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Perception of competition

A measurement of competition from the perspective of the firm

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Summary

In this report, we integrate a cognitive notion of competition in the traditional literature on competition, i.e. industrial organisation and game theory. In industrial organisation literature and game theory, an impressive number of models have been developed using different assumptions of context variables such as the number of firms, the shape of the demand curve, decision-making order and cost (a)symmetries. The models have resulted in valuable insights as to the possible outcomes of the competition process. However, most models are based on rational, profit-maximizing firms thereby disregarding the psychological processes that lie behind competitive decisions. For instance, decision-makers are not fully informed and they use simplifying routines to process (parts of) all available information. By focussing on more behavioural aspects of decision-making and in particular on cognitive psychology insights, the notion of competition can be expanded. Besides cognitive psychology, strategic management and marketing literature can also contribute to a more 'humanised' understanding of competitive processes. In this report, we study competition from a cognitive psychology, marketing and strategic management perspective and hope to contribute to the notion of competition and competitive processes. In addition, we propose a new method to measure competition that is based on these more psychological insights.

In cognitive psychology there is well-known information-processing framework and this consists of the following steps: a) observing information or events; b) the interpretation thereof; and c) the reaction according to this interpretation. This framework is also used in strategic management and marketing to capture the perception of competition. This framework is an important starting point in this study.

An important field of competition in strategic management is concentrating on mapping the competitive environment. Based on the information and events observed, characteristics of the different firms in the firm's environment, the firm's business definition and strategy and other variables, decision-makers form their competitive map. Most decision-makers identify 5 to 9 firms that they label as major competitors. These firms, and the actions they take, are studied and followed more intensively than the actions of other firms.
An important discussion in this field is whether the perceptions of decision-makers converge to a 'homogeneous' view of the competitive environment or whether the perception is very 'heterogeneous' because of the differences in the firm's situation and personal characteristics of the decision maker. Both perspectives have their advocates with their empirical evidence to support their claim. To date, there is no pronounced preference for either view.
In the empirical studies in this field, different research methods are used, including: visual mapping techniques, free response listing of competitors, interviews, content analysis of annual reports or other documents, structured questionnaires and market simulations.

The second important field of competition focuses on actions and reactions of companies to events in their competitive environment. Most of these studies take a dyad of a competitive action of one firm and the reaction of another firm as the unit of analysis. In these studies the characteristics of the competitive action or event are related to how this action is perceived by another firm and how this firm reacts to the observed action. For reaction, one can think of the decision whether to react or not (retaliation, ignoring,

no reaction, accommodation), characteristics of the reaction (the speed, the breadth, the aggressiveness of the reaction) and the instruments that are used to react (price, advertising, innovation, extending the capacity, mergers etc.). The objective of most studies in this field is to predict the reaction and relate this to firm performance. In predicting the reaction other variables such as firm size, market share, interpretation of the event, market growth, experience and personal characteristics of the decision makers, etc. are included.
The most commonly used methods in empirical studies in this field are structured questionnaires, content analysis of annual reports or other documents and market simulations.

In this study, we build further on this second field, because we are interested in the competitive processes and the prediction of competitive actions. We describe the process of scanning the competitive environment, the interpretation of the observations and the possible reactions and characteristics of the reactions. We use Porter's five forces perspective to obtain a good impression of the competitive environment. These forces are: internal rivalry, supplier power, entry threat, threat of substitute products and client power. The scanning activities can be directed to each of these forces. These five forces are also used in New Empirical Industrial Organization literature.

Based on the literature studied, we developed a research framework that relates to the framework of observation, interpretation and action mentioned previously. More specifically, scanning activities are related to the perception of competition (interpretation of the impact of certain events on the firm's own position) and the perception of competition is related to the type of reaction (retaliation versus abandonment/ignoring and tactical versus strategic reaction) and the reaction characteristics (intensity, speed, range and instruments used).
Furthermore we discussed how the perception of competition could be measured. We reviewed empirical studies on competition in the two fields of cognitive psychology, strategic management and marketing. Three methods proved to be most promising, i.e. structured questionnaires, free response methods (visual card technique and repertory grid) and interviews and document analyses. Given the objective to develop a method that can be used to monitor a large number of sectors, structured questionnaires look most promising. The other two methods could be very useful should one or two sectors be studied in depth (e.g., in merger cases or other anti-trust authority's investigations).

Further research should concentrate on the development of a good and valid instrument to measure the latent construct 'perception of competition'. In doing so, research framework proposed in this study could be used to validate the instrument. With such a measuring instrument, further research can be done on the discussion on homogeneous versus heterogeneous perceptions within a sector, prediction of competitive actions, etc. To do this, information about the firm, market and decision-makers should be included as well.
Furthermore, the data on the perception of competition should be related to the more traditionally used indicators in anti-trust studies, such as concentration ratio, turbulence and price-cost margins.

1 Introduction

1.1 Motivation

Competition is an important driver for economic growth, lower prices and better quality (Van Bergeijk and Verkoulen, 2003). Competition can be seen as a mechanism or instrument that contribute to the allocative and dynamic efficiency in the economy that have positive welfare effects. The level or intensity of competition mostly fluctuates in time and also shows variations in different industries. To obtain insight into the intensity of competition in a certain industry, and eventually to understand its development, it is of utmost importance to have an instrument that measures the intensity of competition in a proper fashion. However, competition is a complex and multi-dimensional concept that cannot be comprehended easily without a clear theoretical framework. There are different streams of literature that have taken competition as their research subject. Two dominant theories come to the fore: industrial organisation and strategic management and marketing (with a focus on cognition).

The economic approach of competition and its limitations

Conventional approaches to the analysis of business competition in industries and markets have been dominated by the structure - conduct - performance (SCP) paradigm in industrial organization literature and the strategic groups notion from strategic management (Scherer and Ross, 1990). The SCP paradigm in industrial organisation literature has been supersede by oligopoly models in which structural (number of firms) and behavioural (e.g. reaction curve, price leadership) are incorporated in the (Cournot and Bertrand-type) models. The main purpose of this economic theory underpinning strategic group theory is to explain variations in the strategic behaviour (conduct) and performance of (a group of) firms within industries. So far, most attention is being paid by policy makers in particular, to the outcomes of competition compared to the competition process itself,. This is also seen in the commonly used measurement of the intensity of competition, where relatively easy to measure outcome indicators are used, such as the degree of concentration (Herfindahl-Hirschmann index, C4), the price-cost margin and the number of entrants in a market. Maybe, until now this has been the only way to measure the intensity of competition that can be used for policy purposes.
Recently, Boone and Weigand (2000) introduced a new indicator, the relative profitability of firms. They argued that this indicator more consistently measures the level of competition in an industry. If the relative profitability in an industry is more dispersed, competition is more intense. More efficient companies use their higher efficiency to make higher profits in a competitive industry. Less efficient companies are punished for their inefficiency with lower profits in a competitive industry. In a market with soft competition, deterioration in efficiency hardly causes a fall in profit.
The indicators give information only about results of competition and not the process behind competition. For example, Boone and Weigand (2000) state that the increase in competition can be the result of more entry or more intra industry rivalry. Their measure of the intensity of competition (relative profitability) only measures the outcome of the competition process, not the cause. In fact, the logic of the competitive process - the interaction between market parties - and how this competitive process is perceived by the industry members is one of the major deficiencies in these theories (Johnson and

Hoopes, 2003)[1]. In addition to this shortcoming, Hodgkinson (2001) noted that a number of studies have failed to yield significant between-groups performance differences. Not surprisingly the notion of strategic groups has come under increasingly critical scrutiny. Several researchers (e.g. Hodgkinson and Johnson, 1994; Reger and Huff, 1993) questioned the extent to which secondary financial and accounting information derived from company records or commercially available generic databases, as typically employed by strategic groups researchers, could adequately capture bases of competition. Furthermore, the data used in these studies is relatively old (up to two years) which is a serious drawback for a monitoring instrument in highly dynamic markets. Thus, the major limitation of this economic approach is its inability to explain up to date how and why competitors behave the way they do (see Hodgkinson, 2001; Urbany & Montgomery, 1998; Johnson & Russo, 1997; Meyer & Banks, 1997). The competitive interactions between firms are simply ignored or modulated by game theory perspectives with their disputable assumptions about the rationality of the entrepreneurs and the equal access of significant market information[2].

The process of competition: cognitive notion

The marketing and strategic management stream of literature on competition pays more attention to the process behind competitive strategy and the decision making process of competitive action, most of the time at firm level of analysis. Among business strategy and marketing scholars there is common ground that an important role is played in competition by key decision makers who monitor rival organizations and formulate strategies to achieve competitive success (e.g. Porter, 1980). According to Porac and Thomas (1990) it is because of this key role played by decision makers in an organization's response to rivalry, that "inquiry is necessary about the social psychological factors influencing how decision makers frame competitive environments and understand the nature of competitive perceptions" (p. 224). An important element in this line of reasoning is how entrepreneurs perceive their competitive environment and react on

[1] In oligopoly theory, these interactions are sometimes modeled. In conjectural variation models (New Empirical Industrial Organization) the conjectural variation is used as an estimate for the degree of collusive power and how intensely firms react to each other's behavior (Cabral, 2000). For example, in Cournot models the conjectural variation may vary from zero, i.e. each firm assumes that there will be no reaction on the part of the other firms to –1 (perfect competition outcome), to 1 (monopoly outcome). In limit pricing models, a company chooses its' actions taking into account the possible entry to or exit from the market.

[2] Johnson and Russo (1997: 188-193) discussed the differences between the economic perspective and the behavioral perspective (cognition and strategic management) in more detail. In the economic perspective calculated rationality is an important assumption. Any individual-level bias will be limited, and especially unimportant in the aggregate. The biases will disappear in real-world settings as a result of evolutionary learning (biased decision-makers will be eliminated or selected out by competition) and adaptive learning (learning as a result of feedback on certain decisions). In their perspective, the ultimate question is not whether normative economic models are descriptive of processes but whether they are predictive of outcomes, particularly in the long run.
The response of the behavioral perspective is that the process to equilibrium can be quite long and most of the profit in a market occurs while the market is marching toward equilibrium, not at equilibrium. Especially in dynamic markets with fast changing conditions, equilibrium may never be reached. Furthermore, there are substantial barriers to adaptation, which should be included in the analysis of rationality. The learning processes might not be efficient and effective as the economists argue.
For monitoring the intensity of competition, the behavioral perspective in combination with the Austrian school of economics (Young et al. 1996) seems more appealing.

the basis of this perception[1]. Behind this cognitive logic on competition lies the well-known information-processing framework of (a) observing information, (b) the interpretation thereof and (c) the reaction according to this interpretation (Kiesler and Sproul, 1982; Daft and Weick, 1984). In the last decade, this framework has found its way into the strategic management as well as in the marketing literature (see e.g. Chernatony, Daniels and Johnson, 1993; Lang, Calantone and Gudmundson, 1997; Clark & Montgomery, 1999; Waarts and Wierenga, 2000). And recently, this model was applied to perceptions of competition (Mosselman, De Jong and Prince, 2001). However, various authors stressed that despite the growing attention for perceptions in the context of business-like studies, more empirical research is needed (see Hodgkinson, 1997, 2001; Mosselman et al., 2001; Thoms and Pollock, 1999).
In this study, we will focus on entrepreneurs'/managers' perception of competition in relation to its scanning activities and their intention to competitive (re)actions. We have included the last two concepts in the theoretical background of the instrument of perception of competition, because both can serve as validate checks to test whether firm's perceptions are related to the actual behaviour of the firm (scanning and competitive actions). These checks are of great importance, because we want to prevent an instrument of the firm's perceptions from being developed that measures only an artefact of research that does not have any connection with the actual behaviour of firms in their competitive environment.

Opportunities for improved measurement of competition

Based on the discussed observations, we conclude that a better instrument is needed and feasible that gives more information about competition as it really works in the market. Therefore, it is desirable to develop a measurement instrument that is based on the firm's perception of competition. First of all, data obtained with this instrument will give inside and up to date information about the perceived competition in certain markets. Secondly, the data obtained with this instrument will give information and understanding of the competitive process behind competitive outcomes that may even be used to predict competitive outcomes. In the third place, when government intervention has taken place, better predictions can be made about the effect on the interaction between competitors. A fourth benefit is that it will be possible to monitor the market competition development in certain markets with the data from the market players themselves. And finally, more detailed information will be available to signal low (or high) levels of competition that could lead to government intervention if necessary. With this in mind, a valid measurement to assess the intensity of the perceived competition is desirable. Below we will further explain what point of departure we take in relation to the concept of competition.

Focus on Porter's five forces of competition

Competition in an industry may be fuelled by factors from different directions, with a different degree of intensity. The developed perception of competition measure should incorporate these different directions. Therefore, we will use Porter's five forces model or a method commonly used among researchers and practitioners alike. Porter's model of competition (1980) distinguishes five competitive forces: (a) the rivalry among current market players; (b) the threat of new entrants; (c) the threat of substitute products

[1] The word perception can have different meanings, e.g., 'becoming aware of something via the senses', 'the process of perceiving' or 'knowledge gained by perceiving'. We use the word perception in the meaning of 'the representation of what is perceived'. This notion of perception is closely related to te word cognition, 'the psychological result of perception and learning and reasoning.

or services; (d) the bargaining power of suppliers and (e) the bargaining power of buyers[1].

The *internal rivals,* already active in the market, could be divided in relatively stable firms, fast growing firms and recent entrants. Within these groups the fast growing firms will probably have the strongest effect on the intensity of competition, because they will have to realize growth at the expense of other firms when they compete in a slow growing or declining market. In fact, the threat of these firms will be relatively greater for other firms than the threat posed by more stable ones or entrants in the market (see e.g., Geroski, 1995; Baldwin, 1995). However, this effect is, to a certain degree, influenced by the attributes of the new entrants and the competitors already present (see Waarts and Wierenga, 2000). Mueller (1991), for example, showed that foreign entrants have a greater impact on the competitive environment than national entrants. The foreign entrants are already active in the product market but just in another area/country.

Competitive forces could also be experienced from the threat of *potential entrants* (Bain, 1956). The threat of new entrants could come from many directions especially from new firms who believe in the potential profits of the market, expect market growth or observe high profit persistence by the current competitors (Geroski, 1995). Companies who are active on related markets with *substitute goods* or related competences could also be seen as a threat for the players in the market. For those firms have the knowledge and understanding about the needs of the same buyers. *Supplier groups* form an other force that can shape the way competitors experience competition, mainly when their bargaining power in the market is strong. For example, suppliers could have a strong impact in the market if there are only a few of them, when the cost of switching to another supplier is high or when there is a possibility of integrating forward into the market. *Buyers groups* can also have a significant impact on the way competitors interpret competition in their market, especially, when buyers have high budgets, high demands, strong product preferences and the cost of switching to another competitor is low. These forces will be used as a theoretical frame to build the instrument about the perception of competition.

Focus on the effect of competition on the output market

Besides the different degrees and directions of competitive forces, competition could also occur on more than one market. The two most important markets regarding competition are the input and output market. On the input market firms compete in order to get the best suppliers or input. Especially when the input is scarce, competition on the input market can be very aggressive, take finding and attracting suitable employees for example. At the end of the 1990s it was difficult for firms to attract the best ICT-specialists. As a consequence high salaries were paid and requirements were not so strict. Now that the ICT-market has dropped, and likewise the demand for ICT-specialists, the salaries offered have been adjusted and requirements are stricter. In the end, the level of competition in the input market (prices paid for the resources) influences the marginal costs of producing the output and thereby the competitive posture in the output market[2].

[1] The New Empirical Industrial Organization,also uses the five forces perspective for example in conjectural variation models (see Cabral, 2000: 160, footnote f). Industry rivalry influences the conjectural variation or the degree of collusive power, entry affects the concentration (and indirectly the conjectural variation), substitute products and buyer power influences the demand elasticity and finally supplier power is one of the determinants of the marginal costs.

[2] In the Porter model, this is the power of suppliers.

In research on competition most attention is being paid to the output market, the market where the manufactured products and services are sold. Different suppliers compete for the budget of their clients in order to earn more money and/or win a bigger market share, for example by setting competitive prices, advertising extensively or providing customer friendly services. Competition not only concentrates on prices and quantities. In some markets, competition focuses on the provision of new, innovative products, i.e. competition focuses on new opportunities (Kirzner, 1997). This is related to dynamic efficiency and very important in hyper competitive environments (Young et al., 1996). It can, however, also be interpreted as a highly dynamic market with a constant flow of new products/services. Given the purpose of this study, i.e. measuring the intensity of competition, the focus of this research is on the output market.

1.2 Objective and research questions

Objective

The objective of this study is to explore the cognitive process of the entrepreneur/manager in dealing with his competitors and other competitive forces on his (output) market. The study builds on the above-mentioned framework by distinguishing three activities: the scanning of the competitive environment (observing information), the interpretation of competitive moves and the reaction according to its judgment. This competitive process will be investigated from a cognitive viewpoint by performing a study that provides an extensive review of different streams of literature i.e. strategic management, marketing and cognitive psychology.

Research questions

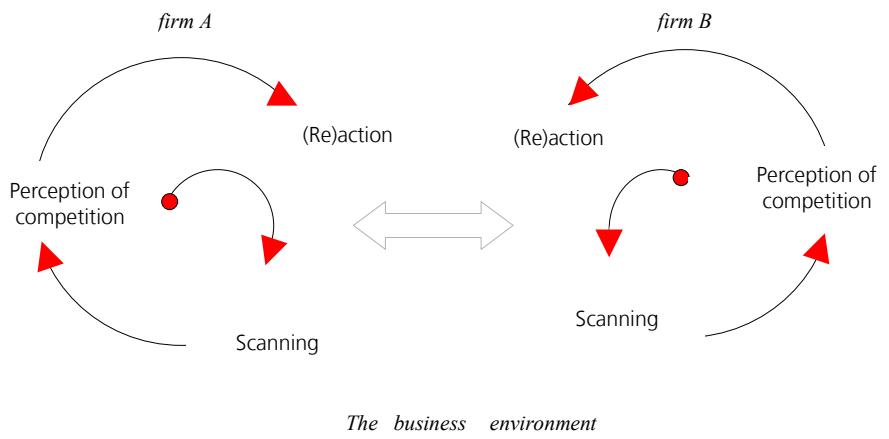
This study discusses current insights of the phenomenon of the firms' perception of competition. It will provide answers to the following research questions:

A. What is scanning? Which sources do managers use to scan their competitive environment? How can the scanning process be described and what different outcomes are related to competition?
B. How can perception of competition be defined? What are the indicators of the perception of competition at the industry level?
C. What competitive reactions can be distinguished and how can firms vary in the magnitude of the reactions?
D. How does the firm's perception of competition relate to its scanning behaviour as well as with its reactions in the business environment?
E. How could the perception of competition be measured?

1.3 The conceptual framework

Answering the research questions presented provides a framework for the relationships between scanning of the competitive environment, entrepreneurs' perception of competition and reactions following these perceptions. The relationships between these constructs are presented in figure 1, these indicate that competition is a dynamic process between contesting firms. The figure shows the most simplified form of competition in an industry, namely between two firms, A and B. In the following paragraphs and chapters firm A is the initiator and will be called the focal firm; the reacting firm B will be called the target firm.

figure 1 Conceptual framework



In this framework two different perspectives (firm and market) are combined and form the basis of our theoretical explanation about perception in the context of competition. Below we briefly explain the two different perspectives in order to explain the framework. They will be discussed more extensively in chapter 3.

A firm-driven perspective

The first perspective of perception is the firm-oriented perspective that has its roots in the cognitive psychology of categorizing the competitive environment (see Porac and Thomas, 1994). It is based on the assumption that the business vision and strategy of a firm determines how the competitive environment will be scanned and perceived (Porter, 1980). The firm's competitive strategy can be seen as a "stable focusing device" which is represented in the above conceptual model by the dot in the centre of the two firms. The chosen strategic focus leads the attention of the firm's managers to certain competitive topics and moves of other firms who are considered to be the (main) competitors. For instance, a firm with a low cost strategy will focus its attention on other low cost competitors, low cost suppliers etc. As a consequence, similar firms together form a strategic group that are likely to share the same perceptions of competition; they identify the same firms as competitors and the same events as competitive threats. For example, when firms A and B both produce personal computers and show some similarity (e.g. in size and product style), their competitive actions, scanning and perceptions of the competitive process are likely to show strong resemblances. Further, our model shows an arrow from the centre in the direction of scanning that symbolizes that the firm focuses its scanning activities on the basis of its business strategy. In our example, this means that based on their similarity firm A will scan the tactics and strategic action of firm B with extra attention. Of course, the same applies for the scanning activities of firm B. How firms select their competitors and on what basis will be explained in section 3.2. Why this is significant for the development of the measurement of competitive perceptions will be discussed in section 3.5. The possible competitive reactions are discussed in chapter 4.

An event oriented perspective

The second perspective is market oriented and has its roots in marketing literature. This perspective gives insight in the way entrepreneurs and managers perceive the events in the market environment - such as a price change, a new product introduction or a new entrant in the market - as a threat to the firm's business. This can best be illustrated

with an example. Firm A, the focal firm, introduces a product innovation (an action), meanwhile firm B, the target firm, scans its environment and hears the news about a contract signed with a celebrity for a commercial for firm A,. Following r brief research on the matter the target firm perceives this information to be threatening with considerable consequences for the profitability of the firm. In reaction to this interpretation the target firm speeds up the process of t its product innovation and plans to introduce its product within one week instead of two months. Probably, sooner or later firm A will be alarmed and plan an even more intense advertising campaign. If firm B does not perceive the innovation as a threat, it will not react at all. How, and on what criteria, the perceived level of threat is evaluated, will be discussed in section 3.3.

1.4 A short reader guide

In chapter 2, we will discuss the scanning of the competitive environment. The perception of competition will be elaborated in chapter 3. The competitive reaction will be discussed in 4. How a firm's perception of competition relates to executives scanning behaviour and the firm's competitive reaction will be dealt with in chapter 5. Finally, we give an overview of the methods being used in empirical research so far on our topic in chapter 6. Based on the theory discussed and empirical studies, we will develop a first version of our measurement instrument of perception. In chapter 7, we end with a conclusion and suggestions for further research.

2 Scanning the environment

2.1 Introduction

Scanning could be compared with a radar that informs a pilot of the incoming navigation conditions, while strategic planning would be the rudder that keeps the business on course[1]. As this metaphor explains, the scanning or browsing behaviour of entrepreneurs has the primary goal to detect events in the external environment. This external environment can refer, according to Dess and Lumpkin (2002),
to both the competitive environment (with current rivals, potential entrants and suppliers in the firm's market) and the general environment (with demographic, socio-cultural, political, regulatory, economic and technological segments). Here, we focus primarily on the competitive environment. In the following sections, we will define the concept of scanning (2.2); explain the process of scanning (2.3.); and list various outcomes of the scanning process (2.4).

2.2 The concept of scanning

Definitions of scanning

In his ground breaking work on scanning, Aguilar defines scanning as "the gathering of information about events and relationships in a company's outside environment, the knowledge of which would assist top management in its task of charting the company's future course of action" (1967, p. 1). Some authors have suggested to extending this definition in the direction of strategic interpretations and actions (Dess and Miller, 1993; Choo, 1998; Audet & d'Amboise, 1998). For example, Dess and Miller define strategic scanning as "the process of monitoring and evaluating information from the external environment and disseminating it to key people within the organization" (1993, p. 38). Others, like Porter place more emphasis on competitor analysis and its predictive value. He argues that the objective of *competitor intelligence* is "to develop a profile of the nature and success of the likely strategy changes each competitor makes, each competitor's probable response to the range of feasible strategic moves other firms could initiate, and each competitor's probable reaction to the array of industry changes and broader environmental shifts that might occur."(Porter, 1980, p. 47). However, these definitions includes both the information gathering as well as the interpretation of events and moves in the environment and is used to predict strategic success. In this chapter, we will focus more on the process of gathering environmental information and not on the interpretation thereof, i.e. we follow the Aguilar's definition. The evaluation and the consequences of the observed events/issues for the perception of competition will be discussed in chapter 3. Therefore, we define scanning as the acquisition of information about events and changes in the environment that serve as input for decision makers to react to different events, changes and actions that might occur in the firm's environment.

[1] The example of the radar and rudder are taken from Pearce, et al. (1982).

2.3 The process of scanning

Information sources

Initial empirical scanning studies indicate that senior executives use various information sources to learn about the external business environment (Aguilar, 1967; Smeltzer, Fann & Nikoliasen, 1988; Kaish and Giliad, 1991). The usual distinction is between personal and impersonal sources of information and whether information comes from sources external or internal to the organization (Aguilar, 1967). Personal sources refer to direct human contact as typified by face-to-face, telephone and email. Impersonal are written and include formal reports, newspapers, survey results, and the output of management information systems. Below we give a few examples of each information type, :

1 Written external sources (e.g. financial papers and magazines, trade journals and magazines, information services, government reports, research reports).
2 Written internal sources (e.g. special internal audits, reports, memos, general emails).
3 Personal external contacts (e.g. business associates, officials, customers, trips, friends
4 Personal internal contacts (subordinates, salespeople, staff people).

In the scanning of literature it is still undecided whether personal or impersonal sources are better suited to interpret the environment. Personal sources usually have the highest impact on executives and are consistent with the informal, irregular scanning that typifies many organizations. However, impersonal reports or informative market figures can make impersonal sources useful for scanning the business environment. In studies of the relationship between scanning frequency and perceived strategic uncertainty, it is often assumed that external sources rather than internal sources are more likely to be used by senior executives because these executives want to form their impression through direct contact with key environmental sources (Daft et al., 1988; Sawyerr, 1993). Direct contact means that data are undiluted and do not suffer from the loss of meaning associated with passing information through intermediaries. Internal sources may still be used by top managers to supplement external sources.

Scanning activities

According to Choo (1991, 1998) scanning is an activity with various goals, motives and forms. It both includes looking at information (viewing, passive) and looking for information (searching, active) (see also Aguilar, 1967; Daft and Weick, 1984; Choo and Auster, 1994). From organization research, Choo built a framework (see figure 2) that combines different aspects of the scanning process into four different typologies of scanning that might help to understand the process of scanning in general. Below, we discuss these four typologies of scanning in more detail and apply them to the context of the competitive environment.

In **undirected viewing**, the goal is to have a broad scope in order to detect signals of coming changes or competitive moves. Many and varied sources of information are used (for example the internet, business magazines, conference meetings, business diners) with minimal effort. This sort of viewing is done mainly by entrepreneurs or managers who want to "sense" or explore new markets, or want to screen the environment for potential threats to the firm.

In **conditioned viewing,** the scanning process is narrower with selected topics and pre-selected information sources that are standardized in the industry, such as external reports, databases and sources that are highly respected and widely used in the industry. The goal is to monitor the environment in a routine manner to be able to evaluate

the significance and impact of the competitive information encountered. The information need lies in the ability to recognize as many competitive moves or more general changes (like changing legislation) in the market environment as possible.

During **informal search**, the entrepreneur or manager actively looks for information to learn more about a specific issue. The search is informal because it is not a formal analysis, but relatively limited and unstructured (for example walking around the shop of an important competitor or snuffling in the public economic databases). The goal is to explore some issues or some market players to the extent that is sufficient or that more time and resources are needed. The information is used to increase knowledge about specific factors that influence competition.

During **formal search**, the entrepreneur makes a deliberate or planned effort to obtain specific "sensitive" information. The formality lies in the prepared, structured and prearranged procedure to gain information (such as SWOT analysis, patents searching or benchmark research). The goal is to find detailed information in order to provide a basis for a well-balanced strategic decision. Formal searches make use of information from sources that are perceived to be knowledgeable, or from information services that make efforts to ensure data quality and accuracy.

figure 2 Modes of scanning activities

Environmental analysability	Passive	Active
Unanalysable	**Undirected viewing** Many sources used Minimal effort Broadly scan a diversity of sources Take what is easily accessible "Noticing"	**Informal search** Few sources used Medium effort Search on a specific issue or event Good search is satisfactory "Exploring"
Analysable	**Conditioned viewing** Few sources used Low effort Browsing in commonly used sources Scan of pre-specified topic or subject "Following"	**Formal search** Many sources used High effort Systematic search on a target Retrieve significant information "Discovering"

Organizational intrusiveness

Source: Choo (1998).

Conclusions about the process of scanning

Various authors have suggested that these different types of scanning can be divided by the intrusiveness and analysability dimension (see Daft and Weick, 1984; Choo, 1998). The intrusiveness dimension means that a firm on the one extreme intrudes very actively (searching) in its competitive environment to find information and on the other extreme it can stay very passive by browsing its environment once in a while (viewing). The environmental analysability is the organization's belief that the environment can be analysed, and that events and processes are determinable and measurable. Here we will not discuss this dimension further, because of its strong overlap with beliefs and interpretations of the environment; an issue we will deal with in the next chapter about percep-

tions of the competitive environment (see also Choo, 1998). The other dimension, organizational intrusiveness, is particularly useful for our research because it deals with the effort, or activity of the scanning behaviour. Scanning activity and perceptions of the environment are a well-studied topic in organizational and strategic literature, a relationship discussed in chapter 5.

2.4 The outcomes of scanning

Observations of the environment

In the previous discussion about scanning, the firm's activity undertaken to acquire environmental information is emphasized. However, the results of those scanning activities are even more important, because those observations of the environment provide the external intelligence for decision-making and strategy formulation. Duncan (1972) defined the environment as the relevant physical and social factors outside the boundary of an organization that are taken into consideration during organizational decision-making. Initial research treated the environment as a single entity. More recent studies divided the environment into categories each of which may have an influence on organizational actions in general.

Scanning the competitive and general environmental

The environment can be conceptualised as having several categories that exist in two layers (Dess and Lumpkin, 2002; Daft et al., 1988; Sawyerr, 1993). The layer closest to the organization is the task or competitive environment that includes categories that have direct contact and transactions with the organization and affects the strategic position of the firm strongest. It includes the competitor, supplier, customer and technological category. The competitor category can further be divided in current rivals, firms who produce substitute goods and potential new entrants (see Porter, 1980).
The general environment is the outer layer and refers to sectors that affect organizations indirectly. The general environment includes the regulatory, economic and sociocultural category. Many different events and changes in the external business environment can be categorized in one of these categories. In table 1, the different sectors of the external business environment are listed. An example of an environmental event or change is given for each sector that a senior executive could have observed while scanning his external environment.

table 1 The external business environment

Environmental categories	*Example of an event or change*
(1) Customer category This category refers to those companies or individuals that purchase the firm's products. Customers include companies that acquire firm's products for resale, as well as final consumers.	Customer groups become larger in size and want to integrate backwards in the market.
(2) Competitor category This category includes the firms and products that compete with your company's product, companies that make substitute products and companies that might enter the market. It also refers to competitive tactics and actions between your firm and other competing firms in the market.	A current competitor begins an aggressive advertising campaign and lowers its prices significantly. There is an increasing number of firms entering the market. A producer of substitutes introduces a new product/service that is able to fulfil the own clients needs.
(3) Technological category This category includes the development of new production techology and methods, innovations in materials and products, and general trends in research and science relevant to your company.	The development of a new technology with great potential for increasing the efficiency of distributing product to the clients.
(4) Supplier category This category consists of companies who supply products or services and distribute these to the own firm.	A supplier takes over his important rival with the likelihood that this supplier will use his bargaining power in the contacts with his buyers.
(5) Regulatory category This category includes federal and state legislation and regulations, city or community policies, and political developments at all levels of government.	Changes in government regulations hazards (e.g., product safety).
(6) Economic category This category includes economic factors such as stock markets, rate of inflation, foreign trade balance, federal and state budgets, interest rates, unemployment and economic growth.	A period of high economic growth.
(7) Socio-cultural category This category comprises social values in the general population, the work ethics, and demographic trends such as an relatively decreasing number of well educated young employees	Shifts in attitudes towards firm's product or services, because of its negative pollution effects.

Source: Based on Daft, et al. (1988).

The competitive environment is expected to change more rapidly, to be more complex, and to have a stronger affect on the business than the events or changes from the general environment (Porter, 1980). Customer's tastes change, competitive strategies change, new entrants or new technological developments demand a direct response

because of the direct impact on the firm's performance, while economic conditions or social demographics may gradually and indirectly affect the organization.

Conclusion about the outcomes of scanning

The 'observables' presented in table 1 are possible scanning outcomes for the key decision makers of the firm. These outcomes might affect the strategic and competitive reactions of firms in an industry. This, however, depends on the extent to which these 'observables' are perceived as threats to the firm's profitability, i.e. the 'observables' have to be interpreted. Decision makers observing the same event or change may have a totally different interpretation of the event, ranging from no impact to very threatening. In fact, what we will argue in the next chapter is that key decision makers' subjective judgements about those 'observables' are the indicators of their perception of competition in their market.

3 Perception of competition

3.1 Introduction

Interpreting information about competition in the market is above all the work of people. Decision makers are often limited in their ability to follow a rational formal path in analysing events and changes in the competitive environment. This limitation is due to the lack of time and effort that is required to search for information and identify threats and because of the limited capacity of both individuals and organizations to process large and complex amounts of information. Therefore, people fall back on their own personal and subjective interpretations of phenomenon they observe (Daft and Weick, 1984). Evidence hat competitive analyses are not perfect is mounting, because the entrepreneur is rationally bounded, and the process is full of subjective biases, cognitive tendencies and heuristics (Simon, 1982; Urbany and Montgomery, 1998).
In cognitive psychology biases in managerial decisions that simplify and frame managers' observations of reality are well explored and tested (for an overview, see Bazerman, 1998, p.39 and 65). Also in the case of the entrepreneur who observes his competitors, these cognitive processes can be evident. Unfortunately, the conventional economic approach to competition has traditionally ignored, or assumed away, the subjective and sometimes non-rational way entrepreneurs think about competition (see Urbany and Montgomery, 1998; Johnson and Russo, 1997).

The firm and market driven perspective

In order to understand the subjectivity of the competitive process, we have to understand both the business and strategy within the firm and the environment outside the firm. Together they shape the way an entrepreneur interprets the competitive processes in its industry. The business and strategic power from within can be seen as an endogenous force, and the events, actions and changes from the market environment outside as exogenous forces. In sections 3.2 and 3.3, we discuss the theoretical basis of the firm-driven (the endogenous forces) and market-driven perspectives (the exogenous forces). The two perspectives come together in sections 3.4 and 3.5, where we discuss the perception of competition at the industry level (3.4) and the question of the similarity and variations in perception between different entrepreneurs in the same industry (3.5). Finally, we will relate the firm's perception of competition in its industry to its scanning behaviour in section 3.6.

3.2 The firm-driven perspective

Cognitive recognition as theoretical starting-point

The firm-driven perspective on the perception of competition has its roots in the psychological theory of cognitive categorization. Porac and colleagues (Porac, Thomas and Baden-Fuller, 1989; Porac and Thomas, 1990, 1994; Porac et al., 1995) were the first to apply this theory of categorization in the context of rivalry. They suggested that subjective rivalry can be better understood if we know how firms categorize their most important competitors. Their work is based on the concept of business definition, a term used to define the own business and to formulate the business strategy. According to Porac and Thomas (1990), a business or more general strategy definition is 'a stable focusing device' that leads the attention of managers to firms with more or less the same prod-

uct positioning and away from firms with less resemblance. To understand this focusing device we will begin our explanation with the entrepreneur's use of mental models.

The use of mental models

The subjective images of reality that people have in their minds can be called mental or cognitive models. These mental models are simplifications of reality (Daniels, De Chernatony and Johnson, 1995, p. 975). Entrepreneurs need these mental models to sort the overload of information about competitors and other interesting information and to select the relevant information so that it has manageable proportions. Porac, Thomas and Badenfuller (1989) assume that these mental models of the competitive environment are used by decision makers to formulate their competitive strategies and to scan their environment more economically (see Porac, Thomas and Baden-Fuller, 1989; Porac and Thomas, 1990; Porac, Thomas, Wilson, Paton and Kanfer, 1995). In other words, the mental model helps to simplify the competitive environment and the operating competitors into more manageable categories of information.

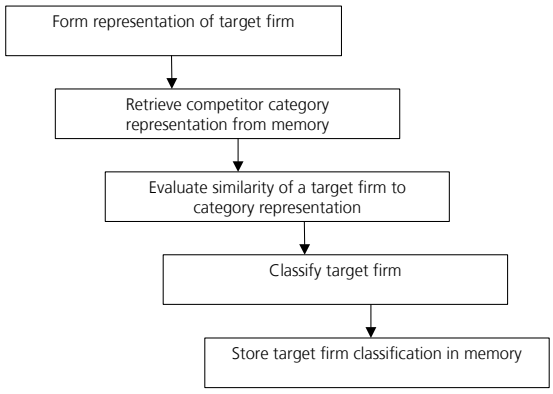
The categorization of competitors

How managers categorize their competitors has implications for how managers, as individuals and as a team, analyse the competitive environment and how they take decisions about competitive strategy (Reger and Huff, 1993; Daniels, Chernatony and Johnson, 1995). Categorizing the industry is done through the identification of the most threatening competitors. According to Porac and Thomas (1990, 1994) managers do this firstly f by assigning themselves to a competitive category based on f their intended business definition and secondly by arraying other competing firms along a continuum on the basis of relevant attributes. After evaluating other firms along this continuum, some firms may be left out of their defined competitive category, others will be included. However, some firms will be more representative within the category than others. The "cut-off point" between a competitor and a non-competitor is of course gradual and changes over time (see Clark and Montgomery, 1999; Porac and Thomas, 1990). This means that it is a continuously evaluated threshold that moves, whenever changes occur in the competitive arena.

A categorization sequence

Clark and Montgomery (1999) suggest that entrepreneurs use several stages when changes in the market occur that effect their current competitor category (see table 2).

table 2 Steps in competitor identification



Source: Clark and Montgomery (1999).

The first step a manager takes when changes are detected (such as mergers or the arrival of new entrants in the industry), is to form a mental representation of the target firm, using some set of firm attributes. Secondly, the manager retrieves the competitor category representation (or focal competitive set). Then the manager organizes and evaluates the similarity of the target firm to the category representation. And finally, the manager commits these inferences, which guide further actions and information processing. In this way, the manager's focus is refined according to the new situation in the market. Or, in line with our earlier scanning metaphor, the radar is adjusted to the new co-ordinates. The changes in the competitor structure could also be initiated by the focal firm itself, for example, when it has bought another firm or when the firm decides to change its market strategy.

Attributes used in the categorization of competition

Various researchers studied the basic elements of strategic groups and found more or less the same set of attributes managers use, or should use, in identifying their most relevant competitors (see e.g. Calori, Johnson and Sarnin, 1994; Greve, 1998; Porac, Thomas, Wilson, Paton and Kanfer, 1995; Hamilton, Eskin and Michaels, 1998). From a brief review of literature on competitor identification, the following attributes have been found to be used by managers to compare their own firm with other firms (see table 3).

table 3 Review of attributes used in competitor identification

Attributes	*Description*	*Authors*
Size	Size refers to the competitor's size in terms of unit sales, number of customers, number of employees, production capacity or number of locations.	Porac et al. (1995); Clark and Montgomery (1999); Walton (1986); Gripsud and Gronhaug (1985).
Product style	Product style refers to the industry defined or functional categories (e.g. high-fashion, traditional, mass market).	Porac et al. (1995); Clark and Montgomery (1999).
Product or market positioning	This reflects explicit statements about the value or benefits the company intends to provide for the customer with its products and is a result of the strategy and core capabilities of the firm.	Clark and Montgomery (1996, 1998; 1999); Hamilton, Eskin and Michaels, 1998); Greve (1998).
Geographic scope	This criterium refers to the geographic area where the firm operates (local, regional, national or international).	Porac et al. (1995); Clark and Montmogery (1999); Reger and Huff (1993); Greve (1999); Calori, Johnson and Sarnin (1992).
Firm success	This mostly refers to the market share, profitability (measured in degree of marketing contribution by Clark and Montgomery), or firm growth.	Clark and Montgomery (1999); Walton (1986).

Source: EIM.

The attributes presented in table 3 are the criteria entrepreneurs and managers are likely to use in comparing their firm with other similar firms within their industry in order to simplify and categorize their market environment. In addition these criteria are used to evaluate whether a competitor's action is dangerous or not. For example, Mueller (1991) has shown that foreign entrants have a greater impact on the competitive environment than national entrants.
Porac and Thomas (1994) argue that based on the above-mentioned attributes firms use the cognitive market boundaries to structure their industry into multiple strategic groups. Hence, the similarity of attributes being interpreted by managers may provide criteria to structure the industry into strategic groups with the notion that this is done from the firm manager's perspective. In doing so, the industry will not be categorized on the basis of pre-selected categories by economic researchers (as done in the market delineation) but on the criteria entrepreneurs and managers are using themselves to identify their competitors (see Porac, Thomas, Wilson, Paton and Kanfer, 1995, Clark and Montgomery, 1999).

The size of the identified competitive group

The assumption that entrepreneurs and managers focus only on a limited set of competitors that constitute their industry and not, as economists presume, on a well defined competitive structure, has been explored quite well (see Daniels, de Chernatory and Johnson, 1995). At least three studies show that managers do indeed select a relatively small number of competitors, smaller than the actual number of competitors present in the market. Gripsud and Gronhaug (1985) asked managers of grocery stores in a small Norwegian city to list the local firms that they considered to be competitors of their own organization. Despite the fact that over 50 groceries existed in the local community, 90% of the managers cited 5 or fewer. De Chernatony, Daniels and Johnson (1993) used a mental mapping technique to elicit the content of managers mental model. The average number of competitors mentioned by the managers was five. Porac, Thomas and Baden-Fuller (1989) studied competitive sense making among managers of Scottish knitwear firms. According to Porac et al., most of these companies sell their products on the world market. Although there are thousands of knitwear firms around the world, Scottish managers defined their competitive environment mainly as those firms in the same town or surrounding environment in Scotland.

In short

From the firm driven-perspective, we can conclude that entrepreneurs and managers use simplifications and identify their competitor category according to the similarity with their own firms. As we saw, they use the characteristics of their own firm as their reference point (the size, product style and positioning, geographic scope, and success) to classify and scan their opponents in the marketplace. Generally, approximately five to seven companies are labelled as close and most important competitors. We can use the criteria that firms use to structure the industry in different strategic groups (for example by product positioning or size) when a general judgement about the perception of competition in a given industry is to be made.

3.3 The event-driven perspective

The theoretical starting-point

The second perspective has its roots in marketing literature and can be called 'market or event-driven'. Representatives of this perspective try to explain and predict the observed responses of companies to a competitor's market action, e.g. a new product introduc-

tion or a new entrant. In this perspective, there is a strong emphasis on the (intended) behaviour of the firm's most important competitors. Research shows that the way these events, or the behaviour of competitors is interpreted, does in fact provide a plausible explanation for the strength, response time and aggressiveness of a firm's reactions to these events and behaviour (Heil and Robertson, 1991; Heil and Walters, 1993; Hultink and Langerak, 2001; Lang, Calantone and Gudmundson, 1997; Prabhu & Stewart, 2001). According to Waarts and Wierenga (2000) managerial interpretations of observed events in the market environment could be best understood as a psychological mechanism that links observed competitive events with the competitive reaction. Clark and Montgomery (1998) see it as a psychological process by which managers make sense of the market environment in which they compete. Managers usually "make sense' of this environment in informal contexts and at unstructured moments of retrospection. At these moments, meaning is given to an observed action and an evaluation of the threat to the firm is being made.

Perceived threat

How events are interpreted depends on different aspects, such as the characteristics of the event (an aggressive price cut), the characteristics of the company behind a competitive action (its market share or success, or its strategic position) and characteristics of the market. For example, a price cut by a large firm that has a strong market position is likely to affect the perceived level of threat more strongly than a price cut by a small firm with a low market share. This is because the action of the large firm has a direct impact on the market share and profitability of the target firm. The study of Waarts and Wierenga (2000) takes two aspects from signalling literature (see Heil and Walters, 1993) to measure perceived threat and adds a third variable to explain competitive reactions to product introductions. They asked their respondents (79 product -, product group - or brand managers), given that the new product would prove to be successful, if they:

- expected the pressure on the market share to be weak or strong
- expected the pressure on profit to be weak or strong
- assessed probability to be low or high.

The first two aspects of perceived threat (pressure on market share and pressure on profit) are criteria that the signalling literature labels as 'consequences' indicating the interpreted consequences of a market event for a firm (Heil and Robertson, 1991; Heil and Walters, 1993; Clark and Montgomery, 1998; Eliashberg and Robertson, 1988). In signalling literature, the intensity or hostility of an event is also considered to be another important criterion for the interpretation of a market event. Recent research shows that when a market event is interpreted as hostile, for example a radical product innovation, the perceived threat of that event is higher than when the product innovation is a small improvement of an older product (see Waarts and Wiernga, 2000).

Conclusion

Firm executives are likely to use the following three criteria to interpret the level of threat in the market environment: 1) the pressure of the event on market share; 2) the pressure of the event on profit and 3) the intensity of the market event. However, these criteria could also be used for the evaluation of other events and characteristics in the firm's external environment (e.g. aggressive advertising, court rulings involving firms in the industry). We suggest that for the measurement of the perceived competitiveness in a given market, these criteria could be used to measure how firms evaluate the perceived intensity and strength of different market characteristics (customers, suppliers, new entrants, current rivals and firms who produce substitute goods). In doing so, we

could build a framework for the perception of competition that could be applied at industry level. What this framework will look like discussed in the next section.

3.4 Perception of competition at the market level

The market level

So far, we have discussed perceptions in relation to the identification of the firm's most important competitors and discussed what criteria firm executives use to evaluate threatening competitive events in their market. We will use these insights to get a grip on the firm's perceptions of competition in a more general sense. By taking this step we are able to develop an instrument that measures the perceived competitiveness at market level. Recent research on how firms experience their market environment will be useful for this purpose (Heiltjes, van Wittelosstuijn and Sorge, 1996; Pecotich, Hattie and Low, 1999). Initially, Porter (1979) listed a number of structural characteristics of industry that indicate intense competition, such as a high number of competitors, low entry barriers and a high market growth rate. However, those structural indicators of the industry are not enough to capture the nature of competition. The structural elements of the industry are limited, because they provide information only about the outcomes of competition, can be used as input in the interpretation process, but give no insight in the competitive process itself. As we argued in the introduction, the competitive process behind the outcomes of competition is equally important, especially as a monitoring instrument. That is why we want to combine both elements in our instrument for measuring the perception of competition.

Five perceived forces of competition

More recently, Pecotich, Hattie and Low (1999) used a combination of structural market characteristics and indicators of the competitive process (such as the aggressiveness of advertising and the intensity of price cuttings) to describe competition. This study has its origin in the well know works of Porter (1979). As we explained before, Porter argues that the nature and degree of competition can be described by five competitive forces: internal rivalry, threat of entrants or substitutes and the power of suppliers and buyers. Pecotich, Hattie and Low"s contribution (1999) is that their empirical work shows that firm executives' interpretation of the competitive environment can indeed be classified by Porter's five forces. Heiltjes, Witteloostuijn and Sorge (1996) also used Porter's framework to describe the competitive environment. They defined the competitive environment as the group of organizations with which the company has direct contact, such as customers, suppliers, financiers and competitors. They developed a questionnaire that consisted of a list of statements about the competitive environment. Their respondents were asked to evaluate these statements as to their correctness according to their interpretation of the market.

From the above three studies about the competitive environment and its relation to competition we have selected a number of variables for each competitive force that could describe how firms perceive their market. These variables are listed in table 4. Together these variables represent the way in which firms perceive competition in their market, or in other words the measure of the perception of competition. For instance, the observation that the production capacity has recently been expanded (result of the scanning process) will be interpreted as more internal rivalry, i.e. an increase in the perceived threat of rivals.

table 4 The perception of competition according to Porter's five competitive forces

Observed indicators of competition → leads to higher→	*Perception of competition*
market is growing relatively strongly	Perceived threat from rivals
large number of similar competitors	
recent production capacity expansions	
advertising campaigns occur frequently	
competing firms invest a lot in R&D	
price cuts are common	
the presence of foreign firms	
price cuts are quickly and easily matched	
high profit margins of market players	Perceived threat from entrants
fixed costs are relatively low	
easy access to distribution channels	
little retaliation by established firms to new entrants	
low barriers to enter the market	
buyers switch easily to substitute goods	Perceived threat from substitutes
client needs' are easily satisfied by other products	
high cost of switching suppliers	Perceived pressure from suppliers
small number of suppliers	
a real chance that suppliers may integrate forward	
the industry's product is not important for the supplier	
buyers react quickly to price changes	Perceived pressure from buyers
buyers preferences have strong effects on prices	
a real change of buyers integrating backwards	

Source: EIM (based on Heiltjes et al. (1996), Porter (1980) and Pecotisch et al. (1999).

The relative strength of each competitive force

The abovementioned market variables or 'observables' are the indicators of the perceived threat for each competitive force and together form the perception of competition. However, when we want to know which force is stronger than the other, we need other indicators that can measure the relative strength of each force. Different suggestions can be made to deal with this issue. The strength of each competitive force could be measured by asking firms in what way each force influences their sales, profitability and the market share. In doing so, we take the criteria for perceived threat as discussed in section 3.4. and apply it to how firms perceive each force as a threat not for the industry in general but for their own company. Other options are interviews with market experts, who can give a more objective judgement about the relative strength of each competitive market force. A third option is to question the current competitors how important each force is for their business.

But before we discuss these more methodological issues, we will have to make space for an important discussion: are the firm's perceptions of competition indeed homogeneous or not?

3.5 Similarity of perceptions within an industry

Homogeneity or heterogeneity in perception?

In the context of evaluating competition in a market, an important question that cannot be set aside is whether different entrepreneurs within an industry perceive competition in the same manner. From organization literature two forces can be detected that both shape the perception between firms in opposing directions (see e.g. Deephouse, 1999; Porac and Thomas, 1990; Mosselman, de Jong and Prince, 2001; Reger and Huff, 1993). The first one is a *converging force* that strengthens the shared perceptions of competition in an industry. For example because of the socialization processes within the industry through media and conferences, different firms will share their perception of competition. This force results in a more homogeneous or common perception of competition among firms in the industry[1]. On the other hand there is a stream in literature that argues that a diverging force is at work weakening the shared perceptions of competition among firms in the same industry. For exam[le, because of differences in strategy or through a unique learning experience firms will have different perceptions of competition at industry level. This force results in more heterogeneous or differentiated perceptions between firms in an industry.

Below we explain the converging force in more detail and argue that the effects of the diverging force can be incorporated through the use of strategic groups based on entrepreneurs' criteria to identify competitors.

The homogeneity of perceptions between firms

Porac and Thomas (1990) argue that different competitors construct and maintain a shared understanding of the social economic reality[2]. Hence, firms within a single market develop a common 'mental model' about the competitive environment and the competition in the market. Porac and Thomas (1990) call this conforming force cognitive enactment. Reger and Huff (1993) theorize that this force is strengthened by the cognitive simplification of reality and elaborations. The simplifications through mental models we discussed earlier; elaboration is a cognitive process in which gaps in information (often unconsciously) are filled in with information consistent with beliefs about other, better known examples that are believed to be similar (see Rosch, 1981 as cited in Reger and Huff, 1993). Hodgkinson (1997) notes that this homogeneity of perceptions about the competitive arena, emerges over time, due to the fact that firms share similar technical and managerial problems and frequently exchange information in the conduct of their business transactions. Others have argued that through processes of institutionalism, inter-organizational learning, social identity and modelling within the industry firms' perceptions of competition become highly unified over time (Peteraf and Shanley, 1997; Lant and Phelps, 1999; Sutcliff and Huber, 1998). For example, institutional theories stress that normative pressures in the market environment strengthen the convergence of mental models in an industry, through media, conferences, governmental legislations -for example laws on patents- and subsidy regulations. It seems likely that these conforming institutional pressures affect the isomorphism of percep-

[1] Scholars in these studies (about the structure of markets) use the term management or firm cognition instead of perception. However, we stick to the word perception, in order to avoid misunderstanding and because it does not harm the meaning or content of the concept.

[2] On page 236 Porac and Thomas (1990) note: "(...) organisations often create their own environment by constructing interpretation and then acting as if such interpretations were true (...); it is easy to see how such perceptions might eventually become objectified and institutionalised through such devices as trade associations, specialized publications and a particular language for describing local ecological conditions".

tions on competition between firms within an industry (Daniels, Johnson and de Chernatony, 2002; Lant and Baum, 1995). In fact, this is what Porac, Thomas and Baden-Fuller (1989) found in the case of the Scottish knitwear industry.

Homogeneity in extreme: cognitive inertia

These converging perceptions, formed on the basis of the conforming pressures, can be harmful to a certain extent if these perceptions are difficult to change; a phenomenon that is known as cognitive inertia. Cognitive inertia represents the emergence of cognitive fixations over time. For example, in competitive scanning cognitive inertia can result in the habitual process of limited scanning of the top 3 competitors in the industry. This cognitive fixed pattern occurs because firms and thus entrepreneurs and managers mostly fall back on routines, rules of thumb and institutionalised strategic choices and scanning behaviour after a certain period of time. Eventually, cognitive inertia is harmful when it makes the routinized players in the industry blind to important threats, for example from new entrants (Zajac and Bazerman, 1991). Or, firms could be misled in the assumption that competition in their market is limited to their geographic location only, while on the other side of the world bigger firms are serious contesters in their market (see Porac, Thomas and Baden-Fuller, 1989).

The heterogeneity of perception in an industry

The diverging force works the other way around. Because firms search for competitive advantage and have a unique learning history they will try to distinguish their firm and products from other firms in the market. The consequence is that firms interpret competitive events and their most relevant competitors differently with as result a more heterogeneous perception about competition within an industry[1]. Indeed, some empirical studies show that executives in different organizations perceive the same environment differently and identify different competitors in the same market (Hodgkinson and Johnson, 1994; Johnson, Daniels and Asch, 1998; de Chernatony, Daniels and Johnson, 1993; Daniels, Johnson and de Chernatony, 1994, 2002: Daniels and Johnson, 2002). For example De Chernatony, Daniels and Johnson (1993: 379) conclude the following from their study: "Within each of the five investigated firms, there was a low level of agreement between managers as to the industry structure. When comparing perceptions of competition across managers from different firms in this study, even less similarity was noted- in fact none of the managers saw the same firm as being a common competitor". However, the results of the above study have received a lot of critique, because of the controversial research methods in comparing the perceptions of competition (see Hogdkinson, 1997; 2001; 2002; Maule and Hodgkinson, 2002). A second note is that the differences in perception found in the above study may be explained by the different characteristics of the competitors in the market, such as size, strategy, product style etc.; variables that were not included in the above study. By classifying the market in (strategic) groups formed on the basis of these criteria - like Porac, Thomas and Baden-Fuller (1989) did in their knitwear study - a more similar picture of perceived competition is likely to emerge. As a consequence, we expect a high level of agreement on the perception of competition between members within the same (strategic) group, and a stronger difference in the perception of competition between the members of two different (strategic) groups. In our research this hypothesis should be tested in or-

[1] For example, in the coffee and tea industry there are different players, like a specialist in foreign coffee and tea, a supermarket with low budget coffee and the familiar brands, or night shops that compete with services through late opening hours. These different firm characteristics determine the perception of competition and are likely to be dissimilar between these different players.

der to determine if the obtained data is a good representation of the population (i.e. the market to be studied).

Conclusions and implications for the measurement of perception

Taking the theoretical views of the similarity and differences in the perception of competition between firms in the same industry into consideration, we expect that the converging force to be stronger. In doing so, we side with a large group of scholars (Porac, Thomas, Wilson, Paton and Kanfer, 1995; Porac and Thomas, 1990, 1994; Peteraf and Shanley, 1997; Lant and Baum, 1995; Reger and Huff, 1993; De Chernatony, Daniels and Johnson, 1993) who argue that firms share more or less the same perceptions about the competition in a given industry. This means that we believe that through various psychological, institutional and social processes certain stable groups of firms will emerge over time that will result in conformity in perception of competition (see also Greve, 1998; McNamara, Deephouse and Luce, in press; McNamara, Luce and Tompson, 2002).

Taking this position has the following implications for the measurement of perception of competition within a market. First, the perceived competition in a market can be measured with the individual evaluations of the level of competition. Second, measuring the level of competition in the market from the perspective of the entrepreneur or manager should be based on the intensity, the commitment, and the impact of the competitive process. Third, these evaluations of competition within an industry should be classified in strategic groups according to the criteria that strategic decision makers use to identify their most important competitors (size, product style an positioning, geographic scope and success), because then the obtained data will give a good representation of the market population.

4 Competitive reactions

4.1 Introduction

Product introductions, new entrants, a merger of two suppliers, a new substitute product or changing preferences of buyers all have a potential impact on the way firms perceive their competitive environment. As our conceptual model suggests these perceptions are likely to trigger firms to react. Depending on the awareness of the threat, the motivation to respond and the ability to respond, firms can react in many different ways and degrees to competitive threats from the competitive environment (see e.g., Chen, Smith and Grimm, 1992; Chen and McMillan, 1992; Smith, Ferrier, and Ndofor, 2001; Ferrier, MacFhionnloach, Smith and Grimm, 2002). Below, we first discuss a variety of reactions (4.2) and dimensions of the reactions (4.3). This will serve as a platform from which we can explain, in chapter 5, how the degree of perception of competition relates to different kinds of competitive reactions.

4.2 Types of competitive reactions

Four types of reactions

The first issue to consider in deciding to mingle in the competitive process is whether to act at all. In the context of deciding how to respond to new entrants Gatignon and Reibstein (1997) identify specifically four potential types of reactions that firms can decide between: retaliate (or fight), accommodate, ignore or abandon. Below, we apply these four types in the context of how firms could respond to high levels of perceived competitive threat. Most of the reactions can be assigned to one of these more general reaction types.

Retaliation. The most common response to a perceived threat is to retaliate. This means that the firm chooses to fight against its his competitors. Retaliation implies a sort of declaration of war, the firm wants to signal to its competitors its intention to defend or expand its market share. This can be done by using various marketing instruments, for example by increasing its' marketing expenditures and pushing its sales through a stronger marketing effort or more strategic re-orientations, like large investments or even hostile take-overs. Reacting in this manner often shows that a firm is committed to defend at any cost, which may deter future aggressive action by its competitors.

Accommodation. Instead of fighting, firms can also choose to take a far less aggressive attitude to combat perceived high levels of competitive threat, namely to accommodate. This means that the firm gives way to other companies to expand. Accommodation can take many forms from silent cooperation to more explicit actions like mergers. According to Gatignon and Reibstein (1997) this decision to adapt is appropriate when there is "enough business for all competitors, or when the increased competition could serve to increase the overall size of the market" (p. 241). The logic behind accommodation is that a cooperative attitude could be in the best interest of all players in the market, for example by reducing aggressive pricing in order to reduce chances of losing profits.

Ignoring. A more passive reaction type is to ignore the competitive threats. This means that a firm decides not to take any competitive action at the time of the threat. This

tactic could be necessary for a number of reasons. It could be due to a lack of significant perceived impact of the action on the firm's performance. Or it could reflect a "wait-and-see" attitude as Gatignon and Reibstein (1997, p. 240) put it, that creates time for the firm's manager to search for more information about the threat and the market's reaction. Another reason why competitors' moves are ignored could be the result of not being aware of the competitiveness and threats in the market. Finally, no reaction could be due to the fact that necessary resources to react are not available.

Abandonment. The most extreme reaction to take when a firm perceives a highly competitive environment is to abandon the market. Reasons for a total withdrawal could be a sense of panic or experiencing an overwhelming increase in hostility from the competing firms who might offer better and newer products, or have better and more resources. This could lead to the conclusion that greater losses while trying to survive are more costly than to give up the fight and abandon the market. Other reasons for a market withdrawal could be problems in finding a suitable successor or when the firm has shifted its main focus to a niche market.

The frequency of the above types of reactions in a market gives an indication of the actual competitive process going on. Moreover, the frequency of each type of action is likely to relate to the strength of the threat firms perceive in the competitive environment. How these relate will be discussed in the next chapter.

Strategic vs. tactical reactions

In contrast to the above classification of Gatignon and Reibstein (1997), Chen, Smith and Grimm (1992) argue for organizing various types of actions into the broad dichotomy of "strategic" versus "tactical". They consider an action strategic if it includes a significant investment in fixed assets and/or people and results in major changes to structure and product positioning. In contrast, tactical actions do not involve such commitments and require relatively minor, routine changes resolvable by middle or low-level managers. Fewer resources are necessary and procedural modifications can generally be substituted for structural reformation.

In predicting competitive actions, general strategy theory (such as Porter, 1980) would expect that competitors will be more motivated and better able to respond to tactical actions than to strategic ones, because strategic actions are more firm-driven and less focused on fighting against competitors than tactical moves. The latter involve less uncertainty and require fewer resources.

4.3 Dimensions of competitive reactions

Marketing literature also speaks of dimensions of reactions, when we discuss to what extent firms can react when facing a highly competitive environment. Kuester, Homburg and Robertson (1999) distinguish five dimensions: the type of marketing instrument, the intensity, the speed, the number of instruments and the domain.

Instrumental dimension. The firm can use different marketing or strategic instruments when it plans to make a competitive action or wants to respond to a threat, for example price cuts, advertising, sales force increase, increase capacity, etc. The preferable (marketing) instrument to be used in reacting to threat will depend on many factors like the firm's capabilities, requirements, the strategy, the industry characteristics, the regulations etc. (Kuester, Homburg and Robertson, 1999; Chen, Smith and Grimm, 1992; Ferrier, 2001, Coviello, Brodie, Danaher, and Johnston, 2002). Usually the firm

reacts with its most efficient (marketing) instrument, i.e. the one with the greatest elasticity (Gatignon et al., 1989).

Intensity dimension. The intensity dimension means that firms can choose to take aggressive steps or less aggressive ones, and substantial price cuts are usually considered as very hostile. A firm's counterattack could deliberately be very hard in order to refute the attacking firm's pretensions to take any future actions in its market. A less aggressive counterattack could be due to limited resources or capabilities or due to the lack of will to fight back hard, because the firm might build a reputation of being aggressive.

Speed dimension. Besides the intensity, firms also vary in their speed of reaction. A firm can react r to the considered threat immediately or wait for some reason to launch a countermove. Quick responses are asked when competitive actions have strong and direct impact on the market (Gatignon, Robertson and Fein, 1997). But, sometimes delay may be preferred, either because that will signal that it does not want a (price) war, or because a reaction needs time, e.g. in the case of product improvements or innovations (Bowman and Gatignon, 1995).

Breadth dimension. This dimension refers to the number of marketing instruments used to retaliate. Sometimes one instrument is preferable, but in other situations more varied actions are taken to hold or enlarge a firm's market share.

Domain dimension. The domain of reactions refers to the market in which the defender counterattacks. Because in the study of Kuester, Homburg and Robertson (1999) this rarely occurred and it crosses the boundaries of a market, we leave out this form of retaliation in our further discussion.

We will focus on combinations of the first four dimensions, because we presume that firms will react differently within these dimensions when they face serious threats in their market than when facing minor threats.

Conclusions

The types of competitive actions discussed above, and their dimensions, have a strong base in competitive action literature and have been extensively explored by the Gatignon school (see Gatignon et al., 1997; Bowman and Gatignon, 1995; Kuester, et al. 1999; Chen, Smith and Grimm, 1992; Hultink and Langerak, 2002; Waarts and Wierenga, 2000) and all are critical variables in the study of competitive interactions (MacMillan et al., 1985; Smith et al., 1989; Ferrier, 2001). Also, they have been extensively researched in the context of predicting responses, in which they are extremely useful for testing our hypothesis about the predictive value of the perceived competitiveness for competitive reactions.

5 The relationships of our conceptual model

5.1 Introduction

The main goal of including the concept of scanning behaviour and competitive reaction in our conceptual model and of testing these with perception of competition, is to look for evidence that perceptions of competition are not a researcher's artefact r, but are actually related to the firm's behaviour both in scanning and in reacting to perceived threats from the environment. Because of the explorative nature of this study, the expected relationships drawn from the theory discussed will be formulated in more general terms and will sometimes lack empirical evidence.

5.2 Scanning and the perception of competition

A reciprocal relationship

In this section, we discuss the relationship between the scanning activities of a firm and the perception of competition. As we argued earlier, the outcomes of the firm's environmental scanning activities are the stimuli for an evaluation about the perceived threat to the firm. Besides that, the relationship is reciprocal, because it is likely that firms that perceive stronger competitive threats in their market environment scan their environment more thoroughly and with more attention[1], because of the danger of losing their market share.

Related evidence from empirical research

Research on the proposed relation between perception of competition and scanning is little or none. Mostly, strategic management literature and research aimed to find a direct link between firm's information gathering and its organizational strategy and performance (Beal, 2000; Audet and d'Amboise, 1998; Jennings and Lumpkin, 1992, Dollinger, 1984) and less on the interpretation process involved in that relation (Jackson and Dutton, 1988). However, some studies explored perceptions of the general environment by investigating the relationship between the firm's perceived environmental uncertainty and its scanning behaviour (Boyd and Fulk, 1996; Buchko, 1994; Sawyerr, 1993; Milliken, 1990; Daft, Sormunen and Parks, 1988). For example Daft et al. (1988) interviewed the chief executives of 50 manufacturing companies about the perceived strategic uncertainty. Perceived strategic uncertainty was calculated by adding up the score for the perceived complexity and the score for the perceived rate of change. The sum is multiplied by the perceived importance. Six dimensions were distinguished: competition, customer, technological, regulatory, economic and socio-cultural. They found that chief executives responded to perceived strategic uncertainty (mostly the competition, customer and economic dimension) with greater scanning frequency. Boyd and Fulk (1996) examined how executives' perceptions of the global environment affect their decisions to collect strategic information. Results from interviews with 72 senior executives in a cross-section of industries showed that strategic importance was the primary determinant of scanning. Sawyerr's (1993) empirical work on chief Executives

[1] This relationship is, of course, also dependent on variables like institutional and business constraints (Elenkove, 1997), the capacity of environmental scanning systems (Yasai-Ardekani and Nustrom, 1996) and even national culture (Sawyerr, 1993; Schneider, 1989), which are not included in this research.

Officers of 47 manufacturing firms in Nigeria showed that: (1) perceived uncertainty in the environment was significantly higher for the task environment (competitors, customers, suppliers) than for the remote environmental dimensions; and (2) if perceived uncertainty increased in a dimension of the environment, scanning frequency and scanning interest also increased. Finally, in their study of SMEs in a state in the US Lang et al. (1997) found evidence for the relationship between perceived competitive threat and information seeking. Perceived competitive threat was measured by the extent of expected competitor inroads and weakness relative to competitive price, quality and transportation. On the basis of these findings, we expect the following relationship:

H1: *The firm's scanning activities are positively related to perceptions of competition.*

To summarize, the relationship between scanning activities and the perceived level of competition is important for our measurement, because we expect the perceived level of competition is associated with how actively a firm scans its competitive environment. Therefore, the concept of scanning can be used to validate the measurement of perceived competition.

5.3 Perceptions of competition and competitive reactions

Marketing literature on reactions sheds some light

Although research about the link between perceptions of the competitive environment and the firm's strategy has been studied extensively, there is a remarkable silence in the area of our interest, i.e. the relationship between perceptions of competition and the actual competitive behaviour of firm. So far, in industrial economic theory this relationship has never been seriously investigated. In marketing and strategic management literature studies can be found that have explored the predictive value of perceived competitive threats for the way firms react (Heil and Walters, 1993; Waarts and Wierenga, 2000; Hultink and Langerak, 2002; Kalra, Rajiv and Srinivasan,1998)). We will use the insights of marketing and strategic management literature to strengthen our argument.

Perception of competition and types of reactions

Discussing how a firm could react to possible new entrants, Gatignon and Reibstein (1997) discussed four types of reaction: retaliation (to fight against), abandonment (leave the market), cooperation (arrangements) and ignoring (doing nothing).

When we apply these types of reaction to the context of perceived intense competition, at least two types of reactions are expected: retaliation, and abandonment of the market. Retaliation suggests that the firm's business has been threatened and therefore it is motivated to fight. Abandon suggests that competition has been perceived to be too intense to fight any longer. Looking at the other two types of reaction, we expect that firms that show signs of cooperation with their competitors have not yet been confronted with intense competition. This could be due to a fast growing market or more seriously that they try to work together to keep other competitors at a distance. However, this last type could also occur in markets with strong competition, in order to defend their hard fought market share using silent and mostly illegal arrangements. Finally, deliberately ignoring the threat is a less clear reaction when firms face strong competition, because the trigger of the threat will likely push the firm to do something. However, a firm might not have the capacity and resources to react to the threat even though the motivation might be strong. Based on these expectations we formulate the following preliminary hypothesis:

H2: *Reactions of retaliation and abandonment of the market will be more strongly related to perceptions of intense competition than reactions of ignoring or co-operation with competitors.*

Strategic and tactical reactions

As discussed earlier, Chen, Smith and Grimm (1992) defined and dichotomised types of action as "strategic" or "tactical" with, on the one hand, significant investments in fixed assets and/or people/structure labelled as strategic actions and on the other low commitment of fixed assets as tactical actions. In predicting which type of action would be preferred when firms faced strong competition, theory is lacking or ambiguous. General strategic theory suggests that competitors will, in general, more motivated and better able to respond immediately with tactical reactions rather than strategic response, because competitors are more familiar with the implications of a tactical action and they are likely to have experience on which to base a response decisions. In addition, tactical actions involve less uncertainty and require fewer (and more general) resources. However, when the competition is perceived to be intense and threatening, firms might also(or instead) want to take strategic action, in spite of the difficulty in reallocating resources and the implementation process of a major strategic reorientation. Since tactical actions are often taken more easily and strategic moves are less frequent and only made when really necessary or wanted, competitors that perceive high levels of intense competition will use both tactical and strategic actions to respond in their market. Taking these factors into account, we suggest t a preliminary working hypothesis for the relationship between perception of competition and type of actions.

H3: *Both tactical and strategic actions will be related positively to firms' perceptions of intense competition*.

Perception of competition and the dimensions of competitive reactions

Besides the type of reaction, marketing research in the field of explaining retaliatory behaviour also distinguishes different dimensions to predict more precise competitive actions. Specifically, three of these dimensions are applicable for testing the relationship between firm's perception of competition and competitive reactions, namely the intensity of retaliation, the breadth or number of marketing instruments and the speed of reaction. These three dimensions all deal with the magnitude of competitive reaction and not directly with its content. Therefore, these dimensions are likely to be related to how firms perceive their market as being more or less competitive. Below we discuss the relationships of all three separately.

Dimension 1: the intensity of competitive reactions

Kuester et al. (1999) defined the intensity of relation as the weight placed behind the marketing instruments used. In other studies it is conceptualised as the aggressiveness or the strength of a competitive reaction (Hultink and Langerak, 2002). Empirical research, using a signalling paradigm, has explored the question to what extent perceptions about competitive actions explain the intensity of competitive reactions. Heil and Walters (1993) empirically tested the three market interpretations of possible threat on its hostility, consequences and commitment to explain competitive reactions to product introductions using primary data collected from a large number of US corporations. They found that the perceived hostility and consequence of a competitor's action has a significant impact on the intensity of competitive reactions; surprisingly, the commitment signal did not have a significant effect. Hultink and Langerak (2002) found in a

similar study on product introductions that perceived signals of hostility as well as commitment had significant positive effects on the strength of the competitive reaction. Further, Kuester et al. (1999) found in their study that the stronger the attack on a specific dimension of reactions (i.e. the level of innovativeness), the stronger the reaction on the product mix will be (see also Axelrod, 1984). Perceived threats from potential entrants are also likely to relate to stronger competitive reactions, especially when the entrant has a competitive advantage, high access to resources and has a higher scale (Robertson and Gatignon, 1991). Finally, when pressures from buyers are perceived as strong, because of low switching costs and transparency of market information, competitive reactions are also likely to be stronger when a threat is perceived, because of the danger that customers will shift to another competitor. Bearing this theory and empirical evidence in mind, we expect that firms, that perceive strong and threatening competition, will react more intensely and thus more aggressively in order to defend or enlarge their market share.
Therefore, we pose the following hypothesis:

H4: *The intensity of firm's competitive actions will relate positively with the perception of stronger competition.*

Dimension 2: the speed of competitive reactions

Reaction speed can be measured as the time lag between competitive threat and response, a dimension that y has been studied recently in the marketing domain (see Bowman and Gatignon, 1995; Gatignon, Robertson, and Fein, 1997; Kuester et al. 1999; Hutlink and Langerak, 2002). Kuester et al. (1999) explain that the higher the threats that firms perceive, the more important it is for the threatened firm to prepare a swift response to limit the potentially harmfully effects on its profitability. Porter (1980) argues similarly that if a rival's new product is perceived as attacking a business of major strategic importance, it is likely to provoke quick responses. Empirical work confirms this unambiguously, MacMillan et al. (1985) found that the perceived visibility, potential, and strength of competitors actions was positively correlated with reaction speed, which means that the more actions were perceived as visible, having potential, and directly attacking the firm's position, the quicker the response was (see also Chen, Smith and Grimm, 1992). However, when competitor actions were perceived as more radical the effect was a longer response time because of the longer decision and implementation process strategic actions demand in contrast with more tactical manoeuvres. Further, empirical research suggests that speedier responses are more prevalent if markets are likely to grow (Bowman and Gatignon, 1995; Kuester et al., 1999), because firms form growth expectations, and if those are jeopardized by a threat (such as a product entry), reactions are likely to occur to hold on to their growth expectations. The effect of perceived competition on reaction speed is also strengthened when firms perceive that buyers have a strong bargaining power in their market. This is because the rivals in that market are strongly motivated to keep their customer base and prevent them from switching to another firm (see Bowman and Gatignon, 1995). Finally, it can be argued that when perceived threats from new entrants or substitute products increase, this will effect the competitive reactions especially in concentrated markets, because incumbents expect new or substitute products to have an impact on their market share gradually as new entrants inevitably will invade their market (Caves, Fortunato and Ghemawat, 1984). As a consequence competitors are forced to provide a speedy defence for r their market position against rival activities.
Therefore, we suggest the following relationship between perceptions of competition and competitive response speed:

H5: *The firm's reaction speed will relate positively with perception of stronger competition.*

Dimension 3: the breadth of competitive reactions

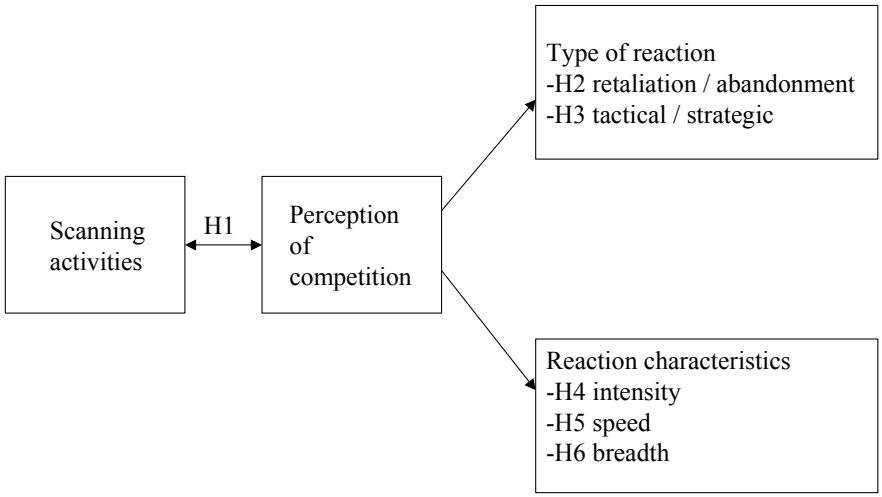
The breadth dimension refers to the number of marketing instruments used to retaliate (Leeflang and Wittink, 1996). In predicting the breadth of competitive reactions, literature on strategic groups suggest that in markets with a large number of competitors, the range of relevant competitive instruments increases (see Kim and Lim, 1988 as cited in Kuester et al. 1999). In contrast, in highly concentrated markets retaliation is expected to be less broad (i.e., incumbents are likely to use fewer marketing instruments), because in such environments a narrower strategy orientation, such as cost leadership through economies of scale effects is likely to occur (see Kim and Lim, 1988 as cited in Kuester et al. 1999). This effect will be stronger when the market is price-sensitive, which means that buyer groups have a strong impact on the market, because buyers switch easily from one competitor to another. When we apply these insights to the context of this paragraph, we can suggest that when firms face more intense competition (mostly from many competitors, see Porter 1980), firms are likely to use more marketing instruments because competitors generally try to pursue a differentiation strategy by employing a wide range of marketing instruments to carve out a profitable and more stable position in the market. In contrast, when firms perceive fewer competitive threats or are competing in more concentrated markets, they are likely to choose the instrument with the strongest elasticity or the instrument which is in line with their product positioning (Kuester et al., 1999).
Given the above discussion, we could formulate a preliminary working hypothesis about how a firm's perception of competition affects the number of marketing instruments used to deter the perceived threat.

H6: *The firm's breath of reaction is likely to relate positively with perception of stronger competition.*

Conclusion

By assuming that perceptions of strong competition have strong relationships with more active scanning behaviour and a strong magnitude of the firm's competitive action, we related the three main elements of our conceptual model to each other and embedded the latent construct of perception in the more manifest variables scanning behaviour and competitive reactions. The relations are visualized in figure 3.

figure 3 Research framework



6 Measuring perception of competition

6.1 Introduction

How can the perception of competition be measured? In this chapter we deal with the issue how researchers can obtain knowledge about managers' perception of competition. To achieve this goal we reviewed a large number of empirical studies on this subject. Hogdkinson (1997, p. 633) notes that 'in a remarkably short period of time, the field of strategic management has witnessed a proliferation in the range of techniques being applied in an effort to 'map' the mental representations of decision-makers'. Below we o discuss the relevant empirical studies using the following questions:

- What is measured in empirical literature about perception of competition and how is it measured (paragraph 6.2)
- How can data about perception of competition be collected (paragraph 6.3)
- What is the unit of analysis (paragraph 6.4)?
- What analytical techniques can be used (paragraph 6.5)?

In paragraph 6.6 conclusions and implications are drawn from the above insights for the development of an instrument that measures the perception of competition.

6.2 Empirical studies, methodology and samples used

Below in table 5 we have summarized the more recent empirical works on the perception of competition from three angles: 1. the topic of the study, 2. the sample used in testing the assumptions and 3. the methodology used.

table 5 Outline summary of recent studies on perceptions of competition

Study	*Topic*	*Sample*	*Methodology and data collection*
Calori, Johnson and Sarnin (1994)	CEO's cognitive maps of the structure and dynamics of their industry in terms of complexity in relation to the scope of the organization's business portfolio	26 CEOs (14 English and 12 French) from 4 industries (brewing, car manufacturing, retail banking and book publishing)	Content analysis of semi-structured interview transcripts in order to infer the respondents' mental models of the structure and dynamic of their industries
De Chernatony et al., (1993), Daniels et al. (1993; 1995)	A cognitive perspective on differences of managers' perceptions of competition and how to measure perception of competition	24 senior managers from 5 pump manufacturing companies and 17 customers from 10 companies (purchasing and engineering managers) within the offshore pumps industry	Free response listing of competitors in conjunction with card sorts and repertory grid

Study	*Topic*	*Sample*	*Methodology and data collection*
Porac and Thomas (1994)	Subjective rivalry and the explanation why categorization process influences perceived competitive boundaries between firms	Three samples of U.S. grocery retail managers: (1) N=25, (2) N=25, (3) N=8	Interviews, analyzed using coding proceedings
Porac, et al. (1995)	The development of a taxonomic model of rivalry among Scottish knitwear producers that describe competition by attributes involving size, technology, product style and geographic location	(1) N=20 managing directors (MDs) from 20 Scottish firms. (2) N= 3 industry experts from trade associations and technical schools (3) N=89 MDs	(1) Field interviews (2) The industry experts were consulted in order to help verify and interpret interview results (3) a structured questionnaire
Reger and Huff (1993)	A cognitive approach to measure the presence of strategic groups	24 strategists from 6 bank holding companies in the city of Chicago, U.S.	Interviews using the repertory grid method and cluster analysis to form different strategic groups within the industry
Reger and Palmer (1996)	Study the cognitive inertia hypothesis, i.e. strategists mental maps fail to keep pace with the major changes experienced by the industry	Three samples, (1) as Reger (1990), (2) as Walton (1986), (3) N-25 "upper echelon executives" from 6 banks and 5 "thrift" organizations in Arizona	A retrospective comparison of findings drawn from 3 separate studies each conducted within the U.S. financial services industry, over differing time periods
Heijltjes, Van Witteloostuijn and Sorge (1996)	An empirical study of consistent environment-strategy combinations in different industries in the Netherlands and Great Britain	24 Production companies in Great Britain and 14 in the Netherlands within different industries, with a emphasis on the chemical and food industry	Structured questionnaire taken in the interviews with members of the Board of Directors

Study	*Topic*	*Sample*	*Methodology and data collection*
Hodgkinson (1997)	The explanation of cognitive inertia in the UK residential estate agents market.	206 participants from 58 organizations in the UK residential estate agency industry with a follow up investigation of a sub sample of N=114 of the original participants from n=41 of the organizations, some 12-18 months later	A longitudinal study in order to compare mental maps of competition using a modified version of the repertory grid technique at two different moments
Lang, Calantone, Gudmundson (1997)	The relationship between competitive threats and opportunities and scanning within small firms.	671 small firms from different type of business and industries (service, retail, manufacturing or wholesale) with 100 or fewer employees in a state of the U.S.	A structured questionnaire via mail
Greve (1998)	Managerial cognition and the consequences of adopting market positions in highly uncertain environments	All commercial radio broadcasting stations in the U.S. in the 299 highest ranked markets in the nation	A content analysis of documents about the spread of new radio format s within the radio broadcasting industry
Pecotich, Hattie and Low (1999)	The development of a scale measurement for perceptions of industry structure based on Porter's five competitive forces	(1) 15 experts in strategic marketing selecting from a bank of 126 items 55 accurate items. (2) 151 executives ranging from a wide range of industries	A validation of a new instrument via a selection of accurate items by 15 experts, a pre-test questionnaire and a structured questionnaire
Clark and Montgomery (1999)	Managerial identification of competitors	(1) 37 MBA-students and 20 executives (2a) 61 MBA students (2b) 100 executives of a European multinational	(1) Open ended survey (2) a quantitative experiment using the Markstrat2 simulation game as empirical setting
Daniels, Johnson and de Chernatony (2002)	Task and institutional influences on managers' mental models of competition	32 managers in the financial services industry (large and medium sized firms) with a selected of a particular product marketed: house loans for first-time homebuyers	Semi-structured interviews with a visual card-sort mapping technique and later a repertory grid questionnaire Three to six moths after the initial mapping follow up interviews were taken

Study	*Topic*	*Sample*	*Methodology and data collection*
Fombach and Zajec (1987)	The use of managerial perception to explain intraindustry stratification	The 114 largest firms in the financial services industry	Survey and content analysis of annual reports

Source: EIM.

Most of these studies use a relatively small sample. This probably has to do with the data collection method. In most studies (field) interviews were conducted. In some of these studies, sorting tasks were included during these interviews. In cases where the sample increased, a structured questionnaire was used.

6.3 Data collection

To collect accurate empirical data about how firms perceive their competitors researchers in this field have used a variety of methods. Below we discuss the following data collection methods:

- Structured questionnaire
- Free-response methods
- Interviews and document research.

Ad 1. Structured questionnaires

To collect data via a structured questionnaire is the most common method in empirical research on perception of competition. For example, Heijltjes, Van Witteloostuijn en Sorge (1996) used a questionnaire based on Porter's five-force model to determine how managers described their competitive environment. They formulated 19 statements about the competitive environment and asked managers (face to face) to evaluate to what extent these statements were true. A similar example is the study of Pecotich et al., (1999). They validated their instrument of perception of industry structure by questioning via a mailed questionnaire top executives of firms from several industries to indicate to what extent statements about their industry were correct.

This method of data collection in studies about perception of competition is the most preferable of the collection methods when comparing different industries (in the case of Heiltjes et al., 1996), comparing types of industries (see Pecotisch et al., 1999), investigating relationships between perception of competition and other concepts such as scanning and competitive/strategic reactions (see Waarts and Wierenga, 2000 and Heiltjes et al., 1996) and most importantly when the objective is to compare data about competitive perceptions within the same industry over time.

More practically, this method is cheap, quick and the data obtained can be used for advanced statistical analyses, such as testing reliability and validity and comparing data through time. An important limit of this method is the chance of losing the more detailed information and the bias of non-response with the serious consequence of drawing conclusions from the data, which are not a good representation of the population.

Ad. 2 Free-response methods

When free-response methods are used the respondents are confronted with questions with an open end. A commonly used application of this method is to elicit which companies are identified by managers as competitors and why. In fact literature mentions

two different types of free-response methods that are worth discussion: the visual card method and the repertory grid.

The visual card technique. This technique involves a visual card-sorting task that shows how people categorize their competitors in groups (De Chernatony et al.,1993; Daniels, et al.,1995; Johnson et al., 1998). The method is based on cognitive categorization theory, given the impetus provided by strategic groups theory and previous cognitive analyses of competitive industry structures. The method requires the respondent to name all those companies that s/he can think of that compete with his/her own company. The names of the elicited companies are written on cards. The respondent is then asked to sort the cards, placing those companies the respondent perceives to compete most closely with each other closest together. The respondent is then asked why s/he placed the cards in this manner. This technique provides a quick and face valid way of representing the relationships between companies in an industry. It also provides descriptions of each of the companies or clusters of companies, depending upon how the cards are arranged. Each of the maps can be recorded by taking a photograph of the map. Using this source, a map can be constructed representing the spatial relationships between the companies as they were arranged. The procedure is potentially very easy to administer and popular among researchers, because it makes minimal a priori assumptions concerning the characteristics of managers' knowledge. The visual card technique is evaluated with respect to its psychometric properties against the well-established repertory grid technique and shows good validity in comparison with the repertory grid technique (Daniels et al., 1995). However, various authors have acknowledged that ideographic methods such as this card technique can artefactually increase the divergence amongst cognitive maps through demand characteristics of companies, that emphasize surface-level triviality in the maps during interviews (Daniels et al. 2002, Hodgkinson, 1997; 2002).

The repertory grid. This more flexible technique is known for eliciting a manager's mental model of competition, in such a way that, via a difficult analysis, systematic comparisons can be made with other personal mental models of competition in the same market (see Reger and Huff, 1993; Daniels, et al., 1995; Hodgkinson, 1997). In the first stage of the method respondents are asked to name the companies s/he believes his/her firm is competing with. The next stage involves eliciting the constructs. In other words, each respondent personally identifies dimensions, which were used to elicit judgments about competitor's attributes and/or strategies. In order to elicit the constructs, the triadingmethod is used. Triading involves selecting three cards at random. The respondent is asked to identify the two companies that are most similar and then to state how these two are different from the third. After the interview, the companies and constructs are then arranged in a grid. The respondent then rates each of the companies on each particular element.
The grid technique usually takes some time to complete since it involves triading and the administration of the grid. This may be a substantial problem if the number of elements is large. Some researchers have also noted that the procedure is somewhat annoying, because of the process of triading and repeatedly comparing the similar concepts. This may create difficulties in obtaining access to some executives, since they may be unwilling to allocate too much time to the researcher. Hodgkinson (2002) further argued that similarity judgments have been found to be both context sensitive and asymmetric, and when faced with numerous complex judgments, individuals tend to use heuristics in order to simplify their judgments. The advantage of the grid technique is its shown reliability by producing similar representations over time of a person's mental model (cf. Hodgkinson, 1997; Reger and Huff, 1993). Another advantage of the grid

technique is that it rests on a well-established and well-articulated theory of psychology (cf. Daniels, et al., 1995).

An example of a study using a free-response method is Clark and Montgomery's qualitative study in which they asked respondents about their competitors and how they identified them. Subjects were given a two page, open-ended survey whose purpose was described as learning about how they thought about competitors. The first question was to list all other firms that competed with their business unit. Then, they were asked to go back and mark each competitor on the list that they would describe as a major competitor. Following this exercise, subjects were asked to choose one of the major competitors they had identified and describe why it was a major competitor of the business unit. The respondents then performed the same task for a minor competitor and a potential competitor of their business unit.

Ad 3. Interviews and document-analysis.
This collection method is the purest form of qualitative data research and can be fruitful in the preliminary stage of theory building. The data in the empirical study of Calori, Johnson and Sarnin (1994) on top managers' perceptions of the competitive environment were collected by open-ended interviews. The interviews were loosely structured, though grounded on two broad questions designed to discover the CEOs' strategic thinking about their industry and their firm: (a) what main changes do you expect in your industry in the 90s? and (b) what changes are you thinking of for your own company in the 90s? Although both questions were about change, managers also discussed the present configuration of the industry. In this way they provided explanations of both the structure and dynamics of the research on hand. Other data about the scope of the company were collected from documentary sources (annual reports, industry studies and the business press). The breath of the business portfolio of a firm in the industry was evaluated by the number of products * markets, in terms of three categories: focus on one business, a few business and most of the businesses in the industry. The geographic scope of a firm was evaluated by the geographical limits of its targeted markets in the industry, according to three categories: domestic, domestic and a few foreign countries, and international (several major foreign countries). The major advantage of this method is that it gives rich data about the object to be studied. There is room for the researcher to be flexible in the interviews, so that information will be gathered that is most interesting for the research question. Although this method is practiced a lot, it has some important drawbacks. First, the data cannot be generalized to other contexts. Therefore, the re-test reliability is relatively low. Second, this collection method is rather expensive and time consuming, with the serious consequence that only a small number of interviews can be conducted. Third, interviews can be strongly manipulated by the researcher, who is often far from objective and mostly eager to find conformation for his personal implicit and often unconscious hypothesis. Given these objections, interviews can be useful, when other methods show ambiguous results (which can happen with structured questionnaires) and explanations for the results are wanted. Interviews could also be helpful, when results from a market study need to be validated and checked or when questionnaires need to be tested. Expert interviews could provide useful and specific information that could enrich the data already collected or the instrument developed.

6.4 Level of analysis

In economic research in general and particularly in the research on perception of competition three different levels of analysis are possible. The researcher may want to study perception on the following levels of analysis:

- The manager's level. Results are focused on the level of the individual manager or firm (Hodgkinson and Maule, 2002), for example in Clark and Montgomery 's study (1999) on how managers identify their competitors and what was the main focus of their study. In f Waarts and Wierenga (2000) how managers react to product introduction were the main focus and the explanatory power of how they perceived such signals. Most empirical studies in marketing literature on competitive reaction are on this level.
- The market level. Conclusions are made about the industries, strategic groups or segments of markets, for example in relation to the perceived intensity of competition (Pecotissch et al., 1999; Heiltjes et al., 1996), the changes in competitive structure and dynamics (Hodgkinson, 1997, Calori et al., 1994), or the similarity in managers model of competition (Daniels, 1995; 2002; Johnson et al., 1998; Porac and Thomas, 1994; Porac et al., 1995). However to obtain data to draw conclusions about the perceived competitiveness in an industry, managers and executives from firms within the industries or experts who know a lot about the industry are questioned. The results of the data obtained will be aggregated to the market level or industry level in the data analysis.
- National or international level. Conclusions are drawn are based on data from business in a state or country. For example, Lang, Calatone and Gudmundson (1997) investigated the reciprocal relationship between perceptions of competitive threat and opportunities and scanning with data from small business in one state of the U.S.

Measuring the perceptions of competition is most interesting at industry level, because with this focus insights are gained into the intensity of competition and the perceived threats of current rivals, new entrants, substitute goods, etc.

6.5 Types of data analysis

This paragraph deals with data analysis techniques that are used to draw conclusions about the managers' perceptions of competition. The goal of the study determines which data analysis is most suitable. Below we discuss a number of examples for each research goal and the main types of analysis. To prevent ourselves from becoming too technical and methodological, we will y discuss only the main characteristics of each group of techniques.

From the literature summarized in the above table four different types of research goals can be put forward (see Mosselman et al., 2001):

- to measure latent constructs
- to relate perceptions of competition with firm characteristics
- to cluster firm's perceptions of competition in groups
- to relate perceptions of competition to other concepts.

Ad 1. To measure latent constructs

In literature on the perception of competition it is suggested using different market characteristics to describe how executives describe their competitive environment, for example threat of substitutes, bargaining power of customers or threat from new entrants (Mosselman et al., 2001). Those market characteristics can be called latent char-

acteristics, because they are abstract, complex constructs for which no validated measurement exists. Usually latent constructs are split in different indicators, which describe the latent construct. Those indicators can be presented to executives in different forms, for example in the form of market descriptions that executives have to evaluate on their correctness. Below we discuss two important studies related to the use of indicators. Heiltjes, Witteloostuijn and Sorge (1996) asked managers from different industries to indicate if the a priori selected indicators of a high competitive environment were applicable to their market. The developed indicators were based on the work of Porter and his five-force model of competition. By asking executives for their opinion on some indicators of the industry they were able to measure the executives' perception of their competitive environment.
Pecotich, Hattie and Low (1999) developed an instrument that had the same purpose, namely to describe the competitive environment with indicators based on Porter's model of competition. They developed many indicators using Porter's indicators of competition and applied both behavioral indicators of existing firms as well as structural characteristics of the market environment. After thoroughly validating of the instrument by 151 executives all involved in top-level strategic decision-making, the authors came up with 42 indicators for the perception of industry structure. A confirmatory factor analysis (CFA) showed that the 42 indicators could indeed be clustered with Porter's five competitive forces: threat of entry, threat of substitute products, power of buyers, power of suppliers and rivalry among existing firms that are present in a firm's competitive environment.

In order to validate whether a group of indicators may be combined to one summated score other data analysis techniques can also be used besides the confirmatory factor analysis technique used by Pecotich et al. (1999), such as PRINCALS-analysis (Heiltjes, Van Witteloostuijn en Sorge, 1996) and reliability analysis (Waarts and Wierenga, 2000).

Ad 2. To relate perceptions of competition to firm characteristics
The perception of competition differences between groups of firms are explored in literature. Usually different firms 'or managers' characteristics are used to explain differences in perceptions. For instance, Heiltjes et al., (1996) and Johnson et al. (1999) explored the differences of perceptions of the competitive environment among different markets and countries. Clark and Montgomery (1999) looked at differences between managers with considerable experience and with less experience in identifying competitors. Daniels et al., (2002) investigated the differences of perception of competition between middle managers and senior managers within the same firm and within the same industry. The following techniques can be used to explore these differences such as t-test, analysis or variance.

Ad 3. To cluster firm's perceptions of competition in groups
Various studies have attempted to investigate the shared (dis)similarity of perception of competition between firms within an industry using different methods such as the visual card technique (see de Chernatony et al., 1993; Daniels et al., 1995;2002; Hogdkinson, 1997), the repertory grid (see Reger and Huff, 1994; Daniels et al., 1995) or structured questionnaires (see Heiltjes et al., 1996; Fombrun and Zajac, 1989) as described above. With the first two methods the difficulty is to compare the perceptions of each firm, because of the divergence in results and the semi-structured way of data collection. Recently, Hodgkinson discussed this matter and suggested some alternatives to make a statistic comparison of the mental representations of competition. For a detailed discussion of these different alternatives, such as three-way scaling of the repertory grid

results by cluster analysis, rating techniques for the comparison of maps or special computer developed software for this purpose (see Hodgkinson, 2001, p. 94-100). To compare perceptions between groups of firms with data from structured questionnaires different techniques are at hand. For example, Heiltjes et al., (1996) used strategic group analysis (see Cool and Dierickx, 1993) to make groups of firms with the same perceptions about their competitive environment. We find a similar approach by Fombrun and Zajac (1987) who conclude that the largest financial services in the U.S. could be ranged in three categories, which are homogeneous in their strategic behavior and perceptions of the environment.

Ad 4. To relate perceptions of competition with other concepts

In literature on the perception of competition relationships with scanning or competitive reactions are not often explored. However, there are two exceptions. The study of Lang et al., (1997) explored the relationship between perceived competitive threats and opportunities and information seeking behaviour for small firms. Frombrun and Zajac related the way firms perceive their environment with their strategic behaviour. In marketing literature on competitive reactions, often the relationship between the perceived threat of a competitive action and its effect on the firm's competitive reaction (the reaction time or the strength of the reaction) is explored (Hultink and Langerak, 2002; Heil and Walters, 1993; Smith, Grimm, Chen and Gannon, 1989). To analyse whether there are relationships between perceptions of competitions and other characteristics of competition the following techniques are used: LISREL (Lang et al., 1997), Analysis of Variance (Heil and Walters, 1993; Hultink and Langerak, 2002) Regression analysis (Fombrun and Zajac, 1987), and conjoint analysis (Waarts and Wierenga, 2000).

6.6 Conclusions and suggestions

Given all the various empirical studies, data collection methods, levels of analysis and techniques of data analysis, we can conclude that the palette of methods for measuring firm's perceptions of competition is richly coloured. Therefore, we go straight to the point in this concluding chapter and present 2 suggestions for the instrument of the perception of competition. In the explanation of these two suggestions we include some of the different aspects discussed in this chapter.

1. A structured questionnaire is preferable when measuring firm's perception of competition.

The theoretical development and empirical research on our topic have both progressed so far, that the explorative qualitative studies of firm's perceptions of their market environment can and must be replaced by more structured empirical data methods to make possible stronger generalizations about the competitive process in markets (see Hodgkinson, 1997). Examples of studies, that y took such steps are: Heiltjes, Van Witteloostuijn and Sorge (1996) and Pecotich, Hattie and Low (1999). Both these studies developed indicators of competition, which were validated empirically in the research. In addition, both studies have used Porter's five forces model of competition to describe and develop their items.

More scientific arguments, more practical reasons could be given for using a structured questionnaire to measure the perceptions of competition. Firstly, it is not so time-consuming as interviews and therefore relatively cheap, especially when the instrument's goal is to monitor a larger number of firms in different markets at different moments in time. Secondly, the data obtained could be compared with data from other

markets and with other indicators of competition. Thirdly, the perception of competition can be validated by testing relationships between perception and related firm behaviour, such as scanning activities and competitive reactions. A fourth point to be made is that a structured questionnaire gives the opportunity to measure the perception of competition on a continual basis, so that the obtained data could be empirically compared over time. In so doing, the effectiveness of a policy intervention could be evaluated by comparing the perception of competition before and after government intervention.

However, one objection to this suggestion is the risk that firms are likely to score strategically in order to defend the status quo. Therefore the chance of them filling in answers that meet their own personal objective are quite realistic and need to be avoided. An important counter-measurement is to be certain that the questionnaire does not provoke strategic behaviour by leaving out the real purpose of the instrument. In addition we could ask for objective competitive behaviour that is related to their perception of competition in order to check if the perceptions are connected with firms' actual behaviours. Another possibility to check for strategic behaviour is to submit the questionnaire to experts from the industry, so that we are able to compare their scores with the firms' scores.

2. Semi-structured interviews with the visual card technique would be useful for more in-depth research in a single market.

A qualitative research on perceptions of competition could be preferable when the objective is to gain more specific knowledge of the relationships of the firms in one market. Many empirical studies, with this research aim have proved that the visual card technique has good validity compared to other techniques such as the repertory grid (see Daniels et al., 1995; 2002; Hodgkinson, 2002). This relatively simple technique offers the opportunity to compare different mental models of competition between several firms in the same market. The similarity or dissimilarity of these mental models between firms and the way firms perceive their competitors could give significant information about how competition in their market is perceived, especially when the question which of the firms are most threatening for them and why, is added
Although the visual card technique has gained ground in recent studies, the data analysis technique to compare the mental representation of their market for each firm is statistically not easy and is disputed by some authors because of its surface-level triviality (see Hodgkinson, 1997 and 2002). However, this technique offers the possibility to measure a firm's perception of competition in one visual representation. And, with the possibility to combine it with the structured questionnaire based on Porter, this visual card technique is preferable for case studies of perception of competition in a single market.

Finally

These two suggestions cover two more or less different research objectives. The first suggestion of using a structured questionnaire is best applicable as a monitoring instrument for different markets. The second suggestion is for more in-depth studies about how firms perceive competition and their competitors in a single market. Both suggestions are likely to provide the proper methods for what we all want, a policy instrument that sends signals to governments that competition might be unfair or appears to be suspiciously low.

7 Conclusion

In most studies on competition in Industrial Organisation literature, the conception of the firm is, by-and-large, de-humanized. The current report's aim is to investigate competition from a manager's perspective. We use (cognitive) psychology, marketing and strategic management literature to develop a theoretical framework how to study competition from a human person's point of view. By doing this, we deviate from the mainstream IO and Game theory literature. The project results in a theoretical proposal to incorporate aggregate psychological variables into the field of IO literature. Also in other fields, aggregate psychological variables prove to be very valuable, for instance, consumer and producer confidence, behavioural finance etc. A further development of a variable to measure the perception of competition may prove to be a good leading indicator for future competitive processes. Such a variable may be a completion to the traditional IO-indicators such as concentration ratio, price-cost margin etc.

We discussed several ways how the perception of competition could be measured and how such a measure could be tested. A measurement instrument based on the five forces of Porter, links the perspective of competition in the strategic management, marketing and cognition literature to the empirical IO-studies. The information could be collected by means of a structured questionnaire that is directed to decision-makers in companies in a large number of sectors. If data is collected periodically, changes in the perception of competition can give valuable policy information. In this way, the perception of competition construct can be used to evaluate the effectiveness of certain policy interventions. Alternative methods like visual card-techniques may provide a clear, in-depth picture of the competitive structure in a market, however, the intensity of competition is more difficult to grasp with this technique. Besides, this technique is very labour-intensive. Therefore, a questionnaire approach seems more suitable to collect information on the competition intensity in a large set of different sectors.

Further research should focus on the actual development of a measurement instrument that is able to collect data on the competitive intensity in a valid and parsimoniously way. Furthermore, the information on the competitive intensity should be linked to other theoretically based construct like competitive actions and performance as well as to other (IO-oriented) indicators that are used as proxi for (parts of) the intensity of competition. Finally, in a longer timeframe, the explanatory power of the instrument for predicting competitive events should be tested. In this way, the instrument can be used by anti-trust authorities and policy makers to monitor sectors for potential anti-trust problems and assess if, and how interventions work out in the competitive practice.

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