.08	-.11	-.07	-.21	.22	-.15	-.26	-.16	-									
15. Customer IAF&U	.11	.27	.33	.12	-.20	.02	.03	-.02	.04	-.24	.15	.06	-.10	.29	-								
16. Information availability	.11	.33	.27	.15	-.27	.08	-.08	-.09	.02	-.29	.12	.08	-.01	.18	.59	-							
17. General IAF	.06	.12	.16	.02	-.18	-.08	-.11	-.23	-.08	-.17	.21	.18	.19	.15	.63	.38	-						
18. Participation	.02	.33	.17	.05	-.12	-.02	.02	-.04	-.04	-.21	.00	-.06	-.04	.28	.35	.37	.15	-					
19. Flexibility	-.16	-.11	-.10	-.07	-.16	-.21	.11	.16	-.09	.10	-.17	-.25	.01	.18	.00	.04	-.03	.10	-				
20. Exploration	-.06	.02	.11	-.08	.02	-.06	-.16	-.17	-.04	-.03	-.03	-.05	-.03	.45	.34	.12	.21	.19	.21	-			
21. Social complexity	-.06	.09	.07	-.24	-.21	-.17	-.18	-.14	.01	-.27	.18	.19	-.03	.07	.16	.20	.31	.25	-.17	.13	-		
22. Differentiation	-.06	.05	.01	.05	-.15	.07	.13	-.12	.00	-.13	.29	.22	.21	.12	.18	.12	.16	.13	.01	.10	.13	-	
23. Circulation size (inv.)	-.18	-.26	-.37	-.12	.06	-.18	-.01	-.16	-.08	-.06	.02	.21	.12	-.25	-.33	-.20	-.08	-.19	.10	-.12	-.01	.03	-

xx Correlation is significant at .01 level (2-tailed)

.xx Correlation is significant at .05 level (2-tailed)

Moderated regression analysis - Exploration as independent variable

Table 3: All independent variables regressed onto effect valence variables, moderated by contextual variables

Dependent variable: Positive-gain	Small firms					Large firms				
	R²	F	ΔF	Exploration	Interaction	R²	F	ΔF	Exploration	Interaction
Original model	.276	2.84***		.08		.086	.75		-.06	
+ Expl.* C IAF&U	.283	2.61**	.68	.08	-.10	.087	.67	.03	-.07	.02
+ Expl.* IA	.307	2.92***	2.93*	.06	-.21*	.096	.74	.73	-.06	.10
+ Expl.* G IAF	.280	2.57**	.38	.06	-.07	.087	.67	.08	-.06	-.04
+ Expl.* Part.	.291	2.71***	1.41	.08	-.14	.092	.71	.47	-.09	-.08
+ Expl.* Flex.	.277	2.53**	.08	.08	-.04	.218	1.95*	11.77***	-.01	-.40***
+ Expl.* Size	.284	2.62**	.72	.10	.11	.086	.66	.01	-.06	-.01

Dependent variable: Controllability	R²	F	ΔF	Exploration	Interaction	R²	F	ΔF	Exploration	Interaction
Original model	.264	2.67**		.10		.212	2.13**		-.06	
+ Expl.* C IAF&U	.271	2.45**	.61	.15	.09	.213	1.89*	.02	-.07	.02
+ Expl.* IA	.275	2.50**	1.01	.09	-.12	.217	1.94*	.45	-.06	-.08
+ Expl.* G IAF	.268	2.42**	.37	.13	.07	.214	1.91*	.16	-.06	-.05
+ Expl.* Part.	.266	2.40**	.21	.10	-.05	.230	2.10**	1.65	-.11	-.14
+ Expl.* Flex.	.268	2.42**	.35	.12	.07	.221	1.99**	.81	-.05	-.11
+ Expl.* Size	.273	2.48**	.80	.12	.11	.213	1.89*	.05	-.07	.03

Dependent variable: Opportunity-extr.	R²	F	ΔF	Exploration	Interaction	R²	F	ΔF	Exploration	Interaction
Original model	.215	2.04**		.01		.215	2.16**		.02	
+ Expl.* C IAF&U	.231	1.98**	1.38	.07	.14	.236	2.16**	1.86	.06	-.15
+ Expl.* IA	.223	1.89*	.64	.02	.10	.223	2.01**	.68	.02	-.09
+ Expl.* G IAF	.248	2.18**	2.87*	.07	.20*	.254	2.38**	3.61*	.01	-.21*
+ Expl.* Part.	.235	2.03**	1.70	.00	-.16	.250	2.33**	3.20*	-.04	-.20*
+ Expl.* Flex.	.230	1.97*	1.26	-.02	-.15	.243	2.25**	2.59†	.05	-.19†
+ Expl.* Size	.215	1.81*	.02	.00	-.02	.245	2.27**	2.73†	-.04	.20†

Dependent variable: Negative-loss	R²	F	ΔF	Exploration	Interaction	R²	F	ΔF	Exploration	Interaction
Original model	.273	2.79***		.27**		.134	1.22		-.07	
+ Expl.* C IAF&U	.273	2.48**	.02	.26*	-.02	.135	1.10	.08	-.06	-.03
+ Expl.* IA	.304	2.88***	2.91*	.24**	-.21*	.135	1.10	.01	-.07	-.01
+ Expl.* G IAF	.279	2.55**	.55	.24*	-.08	.135	1.10	.07	-.07	-.03
+ Expl.* Part.	.296	2.77***	2.16†	.27**	-.17†	.159	1.33	2.06	-.12	-.17
+ Expl.* Flex.	.273	2.48**	.00	.27**	.00	.246	2.28**	10.35***	-.02	-.37***
+ Expl.* Size	.273	2.48**	.00	.27**	.01	.154	1.27	1.60	-.12	.16

Dependent variable: Uncontrollability	R²	F	ΔF	Exploration	Interaction	R²	F	ΔF	Exploration	Interaction
Original model	.227	2.19**		.21*		.163	1.54		.15	
+ Expl.* C IAF&U	.233	2.00**	.50	.16	-.09	.163	1.37	.01	.16	-.01
+ Expl.* IA	.231	1.99**	.37	.20†	-.08	.172	1.45	.73	.16	.10
+ Expl.* G IAF	.229	1.96*	.13	.19†	-.04	.180	1.53†	1.41	.15	-.14
+ Expl.* Part.	.229	1.96*	.15	.20†	-.05	.164	1.38	.10	.16	.04
+ Expl.* Flex.	.249	2.18**	1.90	.18	-.18	.168	1.42	.44	.14	.08
+ Expl.* Size	.246	2.15**	1.65	.18†	-.16	.186	1.60*	1.97	.10	.17

Dependent variable: Threat-extr.	R²	F	ΔF	Exploration	Interaction	R²	F	ΔF	Exploration	Interaction
Original model	.229	2.22**		.21*		.143	1.32		.01	
+ Expl.* C IAF&U	.232	2.00**	.24	.23*	.06	.167	1.40	1.98	.05	-.16
+ Expl.* IA	.235	2.03**	.50	.22*	.09	.181	1.55†	3.27*	.00	-.21*
+ Expl.* G IAF	.242	2.10**	1.08	.24*	.12	.166	1.39	1.89	.01	-.16
+ Expl.* Part.	.243	2.12**	1.17	.20†	-.13	.215	1.92*	6.39**	-.08	-.29**
+ Expl.* Flex.	.254	2.25**	2.19†	.17	-.19†	.172	1.45	2.40†	.04	-.19†
+ Expl.* Size	.237	2.05**	.66	.19†	-.10	.155	1.29	.99	-.03	.13

Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Table 6: All independent variables regressed onto data search variables, moderated by contextual variables

Dependent variable: Core data[a]	Small firms					Large firms				
	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration	Interaction
Original model	.163	1.45		.02		.170	1.59†		.03	
+ Expl.* C IAF&U	.172	1.37	.77	-.04	-.11	.181	1.52	.93	.06	-.11
+ Expl.* IA	.201	1.66†	3.19*	.05	.23*	.172	1.43	.20	.03	-.05
+ Expl.* G IAF	.167	1.32	.34	.04	.07	.170	1.41	.00	.03	-.01
+ Expl.* Part.	.179	1.44	1.36	.02	.14	.171	1.42	.10	.02	-.04
+ Expl.* Flex.	.184	1.49	1.77	-.01	-.18	.170	1.41	.00	.03	-.01
+ Expl.* Size	.163	1.29	.06	.01	-.03	.170	1.41	.01	.03	.02
Dependent variable: Additional data	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration	Interaction
Original model	.098	.81		-.16		.162	1.51		-.06	
+ Expl.* C IAF&U	.108	.80	.71	-.22†	-.11	.163	1.34	.04	-.05	-.02
+ Expl.* IA	.127	.96	2.15†	-.19	-.20†	.163	1.34	.05	-.06	.03
+ Expl.* G IAF	.099	.73	.07	-.17	-.03	.178	1.50	1.33	-.07	-.14
+ Expl.* Part.	.099	.73	.07	-.16	-.03	.169	1.41	.57	-.09	-.09
+ Expl.* Flex.	.116	.87	1.35	-.14	.16	.166	1.38	.31	-.07	.07
+ Expl.* Size	.099	.73	.08	-.17	-.04	.193	1.65†	2.64†	-.11	.20†
Dependent variable: New data	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration	Interaction
Original model	.300	3.19***		.04		.213	2.10**		-.01	
+ Expl.* C IAF&U	.305	2.89***	.43	.08	.08	.216	1.90*	.27	.00	-.06
+ Expl.* IA	.312	2.99***	1.11	.03	-.13	.223	1.98**	.90	-.02	-.11
+ Expl.* G IAF	.306	2.92***	.60	.07	.09	.215	1.87*	.08	-.02	-.03
+ Expl.* Part.	.306	2.91***	.58	.05	.09	.238	2.15**	2.26†	-.07	-.17†
+ Expl.* Flex.	.301	2.84***	.05	.05	.03	.219	1.93*	.54	.00	-.09
+ Expl.* Size	.314	3.02***	1.35	.06	.14	.231	2.07**	1.61	-.06	.15

[a]Reversed

Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Table 4: All independent variables regressed onto issue sorting variables, moderated by contextual variables

Dependent variable: Operational imp.[a]	Small firms					Large firms				
	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration	Interaction
Original model	.113	.93		.02		.134	1.21		-.23*	
+ Expl.* C IAF&U	.122	.90	.67	-.03	-.11	.145	1.17	.91	-.26**	.11
+ Expl.* IA	.123	.91	.79	.01	-.12	.146	1.18	.92	-.23*	.11
+ Expl.* G IAF	.158	1.22	3.48*	-.04	-.23*	.183	1.54†	4.08**	-.22*	.24**
+ Expl.* Part.	.124	.92	.85	.02	-.12	.137	1.09	.21	-.25*	-.06
+ Expl.* Flex.	.129	.96	1.23	.05	-.15	.145	1.17	.84	-.22*	-.11
+ Expl.* Size	.119	.93	.44	.04	.09	.134	1.07	.01	-.23*	-.01

Dependent variable: Strategic imp.[a]	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration	Interaction
Original model	.187	1.69†		-.23*		.201	1.96*		-.25**	
+ Expl.* C IAF&U	.252	2.19**	5.62**	-.36***	-.29**	.205	1.78*	.33	-.27**	.07
+ Expl.* IA	.211	1.74*	1.93	-.25*	-.18	.203	1.76*	.13	-.25**	.04
+ Expl.* G IAF	.212	1.75*	2.06	-.28**	-.17	.258	2.40**	5.29**	-.24**	.26**
+ Expl.* Part.	.197	1.59†	.74	-.23*	-.11	.202	1.74*	.04	-.24*	.02
+ Expl.* Flex.	.191	1.53†	.27	-.22*	.07	.204	1.77*	.21	-.26**	.06
+ Expl.* Size	.189	1.51	.12	-.22	.05	.220	1.94*	1.61	-.21*	-.16

Dependent variable: Unfeasibility[a]	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration	Interaction
Original model	.211	1.96*		.00		.043	.35		-.11	
+ Expl.* C IAF&U	.219	1.83*	.67	-.05	-.10	.052	.38	.66	-.13	.10
+ Expl.* IA	.212	1.74*	.03	-.01	-.02	.044	.32	.10	-.11	.04
+ Expl.* G IAF	.211	1.74*	.01	-.01	-.01	.045	.33	.14	-.11	.05
+ Expl.* Part.	.211	1.74*	.00	.00	-.01	.050	.36	.47	-.08	.08
+ Expl.* Flex.	.229	1.93*	1.50	-.03	-.16	.062	.45	1.36	-.13	.15
+ Expl.* Size	.212	1.75	.10	-.01	-.04	.044	.31	.03	-.11	.02

[a]Reversed
Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Table 5: All independent variables regressed onto causal understanding variables, moderated by contextual variables

Dependent variable: Causal und. I	Small firms					Large firms				
	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration[a]	Interaction
Original model	.125	1.07		.01		.182	1.76*		-.09	
+ Expl.* C IAF&U	.132	1.00	.50	-.03	-.09	.182	1.56†	.00	-.10	.00
+ Expl.* IA	.213	1.79*	7.36***	-.03	-.35***	.195	1.70*	1.14	-.10	-.12
+ Expl.* G IAF	.132	1.01	.54	-.02	-.09	.182	1.56†	.03	-.09	.02
+ Expl.* Part.	.127	.96	.10	.01	-.04	.196	1.71*	1.21	-.13	-.13
+ Expl.* Flex.	.126	.95	.02	.01	.02	.185	1.59†	.23	-.09	-.06
+ Expl.* Size	.156	1.22	2.42†	.04	.21†	.194	1.68†	1.02	-.06	-.13

Dependent variable: Causal und. II	R^2	F	ΔF	Exploration	Interaction	R^2	F	ΔF	Exploration[a]	Interaction
Original model	.148	1.29		.18		.283	3.12***		.35***	
+ Expl.* C IAF&U	.149	1.16	.13	.20	.05	.283	2.77***	.01	.35***	-.01
+ Expl.* IA	.154	1.21	.53	.16	-.10	.284	2.77***	.05	.35***	-.03
+ Expl.* G IAF	.155	1.21	.57	.15	-.09	.284	2.78***	.07	.35***	.03
+ Expl.* Part.	.172	1.37	1.91	.18	.17	.284	2.78***	.07	.34***	-.03
+ Expl.* Flex.	.151	1.17	.26	.19	.07	.285	2.79***	.20	.36***	-.05
+ Expl.* Size	.152	1.18	.33	.17	-.08	.290	2.86***	.64	.38***	-.09

Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Moderated regression analysis - Differentiation as independent variable

Table 7: All independent variables regressed onto effect valence variables, moderated by contextual variables

Dependent variable:		Small firms					Large firms			
Positive-gain	R^2	F	ΔF	Differentiation	Interaction	R^2	F	ΔF	Differentiation	Interaction
Original model	.276	2.84***		.30**		.086	.75		-.06	
+ Diff.* C IAF&U	.276	2.52**	.00	.30**	.00	.104	.81	1.35	-.16	.18
+ Diff.* IA	.280	2.57**	.37	.31**	.07	.097	.75	.79	-.09	.11
+ Diff.* G IAF	.276	2.52**	.00	.30**	-.01	.086	.66	.00	-.06	.01
+ Diff.* Part.	.287	2.65***	1.00	.29**	-.11	.110	.86	1.85	-.08	.17
+ Diff.* Flex.	.276	2.52**	.00	.30**	.00	.087	.67	.07	-.05	.03
+ Diff.* Size	.287	2.66***	1.04	.33**	.14	.117	.93	2.42†	-.14	.21†
Controllability	R^2	F	ΔF	Differentiation	Interaction	R^2	F	ΔF	Differentiation	Interaction
Original model	.264	2.67**		.02		.212	2.13**		.00	
+ Diff.* C IAF&U	.269	2.43**	.48	.06	.10	.214	1.91*	.15	-.03	.06
+ Diff.* IA	.272	2.46**	.68	.03	.10	.214	1.90*	.11	-.01	.04
+ Diff.* G IAF	.265	2.38**	.06	.03	.03	.213	1.89*	.04	.01	-.03
+ Diff.* Part.	.276	2.51**	1.05	.01	-.12	.227	2.05**	1.30	-.02	.13
+ Diff.* Flex.	.264	2.37**	.00	.02	-.01	.223	2.01**	.95	-.01	-.11
+ Diff.* Size	.267	2.40**	.27	.00	-.01	.215	1.92*	.24	-.02	.06
Opportunity-extr.	R^2	F	ΔF	Differentiation	Interaction	R^2	F	ΔF	Differentiation	Interaction
Original model	.215	2.04**		.30**		.215	2.16**		-.03	
+ Diff.* C IAF&U	.245	2.14**	2.57†	.40***	.23†	.218	1.96*	.29	-.07	.08
+ Diff.* IA	.226	1.92*	.89	.32**	.12	.216	1.93*	.11	-.02	-.04
+ Diff.* G IAF	.231	1.99**	1.40	.37**	.16	.226	2.04**	.98	.03	-.14
+ Diff.* Part.	.225	1.92*	.89	.30**	-.11	.220	1.98**	.45	-.04	.08
+ Diff.* Flex.	.215	1.81*	.02	.30**	.02	.228	2.07**	1.20	-.02	.13
+ Diff.* Size	.236	2.04**	1.80	.34**	.19	.272	2.61***	5.45**	-.14	.29**
Negative-loss	R^2	F	ΔF	Differentiation	Interaction	R^2	F	ΔF	Differentiation	Interaction
Original model	.273	2.79***		-.03		.134	1.22		.07	
+ Diff.* C IAF&U	.275	2.51**	.21	-.01	.06	.147	1.21	1.03	-.02	.15
+ Diff.* IA	.285	2.63***	1.12	-.02	.13	.138	1.12	.26	.05	.06
+ Diff.* G IAF	.276	2.52**	.33	-.07	-.08	.137	1.11	.23	.10	-.07
+ Diff.* Part.	.281	2.58**	.76	-.04	-.10	.134	1.09	.00	.07	.00
+ Diff.* Flex.	.297	2.78***	2.22†	-.04	-.17†	.140	1.14	.47	.06	-.08
+ Diff.* Size	.293	2.73***	1.86	-.08	-.18	.145	1.19	.87	.02	.12
Uncontrollability	R^2	F	ΔF	Differentiation	Interaction	R^2	F	ΔF	Differentiation	Interaction
Original model	.227	2.19**		-.02		.163	1.54		-.11	
+ Diff.* C IAF&U	.229	1.96*	.17	.01	.06	.176	1.50	1.13	-.02	-.16
+ Diff.* IA	.245	2.14**	1.56	.00	.15	.168	1.42	.43	-.09	-.08
+ Diff.* G IAF	.227	1.94*	.04	.00	.03	.169	1.43	.53	-.06	-.11
+ Diff.* Part.	.227	1.94*	.01	-.01	.01	.205	1.81*	3.72*	-.08	-.23*
+ Diff.* Flex.	.236	2.03**	.74	-.02	-.10	.172	1.45	.71	-.12	-.10
+ Diff.* Size	.240	2.09**	1.14	-.05	-.15	.177	1.50	1.17	-.16	.14
Threat-extr.	R^2	F	ΔF	Differentiation	Interaction	R^2	F	ΔF	Differentiation	Interaction
Original model	.229	2.22**		-.09		.143	1.32		.11	
+ Diff.* C IAF&U	.243	2.12**	1.23	-.02	.16	.161	1.34	1.47	.01	.18
+ Diff.* IA	.244	2.13**	1.29	-.07	.14	.158	1.32	1.25	.07	.14
+ Diff.* G IAF	.229	1.97*	.01	-.08	.01	.148	1.21	.37	.07	.09
+ Diff.* Part.	.230	1.97*	.02	-.09	-.02	.145	1.19	.17	.12	-.05
+ Diff.* Flex.	.234	2.02**	.41	-.09	-.08	.149	1.22	.46	.12	.08
+ Diff.* Size	.230	1.97*	.07	-.08	.04	.184	1.58†	3.52*	.01	.24*

Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Table 8: All independent variables regressed onto issue sorting variables, moderated by contextual variables

Dependent variable: Operational imp.[a]	Small firms					Large firms				
	R²	F	ΔF	Differen-tiation	Inter-action	R²	F	ΔF	Differen-tiation	Inter-action
Original model	.113	.93		.03		.134	1.21		.16	
+ Diff.* C IAF&U	.117	.87	.36	.07	.09	.134	1.07	.00	.16	-.01
+ Diff.* IA	.114	.84	.10	.04	.04	.145	1.17	.88	.13	.12
+ Diff.* G IAF	.114	.84	.13	.01	-.05	.140	1.12	.44	.20†	-.10
+ Diff.* Part.	.127	.94	1.05	.04	.13	.139	1.11	.36	.15	.07
+ Diff.* Flex.	.124	.92	.84	.03	-.12	.136	1.09	.17	.16	-.05
+ Diff.* Size	.158	1.22	3.50*	.09	.28*	.134	1.07	.01	.16	.01
Dependent variable: Strategic imp.[a]	R²	F	ΔF	Differen-tiation	Inter-action	R²	F	ΔF	Differen-tiation	Inter-action
Original model	.187	1.69†		.05		.201	1.96*		-.08	
+ Diff.* C IAF&U	.189	1.52	.15	.03	-.06	.202	1.74*	.02	-.09	.02
+ Diff.* IA	.196	1.59†	.73	.04	-.11	.206	1.79*	.41	-.10	.08
+ Diff.* G IAF	.191	1.53†	.28	.02	-.07	.219	1.94*	1.58	.00	-.18
+ Diff.* Part.	.189	1.51	.12	.05	.04	.209	1.82*	.64	-.09	.09
+ Diff.* Flex.	.188	1.50	.03	.05	.02	.224	1.99**	2.03	-.06	.17
+ Diff.* Size	.192	1.54†	.33	.07	.08	.230	2.06**	2.54†	.00	-.20†
Dependent variable: Unfeasibility[a]	R²	F	ΔF	Differen-tiation	Inter-action	R²	F	ΔF	Differen-tiation	Inter-action
Original model	.211	1.96*		-.06		.043	.35		.01	
+ Diff.* C IAF&U	.212	1.75*	.05	-.07	-.03	.044	.32	.06	.03	-.04
+ Diff.* IA	.212	1.75*	.05	-.06	.03	.043	.31	.01	.02	-.01
+ Diff.* G IAF	.222	1.85*	.87	.00	.13	.046	.34	.22	-.02	.07
+ Diff.* Part.	.228	1.92*	1.42	-.05	.14	.043	.31	.01	.01	-.01
+ Diff.* Flex.	.225	1.88*	1.12	-.05	.13	.054	.40	.81	.00	-.12
+ Diff.* Size	.329	3.18***	11.39***	.04	.44***	.061	.45	1.30	.08	-.16

[a]Reversed
Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Table 9: All independent variables regressed onto causal understanding variables, moderated by contextual variables

Dependent variable: Causal und. I	Small firms					Large firms				
	R²	F	ΔF	Differen-tiation	Inter-action	R²	F	ΔF	Differen-tiation	Inter-action
Original model	.125	1.07		.17		.182	1.76*		.22**	
+ Diff.* C IAF&U	.201	1.66†	6.28**	.02	-.37**	.204	1.79*	1.91	.11	.20
+ Diff.* IA	.141	1.09	1.24	.15	-.15	.204	1.79*	1.90	.18†	.16
+ Diff.* G IAF	.191	1.56†	5.38**	.03	-.21**	.185	1.59†	.26	.19†	.07
+ Diff.* Part.	.162	1.27	2.86*	.15	-.21*	.185	1.59†	.28	.21*	.06
+ Diff.* Flex.	.161	1.27	2.81*	.18	.21*	.184	1.58†	.21	.23**	.05
+ Diff.* Size	.127	.96	.14	.18	.06	.209	1.85*	2.38†	.30**	-.20†
Dependent variable: Causal und. II	R²	F	ΔF	Differen-tiation	Inter-action	R²	F	ΔF	Differen-tiation	Inter-action
Original model	.148	1.29		.07		.283	3.12***		.06	
+ Diff.* C IAF&U	.222	1.89*	6.35**	.23†	.36**	.283	2.77***	.00	.06	-.01
+ Diff.* IA	.187	1.52	3.23*	.10	.23*	.284	2.77***	.04	.07	-.02
+ Diff.* G IAF	.203	1.68†	4.57**	.20	.29**	.297	2.96***	1.36	.13	-.16
+ Diff.* Part.	.207	1.73*	4.97**	.10	.26**	.283	2.77***	.00	.06	.00
+ Diff.* Flex.	.206	1.71*	4.87**	.06	-.26**	.284	2.78***	.09	.06	-.03
+ Diff.* Size	.206	1.72*	4.88**	.00	-.31**	.284	2.77***	.04	.05	.03

Significance levels: †<.15; *p<.10; **p<.05; ***p<.01

Table 10: All independent variables regressed onto data search variables, moderated by contextual variables

Dependent variable: Core data[a]	Small firms					Large firms				
	R^2	F	ΔF	Differen-tiation	Inter-action	R^2	F	ΔF	Differen-tiation	Inter-action
Original model	.163	1.45		-.22*		.170	1.59†		-.05	
+ Diff.* C IAF&U	.167	1.32	.31	-.19	.08	.170	1.42	.07	-.08	.04
+ Diff.* IA	.163	1.29	.04	-.22†	.03	.170	1.41	.01	-.06	.01
+ Diff.* G IAF	.174	1.39	.91	-.16	.13	.171	1.42	.12	-.03	-.05
+ Diff.* Part.	.178	1.43	1.20	-.21†	.13	.223	1.98**	4.73**	-.09	.25**
+ Diff.* Flex.	.164	1.29	.10	-.22†	.04	.170	1.41	.00	-.06	.00
+ Diff.* Size	.165	1.30	.16	-.23*	-.06	.197	1.69†	2.33†	.02	-.20†

Dependent variable: Additional data				Differen-tiation	Inter-action				Differen-tiation	Inter-action
	R^2	F	ΔF	tiation	action	R^2	F	ΔF	tiation	action
Original model	.098	.81		.17		.162	1.51		.26**	
+ Diff.* C IAF&U	.101	.74	.21	.14	-.07	.171	1.43	.73	.19	.13
+ Diff.* IA	.098	.72	.00	.17	-.01	.163	1.34	.01	.26**	-.01
+ Diff.* G IAF	.104	.76	.40	.13	-.09	.163	1.34	.04	.24*	.03
+ Diff.* Part.	.110	.81	.84	.16	-.12	.163	1.34	.04	.26**	-.02
+ Diff.* Flex.	.101	.75	.24	.17	-.06	.268	2.52**	9.91***	.30***	.36***
+ Diff.* Size	.099	.72	.04	.17	-.03	.174	1.46	.99	.21†	.13

Dependent variable: New data				Differen-tiation	Inter-action				Differen-tiation	Inter-action
	R^2	F	ΔF	tiation	action	R^2	F	ΔF	tiation	action
Original model	.300	3.19***		.18†		.213	2.10**		.19*	
+ Diff.* C IAF&U	.302	2.86***	.18	.16	-.06	.219	1.94*	.57	.13	.11
+ Diff.* IA	.312	3.00***	1.19	.20†	.13	.214	1.88*	.13	.18†	.04
+ Diff.* G IAF	.302	2.86***	.20	.21†	.06	.213	1.86*	.00	.19†	.00
+ Diff.* Part.	.327	3.21***	2.65†	.17	-.18†	.224	1.99**	1.01	.21*	-.12
+ Diff.* Flex.	.300	2.83***	.03	.18†	-.02	.237	2.15**	2.23†	.21*	.17†
+ Diff.* Size	.303	2.87***	.30	.17	-.07	.217	1.91*	.40	.16	.08

[a]Reversed

Significance levels: †<.15; *p<.10; **p<.05; ***p<.01