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## **Capabilities for growth**

**An exploratory study on medium-sized firms  
in Dutch ICT services and life sciences**

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# 1 Introduction

This study explores firm growth and its relation with firm-specific capabilities. *Growth* is a subject of all times. Organizations can benefit from growth in many ways, including greater efficiencies through economies of scale, increased power, the ability to withstand environmental change, increased profits and increased prestige for organizational members. Furthermore, growing organizations are a stimulus for economical development of nations (Audretsch et al. 2002, Kemp and Verhoeven 2002). Fast growing companies account for one quarter of total employment creation in the Netherlands (Bangma and Verhoeven, 2001). To stimulate firm growth, governmental and commercial institutes recently created lists and meetings for fast-growing firms in Europe and the Netherlands (Europe's 500 and the Dutch Technology fast 50). The second element of research in this study –*Capabilities*– refers to the ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments.

Important theories on the evolution and revolution in corporate development and the growth of the firm have been developed 40 or more years ago (Gibrat, 1931, Penrose, 1959). Although recently the growth of firms seems to have gained back some of its attention by researchers (see e.g. Baum et al. 2001, Man et al., 2002), relative little attention is paid to research on internal (organic) growth. Focusing on the internal organization in sustaining a competitive advantage are theories on resources and capabilities. In the early nineties the resource-based view became popular in strategic management literature (Barney, 1991). In this view managers must constantly scan the environment for opportunities and search for competitive creation and utilization of unique firm resources. A further developed of this view is presented by the dynamic capabilities framework (Teece et al., 1997). This framework analyses the sources and methods of wealth creation and capture by firms operating in environments of rapid technological change. The competitive advantage of firms here is seen as resting on distinctive processes, shaped by the firm's (specific) asset positions and the evolution path it has adopted or inherited.

The fields of growth and capabilities seem to be complementary. Both academics and managers argue that the growth of the firm is related to the building of competences, required to respond to changing industrial opportunities. However, the exact relationship currently seems to be underdeveloped. Linking the two fields of thought with the current absence of investigation on internal growth processes, an interesting research topic comes forward. In this study an attempt is made to incorporate the development of capabilities in the process of organizational growth. This study addresses the following issues: how organizations strive to grow, how firm-specific capabilities are incorporated and translated into the corporate strategy and whether these companies have succeeded.

## 1.1 Research aim and central question

Schumpeter (1934) claims that industrial growth and development is a direct product of the competitive process. It is 'a force from within' since discovery is determined by the things that people in organizations do. Penrose (1959:14) argues that there is a cumulative process of interaction between the "market opportunities of the firm and the productive services available from its own resources". Growth is essentially an evolutionary

process, which involves the accumulation of knowledge unique to the firm (Penrose, 1959). This research project adopts these rational, endogenous, perspectives in order to come to an explanation of why certain firms autonomously grow faster than their competitors, and to describe the influence of firm-specific capabilities on this growth. The aim of this research is to provide, on the basis of theoretical and empirical analysis of medium-sized firms, a deeper understanding of the relation between firm-specific capabilities and organizational growth.

This study strives to contribute to the theoretical debate on the growth of firms and the role of firms' competencies in the expansion of activities. The scientific contribution lies in the attempt to create a deeper understanding of theories on firms' capabilities, the growth of organizations, and their relation. These insights derive from analysis of management literature on strategy, organizational behaviour and growth. The concepts of these fields are integrated into a theoretical framework. This framework is further developed by empirical research on six fast-growing medium-sized firms in the Netherlands, active in two industrial sectors of rapid technological change: ICT services and life sciences.

The practical contribution is to be realized by identifying firm-specific capabilities that influence a successful growth process in a dynamic environment. An effort will be made to measure (dynamic) capabilities in firms and to generalize the specific results for a broader context. Top management of medium-sized Dutch firms in ICT services and life sciences can primarily use the outcome as an indication of elements that played a principal role in the growth process. Furthermore this research intends to show the relevance of specific capabilities for firm's growth processes and the usability of scientific research for medium-sized firms. This research contributes to the understanding of growth processes and can help for a better support for small and medium-sized firms in the Netherlands

To generate relevant theoretical insights and come to a deeper understanding of the subject of organizational growth and the influence of firm-specific capabilities, the central question of this research is as follows:

*What is the relationship between firm-specific capabilities and the growth of medium-sized Dutch firms in ICT services and life sciences?*

This study considers a firm-specific identity, one of the basic elements for the creation of capabilities, to change with a merger or acquisition. Therefore, the focus here is on internal growth, that is, growth without merger or acquisition. Furthermore this research aims to examine sustained growth, defined here as growth both in revenues and employees over a period of three to eight years. Firm-specific capabilities are defined as the capacity to deploy both tangible and intangible resources (including managerial resources) via distinct organizational and managerial processes. In this research an effort will be made to come to a categorization of firm-specific capabilities.

## 1.2 Research questions and methodology

The central question is split up into broad research questions that provide more clear descriptions of its aspects. This division into four areas of research enables the answering of the central question in line with the research aim. The research questions are as followed:

- What do theories contribute to firm-specific capabilities and which categorization can be made to increase insight on the topic?
- What do theories contribute to the different growth processes, and what are possible determinants for growth of small and medium-sized organizations?
- How can capabilities and determinants for growth be combined into variables that (dynamically) influence the organic growth of medium-sized firms?
- How can variables for growth be measured in the strategy of medium-sized Dutch firms in the ICT services and life science sector?

To investigate and come to a better understanding of the relation between firm-specific capabilities and the growth of medium-sized firms, a combination of research methods is seen as most advantageous for this study. To answer the research questions a mix of a literature study and a field research is performed. The first three questions are answered on the basis of a review of strategic management and organizational behaviour literature with special attention paid to theories of (dynamic) capabilities and growth of the firm. The critical review of theories on capabilities and growth are integrated by means of a conceptual framework of firm-specific and dynamic capabilities that influence the growth of the firm. From this framework propositions are deduced that form the basis for empirical research. Next, an evaluation of methodological issues and the measurement of terms are dealt with to provide an answer to the fourth research question. The empirical part of the research consists of an environmental and multiple-case study. On the industry level, analysis is presented on the developments in ICT services and life sciences between 1994 and 2001. The multiple-case study contains a group of ten medium-sized<sup>1</sup> firms from the two sectors.

Considering the relative underexposure and abstract level of the subject, the research has an explorative nature. To increase the reliability and usability of the conceptual framework, interviews are held with academic experts with expertise on growth, capabilities and developments in the specific sectors.

### 1.3 Structure of the study

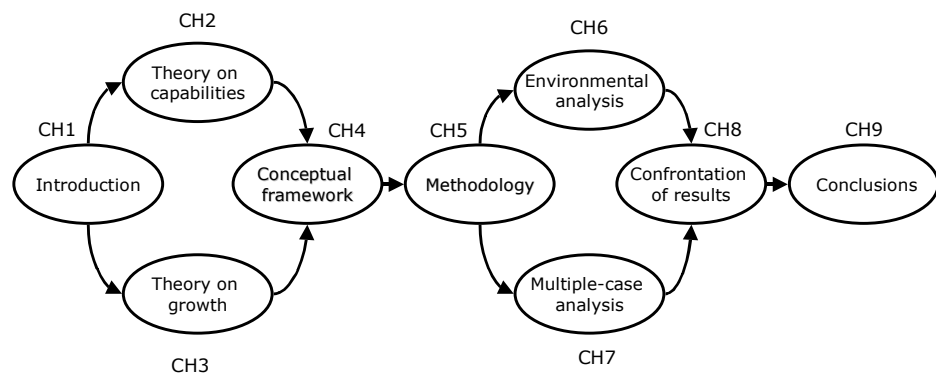
The chapters of this study are structured as followed. In the second chapter is dealt with theories of strategic management literature and organizational behaviour on (dynamic) capabilities of organizations. The theoretical exploration leads the way for an elaboration on four categories of firm-specific capabilities, chosen in this study: Managerial-, Input-based-, Transformational-, and Output-based capabilities. Chapter three investigates theories and determinants of firm growth. In this chapter the wide field of theories on growth will be reviewed. After choosing the integrative perspective of strategic entrepreneurship, the second paragraph of this chapter presents an overview of the most important environmental, organizational and entrepreneurial determinants for medium-sized firm growth. An integrating effort of the concepts of these two fields of research is presented in the fourth chapter. The combination and confrontation of both theories provides the input for the tentative model of the relation between firm-specific capabilities and the growth of medium-sized firms. In this process theoretical propositions and a causal relation scheme for dynamic variables for growth are generated.

<sup>1</sup> For this study, a medium-sized firm is defined as an organization with 25 to 250 employees.

As a prelude to the empirical part of the study, chapter five discusses the specific empirical research methods employed, primarily in terms of data collection, analysis and validity. Chapter 6 and 7 move on to an inquiry into the relation between firm-specific capabilities and the growth of the firm. The first of these chapters focuses on the environmental developments in the sectors of ICT services and life sciences in the Netherlands. On the firm level, the seventh chapter contains the analysis of growth from the entrepreneurial management's point of view. This chapter cross-analyses the single case studies of ten fast-growing firms, in terms of distinct managerial and organizational growth processes between 1999 and 2001. Chapter eight assesses the validity of the framework by confronting the empirical findings with the theoretical propositions. Essentially it addresses the research questions again, incorporating additional knowledge derived from the empirical setting. Guided by the initial research aim, the research's primal conclusions are presented in the final chapter. Furthermore critical remarks and future research trajectories are suggested.

The structure of the study is presented in figure 1.

figure 1 Structure of this study



Source: EIM



## 2 Theory on capabilities

This chapter provides an overview of literature on dynamic capabilities and the related resource-based view of the firm. Central for this chapter is the first research question:

*“What do theories contribute to firm-specific capabilities and which categorization can be made to increase insights to this topic?”*

The chapter starts with the first part of this research question and provides an overview of the key perspectives of strategic management literature on capabilities. Explained is why, according to the resource-based and dynamic capabilities view, firms initially are considered to be idiosyncratic in their appearance and behaviour. These views assume that heterogeneity in organizational assets among firms leads to differences in the capabilities they have. This is why some firms are able to create superior capabilities and, as a consequence, generate a competitive advantage over others enabling the firm to grow. On the other hand, forces of competition drive firms, in the end, to choose those strategies that make their capabilities compatible to the rules of the competitive game. Therefore, besides theories of (dynamic) capabilities, the analysis incorporates the behavioural view of the firm to come towards a well-founded perspective on organizational development.

The second paragraph deals with the last part of the research question. The concept that integrally links four components of a firm’s “distinctive competencies” (managerial, input, transformational – and output-based capabilities) is explained here and given meaning in the light of this study. The final section summarizes the contribution of this chapter.

### 2.1 Perspectives on capabilities

In this paragraph an overview is presented on theories of capabilities. To provide a timely overview of this rather new perspective in management literature, concepts are presented from the fields of strategic management and organizational (competitive) behaviour.

#### 2.1.1 *Strategic management theory*

Over the last four decades, strategic management has become established as a field of research and practice. In its evolution, a diversity of partly competitive and partly supplementary perspectives has emerged. These perspectives have implications for putting strategy into action. The different schools of thought on strategy, that all have their merit, are analysed for their contribution and fit to the topic of this research. For further investigation of the development of capabilities, this study discusses (dynamic) processes of resource development and deployment brought forward by the resource-based and dynamic capabilities view.

##### *Resource-based view*

In 1984 Wernerfelt picked up Penrose’s (1959) theory of the corporate growth in which the expansion of firm is primarily determined by the availability of firm-specific management resources. In the early nineties a stream of strategy research builds further on this argument and generally posits that organizational resources and capabilities that

are rare, valuable, non-substitutable and imperfectly imitable form the basis for a firm's sustained competitive advantage (e.g. Barney, 1986a, 1991). This "Resource-based view" (Conner, 1991, Wernerfelt, 1984) of organizational strategy and competitive advantage has engendered a great deal of theoretical and empirical efforts (Amit and Shoemaker, 1993, Barney, 1991, Conner, 1991, Grant 1996, Lado et al., 1992, Prahalad and Hamel, 1990, Reed and DeFillippi 1990, Teece et al. 1997). From this perspective the firm is seen as the principal unit of analysis and its message is plain: *Search and learn to know your core competencies and next build a durable competitive strategy upon them* (Van den Bosch, 1997, Penrose, 1959).

According to proponents of the resource-based view, there are at least two reasons why firms should build their strategy upon an infrastructure of resources and capabilities instead of relying upon an analysis of their external environment. First, the various frameworks and conceptual models used as tools for external analysis are public property, so the expected variance in firms' outlook on their environment will be very low (Barney, 1991). Second, whereas the firm is assumed to have little or no control on the pace of external change, it is far more reasonable to trust the stability of the firm's own organizational assets, as their development can be controlled to a much higher degree.

The resource-based view has adopted the assumption of firm heterogeneity. The reason for this assumption is not only because intuitively is known that no organization is the same as any other, but also because there is plenty of evidence that there are indeed companies that perform (much) better than their rivals and seem to have a competitive advantage. Nelson and Winter (1982) state that the behaviour of an organization is reducible to the behaviour of individual members. The authors argued that all organizations must be unique to some degree. As no individual is the same as any other, firms breed distinctive competencies.

According to Porter (1991), the added value of resource-based views primarily lies in the explanations they offer for corporate strategy issues. Porter (1996) further states that core competencies, or resources cannot be decoupled from the system of activities and should be embedded in the firm's value chain. A perspective that essentially is an exposition on corporate strategy is the article by Prahalad and Hamel (1990) on core competences. They argue that core competences should "constitute the focus for strategy at the corporate level" and should be seen as "the glue that binds existing businesses" because they embody "the engine for new business development" (1990: 82). The notion of competence also renewed interest into the nature of organizational behaviour that characterizes the firm's development of resources and capabilities. For it is precisely this behaviour that enables firms to take and hold position on the chosen product market, and may lead them to a competitive advantage.

#### *Dynamic capabilities view*

A further incorporation of the element of time into the resource-based view has been suggested by proponents of the dynamic capabilities view. An important contribution here is the study by Teece et al., (1997:509): "The competitive advantage of firms is seen as resting on distinctive processes (ways of coordinating and combining), shaped by the firm's specific asset positions and the evolution path it has adopted or inherited". The authors define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece et al, 1997: 516). In other words, dynamic capabilities identify the dimensions of firm-specific capabilities that can be sources of advantage, and to explain how combinations of competences and resources (value, rareness, imitability, and

substitutability) can be developed, deployed and protected. On the subject Eisenhardt and Martin (2000) argue that, like the resource-based view, the dynamic capabilities view is a rational, endogenous, perception. This perspective consists of specific strategic and organizational processes like product development, alliancing, and strategic decisions that create value for firms within dynamic markets. The authors argue that: "while dynamic capabilities are certainly idiosyncratic in their details, the equally striking observation is that specific dynamic capabilities also exhibit common features that are associated with effective processes across firms." (Eisenhardt and Martin, 2000:1108).

Lei et al., (1996:559) remark on the topic that "dynamic routines refer to the organization's cognitive maps and particular approach to framing" that are essential to the firms problem-solving requirements to new market approaches. Bettis and Prahalad (1995:8) claim that an organization's intelligence is its ability to learn over time, and "what an organization is able to learn can be transformed into organizational knowledge."

### *Sustaining the competitive advantage*

Organizations are different in their repertoires of organizational assets such as people, knowledge and capabilities. This heterogeneity enables firms to gain a competitive advantage relative to rivals with comparable resources. However, having a capability is entirely different than keeping it alive. At the moment a firm earns superior returns through the creation of a competitive advantage, it also stimulates others to imitate its actions and eliminate its privileged position. In order to sustain a competitive advantage, firms should be able to protect the resources that underlie this edge from appropriation by rivals.

The notion of barriers to imitation is crucial to the resource-based and dynamic capability view of the firm in their search for sustainability, for without the existence of these barriers it is simply not possible for companies to preserve a competitive advantage (Huygens, 1999). On this subject Hall (1993) stated that the real sources of sustainability often do not rest in 'having' resources, but instead lie in the firm's 'doing' capabilities. Those skills and competences that have an integrative, coordinative or creative quality are critical to the preservation of competitive advantage, simply because they cannot easily be imitated as the firm's other assets. The character of doing capabilities is to a very large degree dependent on the underlying knowledge patterns residing within the firm's organization. The more unique and idiosyncratic a company's knowledge is in content and form, the more problematic imitation will be for its competitors.

Barriers to imitation, for one reason, are caused by the concept of 'causal ambiguity' (Lippman and Rumelt, 1982). In other words, the uncertainty involved in analysing the nature of the successful firm's knowledge bundle often makes it tremendously ambiguous for rivals to determine which organizational capabilities are critical to that firm's competitive advantage. The degree of ambiguity, and thus its inherent power as a barrier to imitation, is an outcome of the characteristics of the leading firm's individual resources and capabilities as well as the way in which they are linked to each other.

Besides ambiguity, the second keystone on which the resource-based theories have built their premise that barriers to imitation can lead to sustainable advantages is known as 'path dependencies'. From this point of view, firm heterogeneity is time dependent: throughout the years, firms create different resource bundles as a result of gradually growing differences in management styles, cultural values, processes and procedures. Over time, individual firms develop unique routines to repeatedly perform organizational tasks, and these routines can eventually turn out to be (at the basis of) the com-

pany's distinctive competencies. When this leads to a competitive advantage, the successful firm will be able to sustain that edge in two ways: (1) rivals cannot copy them precisely because it took the leading company a long time to develop them in a unique way, and (2) by the time rivals have succeeded in imitating the target capabilities, the pioneer has used its lead to move on and further develop its distinctive competences (Teece et al., 1997). The role of learning becomes an indispensable component in explaining the component of path dependency, especially when one recognizes that "the routinisation of activity in an organization constitutes the most important form of storage of the organization's specific operational knowledge" (Nelson and Winter, 1982: 99).

### 2.1.2 *Behavioural theories*

The 'behavioural theory of the firm', which has originally been developed by Cyert and March (1963), pays attention to both organizational and competitive behaviour. The behavioural theory assumes that firms have some degree of control over their market environment, and that they adapt to their habitat through learning processes. Learning takes place after feedback loops and brings market knowledge to the organization, which confronts the firm with particular problems. Firms respond to such problems through 'search behaviour' by which they pursue or develop alternative ways of doing. Two basic types of search behaviour exist:

- Exploitation, the hunt for expansion of current competitive recipes (in the neighbourhood of current practice)
- Exploration, the pursuit of alternative competitive formulas (radically new alternatives)

By incorporating the behavioural theory as an influencing theory on capabilities, firms can be seen as expressing exploitative and explorative search behaviour at the firm level. According to Cyert and March (1963) organizational learning is guided by so-called 'standard operating procedures' (SOP's). These SOP's determine the degree and direction of the firm's search behaviour as a response to encountered problems that arise from market feedback. Nelson and Winter (1982) translate the notion of SOP's into the concept of routines as organizational carriers of knowledge and expertise, and argued that such routines influence firm's search for new alternatives. The authors' claim that capabilities are built on hierarchies of routines in which inertia is deeply hidden. Not only do routines shape the organizational processes underlying capabilities (Winter, 1995), but also they are key to the learning process by which firms adapt to changes in their environment. This confronts the behavioural theory's idea that organizations have some degree of control over their habitat.

It seems that organizations search for capabilities in their efforts to instigate or (less ambitiously) accommodate to changes in their operating environment (Huygens, 1999). Hedberg et al. (1976) in this respect discriminate between adaptive and manipulative actions: while adaptation embodies a firm's response to an environmental stimulus, an act of manipulation actually stimulates such environmental reactions. Whereas "the adapter defends, conforms or submits," the manipulator is "aggressive, proud, perhaps selfish" (1976:46). The previous paragraph already discussed how increasing commitment to existing routines reduces a firm's flexibility in changing environments and raises organizational inertia. Over time such frictions infiltrate into its managerial and technical systems that, together with skills and values, make up the firm's capabilities. When adaptation becomes a prerequisite for survival, firms often tend to stick to these routinised capabilities, turning them into 'core rigidities' (Leonard-Barton, 1992). Huygens (1999) argues that whereas manipulators search for new industry practices, adapters

search for ways to first escape the rigidity from current routines, and then adapt to the new practices. Because individual firms have distinct histories that make them heterogeneous at a basic stratum the way in which they create new capabilities may differ considerably (Nelsson, 1991).

Whereas organizational behaviour at the firm level tends to increase rival's idiosyncrasy, competitive behaviour at the industry level tends to raise their uniformity. At a concrete level, the firm searches for capabilities to adapt to, or even manipulate, its competitive context. But as a collection of rival companies, firms are engaged in the search for capabilities at the more abstract level of competition where the dynamic of innovation and imitation rules. The firm searches for capabilities to adapt or even to manipulate its competitive context. Obviously, the creation and refinement of capabilities by firms impacts the development of capabilities at the industry level. The variety in capabilities at the firm level increases once the various rival firms have managed to adapt, and start to refine the newly created capabilities. This two-phased process of capability building has been noted by Winter (1995:151) where he distinguishes between a firm's ability "to amplify the contributions of present resources and expand existing lines of activity", and its more creative ability "to combine resources in novel ways and establish new activities." On the subject of search behaviour Huygens (1999) states that "Explorative and exploitative search behaviour of rival firms results in the creation and refinement of capabilities at the firm level". Search behaviour leads to capability development (Barnett and Hansen, 1996; Stuart and Podolny, 1996).

Although this study views firms as idiosyncratic in a dynamic view as discussed previously, firms cannot be considered as simple standalone entities in a largely indefinable operating context. Instead, firms build capabilities in an industry environment where they compete with other rivals, each of which employs its bundle of capabilities in the competitive process (Huygens, 1999). Some firms create competitive advantages by introducing new capabilities to the industry, but others will unavoidably manage to replicate these capabilities. As more rivals find ways to build the capabilities required for competing under the new rules of the competitive game, the pioneer's advantage will eventually disappear. Moreover, rival companies are expected to become increasingly homogenous as to their strategy and capability bundles. Such interaction patterns of innovation and imitation form then the endogenous driver of an industry's evolution (Schumpeter, 1934).

This is in line with the premise of Cyert and March (1963, 177) that behavioural theory can be "a basis for describing the behaviour of certain aggregates of firms". In this view rival firms are related to each other as each of them searches for new capabilities to compete in their industry. Indeed, in so-called "ecologies of competition, the competitive consequences of learning by one organization depend on learning by other organizations" (March, 1991:81). In other words, actions taken by one company in search of capabilities have implications for the direction of search behaviour of its rivals. In their study of the local search for technological positions by firms, Stuart and Podolny (1996:36) remarked that "firms do not search in isolation; rather they search as members of a population of simultaneously searching organizations." Competition as a process of capability-based innovation and imitation creates dynamic pressures for rivals to search for capabilities, either as leaders or laggards.

Considering the foregoing it seems appropriate to assume that interesting contributions can be expected from a co-evolutionary approach of the development of 'firm-specific capabilities' in interaction with the competitive environment (Huygens, 1999). In the

second paragraph these firm-specific capabilities are further elaborated to come towards a categorization of the concept.

## 2.2 Firm-specific capabilities

In this section the second part of the research question is handled by presenting a capabilities framework with categories of firm-specific capabilities.

A growing body of (empirical) literature points to the importance of firm-specific factors in explaining variations in economic rents (e.g. Hansen and Wernerfelt, 1989, Amit and Shoemaker, 1993, Castanias and Helfat, 2001, Mahoney, 2001)). Resources and capabilities have been labelled distinctive competence (Fiol, 1991; Reed and DeFillippi, 1990; Selznick, 1957), core competence (Prahalad and Hamel, 1990), firm-specific competencies (Pavitt, 1991), organizational capabilities (Stalk et al., 1992), and organizational capital (Prescott and Visscher, 1980), reflecting a wide range of research objectives and theoretical perspectives. Organizational capabilities characterize the dynamic, non-finite mechanisms that enable the firm to acquire, develop, and deploy its resources to achieve superior performance relative to other firms (Dierickx and Cool, 1989). Among the organizational capabilities that have been posited as potent sources of sustainable competitive advantage are organizational culture (Barney, 1986a; Fiol, 1991), learning (Fiol and Lyles, 1985; Teece, et al., 1997) routines (Nelson and Winter, 1982) and entrepreneurship (Nelson, 1991; Rumelt, 1987; Schumpeter, 1934). Furthermore more recently strategic management stresses the value of knowledge as deeply hidden but fundamental component of a firm's capability (Hedlund, 1994; Nonaka and Takeuchi, 1995; Grant, 1996). However, this focus on knowledge has led to a neglect of other organizational resources in strategy research (Conner and Prahalad, 1996). Physical assets, property rights, reputation and other forms of capital on which capabilities are built are often overlooked, "but there is no a priori reason why they should not be included in a more comprehensive evolutionary theory of the firm" (Foss et al, 1995: 6).

Most definitions of capabilities focus on their attributes that contribute to the firm's unique organizational behaviour. Definitions vary from integrated clusters of idiosyncratic assets (Teece et al., 1997), a firm's capacity to deploy resources via distinct organizational processes (Amit and Schoemaker, 1993) to bundles of firm-specific knowledge sets (Leonard-Barton, 1992)

The chosen definition of capability here is:

*The capacity to deploy both tangible and intangible resources (including managerial resources) via distinct organizational and managerial processes*

For the purpose of this research firm-specific capabilities describe firm-specific resources and competencies that enable the organization to develop, choose and implement value-enhancing strategies. Firm-specific capabilities include all firm-specific assets, knowledge, skills and competencies embedded in the organization's structure, technology, processes and interpersonal (and inter-group) relationships. Drawing on theoretical insights from the resource-based view, Lado and Wilson (1994) explored the development and utilization of organizational capabilities. They suggest a typology that allows for the incorporation of search behaviour as fundamental to the creation and redefinition of capabilities, and also recognize the significance of mutual interaction patterns between capabilities and competition. The four distinguished categories are managerial, input, transformation and output-based capabilities.

These capabilities are presumed to yield sustained competitive advantage for a firm. Two assumptions underpin the analysis of sustained competitive advantage. First, an open system view is assumed to examine the extent to which the firm's growth is caused by the development of managerial, input-based, transformational, and output-based competencies (Lado and Wilson, 1994). Second, this research conforms to the view that managers are as much responsible for their organization's success as they are for its failure (Castanias and Helfat, 1991; Penrose, 1959; Reed and DeFillippi, 1990).

### 2.2.1 *Managerial capabilities*

Broadly conceived, managerial capabilities include the unique capabilities of the organization's strategic leaders to articulate a strategic vision, communicate the vision throughout the organization, and empower organizational members to realize that vision (Westley and Mintzberg, 1989). Furthermore managerial capabilities include the unique ability to enact a beneficial firm-environment relationship (Tushman and Romanelli, 1985). These managerial competencies determine the acquisition, development, and deployment of organizational resources, and the delivery of value to organizational stakeholders. These managerial capabilities can be potent sources of managerial rents, and, thus, sustained competitive advantage (Castanias and Helfat, 1991; Lado et al., 1992).

#### *Articulating a strategic vision*

Strategy researchers have argued that a firm with a well articulated strategic vision potentially will achieve sustained competitive advantage over those that lack such a vision (Hamel and Prahalad, 1989; Prahalad and Bettis, 1986; Prahalad and Hamel, 1990; Westley and Mintzberg, 1989). Strategic vision provides a cognitive map (Weick, 1979) that supplies the underlying logic for combining, deploying, and mobilizing resources within the firm and among the organization's strategic business units (Prahalad and Bettis, 1986) and focuses and channels organizational competencies toward effective accomplishment of organizational goals (Westley and Mintzberg, 1989). Because strategic vision is essentially tacit (it is not based on codifiable recipes of success), it is specific to an organization's unique historical context, and is socially constructed through complex interactions among the organizational key actors, it can yield sustained competitive advantage (Lado and Wilson, 1994). In this regard it is the manager (entrepreneur) who is responsible for developing "an overall sense of purpose and direction that guide(s) integrated strategy formulation and implementation in organization" (Shrivastava and Nachman, 1989:51).

#### *Enacting organizational environment relationship*

As systems of shared meanings (Morgan, 1986), organizations, through their managers, constantly act upon, cognitively interpret, and select their own environments (Smircich and Stubbart, 1985; Weick, 1979). Proponents of this view avoid an objective environment that exists independent of an organization. Instead, they subscribe to the notion that organization and environment are enacted through the collective action of the top management team, the collective interpretation and assignment of meaning to those actions, and the selection and retention of those actions that make sense to the organizational members (Morgan, 1986; Smircich and Stubbart, 1985; Weick, 1979). The enactment process is idiosyncratic, imaginative and evolutionary. Idiosyncrasy involves the generation and interpretation of firm-specific, symbolic knowledge. Imaginative refers to the search for strategic possibilities through intuition, experimentation and improvisation. Evolutionary processes involve divergent and convergent course of variation, selection and retention of human actions and cognitions, linking past actions with

future organizational realities. Therefore, it may hold the potential of sustained competitive advantage.

### 2.2.2 *Input-based capabilities*

Input-based capabilities encompass the physical resources, organizational capital resources, human resources, knowledge, skills and capabilities that enable a firm's transformational processes to create and deliver products and services that are valued by customers (Lado et al., 1992). Strategy researchers argue that achieving sustained competitive advantage depends upon the firm's ability to utilize or reallocate existing stocks of resources and its ability to accumulate new resource stocks more efficiently and effectively relative to competitors (Penrose, 1959; Prahalad and Hamel, 1990; Wernerfelt, 1984). Input-based competences both influence and are influenced by managerial vision (Prahalad and Bettis, 1986; Prahalad and Hamel, 1990). They "shape the scope and direction of the search for knowledge" (Penrose, 1959:77), and "provide the proverbial grist to the organizational mill for creating and delivering value to customers" (Lado and Wilson, 1994: 704).

#### *Exploiting imperfections in the market*

In markets or industries in which firms have different expectations about the future value of strategic resources, there exists a potential to earn above normal returns from the acquisition and deployment of those resources (Barney, 1986a). A firm whose employees have unique abilities, knowledge and foresight to make an accurate assessment of a strategic resource's rent-earning potential may achieve superior economic benefits relative to those firms that lack such unique capabilities, knowledge or foresight. According to Barney (1986a), given information asymmetries in the strategic factor markets, a firm whose members have unique skills and capabilities and/or are lucky may earn superior returns by purchasing undervalued resources and using these resources to implement strategy, or by not buying overvalued resources.

#### *Human capital*

Internal labour markets emerge to facilitate the exchange and utilization of human capital that is firm-specific (human asset specificity) and that is difficult to evaluate or monitor (Williamson, 1981). Human asset specificity refers to the unique knowledge, skills and abilities learned on the job. Because such capabilities entail nontrivial replacement costs, there exists an economic rationale for their continued utilization in current employment (Lado and Wilson, 1994). When the economic contribution of the firm-specific knowledge, skills and abilities cannot be readily assessed quantitatively, internal (hierarchical) mechanisms are presumably superior to the external or "spot" market in facilitating the efficient allocation and utilization of such resources. Williamson and colleagues (1975) maintained that internal labour markets, by stimulating collective bargaining (which places emphasis on objective task characteristics rather than on the subjective, idiosyncratic knowledge, skills and abilities of workers as the basis for determining wage structure), serve to reduce workers' proclivity to behave opportunistically.

If the labour market were purely competitive such that human resources were homogeneous and freely mobile across firms, a market determined wage rate would provide all the information needed to attract, retain, or, replace human resources in the organization (Lado and Wilson, 1994). In this case, an investment in firm-specific human capital (i.e., the set of knowledge, skills, and abilities that are embedded in the firm's human resources) through the firm's HR policies and practices would not be economically rea-



sonable. In reality, however, firms face a heterogeneous demand for and supply of human resources, reflecting differences in the distribution of the knowledge, skills and abilities across individuals, and variances in their productive capacities (Wright and Snell, 1991). Firm-specific human capital is valuable because it potentially enhances the productive capacity of human resources (Becker, 1975), it is not widely available in the external labour market (Dierickx and Cool, 1989), and it cannot be readily substituted by other resources without having to incur heavy replacement costs (Barney, 1991, Williamson, 1981).

### 2.2.3 *Transformational capabilities*

Transformation-based capabilities describe: "organizational capabilities required to advantageously convert inputs into outputs" (Lado et al. 1992: 85). These capabilities include innovation and entrepreneurship, organizational learning and organizational culture. The notion of transformation-based competencies is also closely linked to the 'value chain' concept first developed by McKinsey and Co. and subsequently adopted as an analytical tool for strategic management by Porter (1985).

#### *Harnessing innovation and entrepreneurship*

As stated before, Schumpeter (1934) recognized that innovation and entrepreneurship constituted the crux of the capitalist economic system. In this view, sustained economic development was possible only when firms engaged in a process of 'creative destruction', referring to the carrying out of new combinations of resources, methods, systems, and processes to generate new products and services that effectively fulfilled actual and potential needs of customers. Applying this view to strategic management, Barney (1986c), Rumelt (1987), Nelson (1991), and Nelson and Winter (1982), among others, have argued that firms that possess the unique resources, skills and capabilities needed to generate Schumpeterian revolutions in the industry and/or that possess the unique abilities to rapidly adapt to these revolutionary changes, can earn and sustain supra-normal returns relative to firms that lack these capabilities. In other words, innovation (e.g. technological, marketing and managerial) provides an organization with the capability to generate new products and processes faster than competitors (Nelson and Winter, 1982).

Entrepreneurial talents are rare (Liebenstein, 1987). Entrepreneurial skills are considered to be cultivated and nurtured over a long period of time, and are embedded in a firm's historical context. Because they provide an important driving-power for resource mobilization and utilization, entrepreneurial skills are a non-substitutable strategic asset.

#### *Fostering organizational learning*

Learning takes place when, for a given work-related stimulus, employees respond in different and qualitative better ways from their responses to similar stimuli in the past (Bower and Hilgard, 1981). To the extent that such responses lead to reduced variability in the employee's performance over time or result in increased gains in productivity, learning is economically efficient since it builds routines (March, 1991). Over time, the individual develops a deeper understanding of specific tasks, duties, and responsibilities required of the job and hones the KSAs needed to perform the job in a skilful and cost-effective manner. Through this learning-by-repetition approach, the behavioural actions and responses of organizational members may eventually coalesce into a distinct set of organizational routines (Nelson and Winter, 1982). This pattern of learning has been variously referred to as single-loop learning (Argyris and Schön, 1978), lower level learning (Fiol and Lyles, 1985), and level-level learning (Duncan, 1974). It enables organiza-

tional members to detect performance deviations and make incremental adjustments to achieve congruence with the current levels of organizational performance.

In contrast, double-loop learning (Agyris and Schön, 1978) characterizes a non-traditional organizational learning approach (Weick, 1979, 1991). This approach permits organizational members to question and reassess the relevance of existing performance standards, work norms, and underlying assumptions and beliefs (Morgan, 1986). It encourages organizational members to improvise and tinker with new ideas, to question and reflect on their reactions, and to make sense of and generate new understandings from those actions (Weick, 1979). This learning-by-improvisation-and-reflection approach may generate tacit organizational knowledge through socially complex interactions among organizational members. Double-loop learning may also enhance organizational flexibility by enabling members to think and respond divergently to changes in the internal and external work environment. The outcome is that compared to single-loop learning, double-loop learning holds a greater potential of sustained competitive advantage.

#### *Promoting organizational culture*

Strategy researchers have recognized organizational culture as a rent-yielding strategic resource that potentially generates sustainable competitive advantage (Barney, 1986b; Fiol, 1991; Schoemaker, 1990). Accordingly, organizational culture may enhance firm profitability by reducing the uncertainty and ambiguity inherent in strategic decisions and actions. Further, by articulating a set of broad, tacit rules and values that serve to unify and regulate the behaviour and actions of organizational members, organizational culture may reduce the transaction costs entailed in the management of human resources (Williamson, 1981). Organizational culture also may serve to unleash the valuable leadership talents and time that would otherwise be expended in coordinating work and controlling employee effort to achieve desired organizational outcomes (Schein, 1985). Barney (1991) argued that an organizational culture could be the source of sustained competitive advantage insofar as it is valuable, rare, imperfectly imitable and non-substitutable.

Morgan (1986) identified two salient roles of organizational culture that bear significantly on organizational efficiency and effectiveness: rule following and enactment. In a culture based on rule following, the emphasis is placed on establishing a set of cultural rules or social norms to which every organizational member is expected to adhere in order to attain organizational efficiency, stability and predictability. Similar to the 'invisible hand' notion of economic and natural selection, organizational cultural rules form powerful disciplinary and selective forces on human conduct, " 'selecting in' or reinforcing the values and behaviours associated with success and 'selecting out' or extinguishing those values and behaviours that are deemed peripheral, unsuccessful, or unimportant" (Miller, 1993:122).

An enactment-based view of organizational culture contains the notion of organizational members who are capable of proactively creating, shaping and responding to their organizational cultural values and norms. These cultural values and norms are created and recreated through the variation-selection-retention process of "artificial selection" so aptly described by Weick (1979). According to Lado and Wilson (1994), organizational members proactively generate cultural variation through experimentation and improvisation; they develop cognitive frames for selecting in and retaining successful cultural norms and selecting out unsuccessful ones. Thus, the enactment view of organizational culture suggests that organizations evolve into complex systems of shared

meanings "that rest as much in the heads and minds of their members as they do in concrete sets of rules and relations" (Morgan, 1986:131)

#### 2.2.4 *Output-Based Capabilities*

Output-based capabilities include all knowledge-based, invisible strategic assets, such as corporate reputation or image, product or service quality, and customer loyalty (Lado and Wilson, 1994). Because these capabilities entail large amounts of firm-specific investments of financial, technological, human and organizational resources that are developed over a considerable period of time and are not freely tradable, they can generate future streams of economic returns and, thus, be potent sources of sustained competitive advantage (Barney, 1986b, 1991, Dierickx and Cool 1989, Lado et al., 1992). These competencies are interrelated; corporate reputation or image arises from a firm's dedication to create and deliver products and services of superior quality and for which customers are willing to pay a price premium (Shapiro, 1982). The rents from the superior product/service quality, in turn, motivate the firm to invest in quality-enhancing systems for creating and delivering value to the customers (Shapiro, 1983). Given a critical core of loyal customers (secured over a period of time through dedication to quality offerings), the firm may continue to acquire superior economic benefits for a sustained period of time. Further, these output-based capabilities may serve to signal efficient and effective utilization of organizational resources, making the firm attractive to potential customers, employees, shareholders and other stakeholders who may be willing to increase their supply of resources and KSAs in expectation of higher returns on their investments (March and Simon, 1958).

The four categories of firm-specific capabilities are essentially components to be combined in a more holistic construct. Achieving a sustainable competitive advantage through firm-specific capabilities will require continuous monitoring by the firm since competency patterns may change over time (Lado and Willson, 1994). On the subject of how firms deal with changing environments, Volberda (1998) argues that successful firms will generally move along a diagonal of increasing variety and speed of managerial capabilities together with higher levels of organizational responsiveness. Thus, managers may need to continue question and re-examine their assumptions regarding what constitutes a distinctive competence for their firms.

### 2.3 Summary

The concept of competitive advantage drives business strategy and has received considerable treatment in management literature. In this chapter the concept is explored in the context of the resource-based and dynamic capabilities view, behavioural theories and the competitive context. table 1 presents an overview of the most influencing perspectives on capabilities, used in this study.

**table 1** Perspectives on capabilities

<i>Perspective</i>	<i>Main authors</i>	<i>Key arguments</i>
Resource-based view	Barney (1991), Wernerfelt (1984)	A firm's sustained competitive position is formed by organizational resources and capabilities that are rare, valuable, non-substitutable and imperfectly imitable.

<i>Perspective</i>	<i>Main authors</i>	<i>Key arguments</i>
Dynamic capabilities view	Eisenhardt and Martin (2000), Teece et al. (1997)	The competitive position of the firm rests on distinctive processes, shaped by the firm's specific assets position and the evolution path it has inherited or adopted
Behavioural theory of the firm	Cyert and March (1963)	Firms have some degree of control over their market environment, and they adapt to their habitat through learning processes
Competitive context	Schumpeter (1934)	Forces of competition ensure that the firm searches for capabilities to adapt or even to manipulate its competitive context.

Source: EIM.

The overview of the perspectives on resources, capability building and organizational behaviour, shows an interesting combination. Although firms are seen as idiosyncratic – each with their unique capabilities- firms build these capabilities in an industry environment where they compete with other rivals, each of which employs its bundle of capabilities in the competitive process. This co-evolutionary approach of (dynamic) capabilities provides better insight in the creation and refinement of capabilities. In the pluralistic view on the competitive advantage of firms, the four perspectives are considered to be supplementary. The competitive position of the firm is seen as a synthesis of distinctive processes that evolve on basis of the firm's specific asset position, the search for capabilities in the market environment, and adaptation through learning. A primal influence here comes forward from the dynamic capabilities view. This view is a further elaboration of the, more static, resource- based view of the firm, and a rather young perspective in the field of strategic management. Critics call the dynamic view of the firm's capability development tautological. The description in this chapter aimed to show the importance of incorporating dynamic processes in the building of theory on sustainable development of capabilities. In this regard the approach addresses the latter part of the first research question and leads the way for the analysis of more concrete firm-specific capabilities.

To come to an answer of the second part of this chapter's research question, table 2 provides the definitions of the four components of firm-specific capabilities, chosen for this study: managerial, input-based, transformational, output-based. For the purpose of this research firm-specific capabilities describe distinct resources and competencies that enable the firm to choose, develop and implement value-enhancing strategies. The presented perspectives on capabilities are an indication of organizational and managerial processes that influence the performance of firms.

table 2 Categories of capabilities

<i>Category</i>	<i>Description</i>
I <i>Managerial Capabilities</i>	The unique capabilities of the organization's strategic leaders to articulate a strategic vision, communicate the vision throughout the organization and empower organizational members to realize that vision. The unique ability to enact a beneficial firm-environment relationship.
II <i>Input-Based</i>	The physical resources, organizational capital resources, human

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<i>Category</i>	<i>Description</i>
<i>Capabilities</i>	resources, knowledge, skills and capabilities that enable a firm's transformational processes.
III <i>Transformation Capabilities</i>	Organizational capabilities required to advantageously convert inputs into outputs. This includes harnessing innovation and entrepreneurship, promoting organizational culture and fostering organizational learning
IV <i>Output-Based Capabilities</i>	Physical outputs and all knowledge-based, invisible strategic assets such as corporate reputation or image, product or service quality, and customer loyalty

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*Source: Lado and Wilson (1994).*

The analysis of this chapter showed that capabilities do not merely accrue to the firm (from a good fit with industry or environmental requirements), but may consciously and systematically be developed by the wilful choices and actions of the firm and its strategic leaders. Thus, a voluntaristic (as opposed to deterministic) philosophical posture is adopted in the discussion of the concept of capabilities and their sustainable competitive advantage.

In this study the focus is not merely on the sustained competitive advantage of firms. An important outcome of this notion, through appropriation of the strength of firm-specific capabilities, is autonomous growth. The next chapter presents an exploration of literature on this second pillar of the theoretical framework.



## 3 Theory on growth

Contrary to the relative young field of the dynamic capabilities view discussed in the previous chapter, relevant insights on the evolution and revolution in corporate development and the growth of the firm have been developed 40 or more years ago (Gibrat, 1931, Penrose, 1959). Nowadays, the field of theories on growth is rather dispersed, creating diffusion on the answer to the question "What is growth management?" Nevertheless, entrepreneurship researchers have pointed to growth as crucial indicator of venture success, rather than other performance indicators (Covin and Slevin, 1997, Low and MacMillan, 1988)

To gain better insight and understanding of the field of research on growth, this chapter presents an overview of literature the factors that influence on the growth of firms. The aim here is to provide an answer to the second research question:

*"What do theories contribute to different growth processes, and what are possible determinants for growth of small and medium-sized organizations?"*

Similar to the previous chapter, the analysis of theories in this chapter is explorative and descriptive. The first paragraph examines the most influencing perspectives in the field of research. In the second paragraph, possible determinants for the growth of (small and) medium-sized firms are presented and a critical review is given for their possible 'fit' in the theoretical framework of this study. The final section contains the summary.

### 3.1 Perspectives on organizational growth

This section presents an overview of theoretical perspectives on the growth of firms. Schumpeter (1934) claimed that industrial growth and development is a direct product of the competitive process. This competitive process is rooted within the companies. It is 'a force within' since discovery is determined by the things that people in organizations do.

In this section, different theoretical perspectives will be discussed with the firm as the unit of analysis. An overview is presented for lifecycle theory and the teleology theory. They are combined with the resource-based view of the firm and insights from entrepreneurial research into the concept of strategic entrepreneurship.

#### 3.1.1 *Lifecycle theory*

According the lifecycle theory, companies pass through distinctive stages (each with its own characteristics) as they develop. This development can be linked to the product lifecycle. Like products, companies do not move through the cycle at the same speed and unlike most products companies can stay in the same stage for considerable period of time. Lifecycle theory is deterministic by nature. In the lifecycle theory, companies have to react to changes and the crises that are inherent to the distinctive and sequential stages of the companies (reactive). The lifecycle theory depicts the process of change in an entity as progressing through a necessary sequence of stages (Van de Ven & Poole 1995). A number of multistage models have been proposed in which predictable patterns of growth of organizations are assumed to exist. Often the stages follow a pattern of start-up, growth, formalization and so on (e.g. Quinn & Cameron 1983).

More recently, the most important lifecycle models are reviewed by Hanks et al. (1993). Based on this review, the authors come to a five-stage model: start-up stage, expansion stage, consolidation stage, diversification stage and a decline stage. Some models focus on specific cases such as small business (Scott and Bruce 1987, Mount et al. 1993), leadership (Eggers et al. 1997) or technology-based companies (Kazanjin 1988), dominant management problem (Greiner 1973).

In all these models, the development stage of the company determines the importance of different management tasks and leadership styles. Also each stage has its own (growth) strategy. In these models, there is an implicit assumption that growth is an objective and that size will increase.

The empirical work that has emerged has primarily focused on differences in internal organizational characteristics (such as leadership and policies, structure, strategy etc) across theorized stages. For example, in the first stages of the life cycle, entrepreneurial orientation proved to be an important predictor of performance and growth of the organization (Wiklund, 1998). In the later stages, a "continued entrepreneurship" could be a predictor of the growth rate of established firms (Davidsson 1991).

### 3.1.2 *The teleology theory*

In the teleology theory, the purpose or goal is the final cause for guiding the direction of a company. In this perspective, an organization sets goals and by taking actions and adaptation it tries to reach their goals. Thus, development is a repetitive sequence of goal formulation, implementation, evaluation, and modification of goals based on what the organization has learned and achieved. Central in this theory are theories on decision making (March & Simon, 1958) and models of strategic planning and goal setting (Chakravarthy & Lo-range, 1991). In the decision-making theory, the starting point is psychology with stimulus-response/actions processes. The individual with other individuals form a group or organization, each with their own goals. Together they formulate the goals and objective of the organization. There is a focus on individual persons and their role in the decision making process and the interaction with other members in a group. Especially management is important for formulating the organisational goals. Growth, amongst other goals, can be one of the objectives a company might pursue.

In the teleology theory, there is a focus on the prerequisites for attaining the goals: the functions that must be fulfilled, the accomplishments that must be achieved, or the components that must be built or obtained for the end state to be realized. The purposiveness of an actor or unit as a motor for change is constraint by the organizational environment and resource constrains. Once an organization attains its goals, this does not mean it stays in permanent equilibrium. Based on social psychology, Weick (1979) argued that goals are socially constructed and enacted based on past actions. Influences in the external environment or within the organization itself may create instabilities, as new goals are set. Teleology theory cannot specify up front what trajectory development an organization must follow in order to reach its goals. It can only list a set of possible paths and then rely on norms of decisions rationality or action rationality (Brunsson, 1982) to prescribe certain paths.

Given the business competencies and the complexity of the business environment, certain strategies are more appropriate. Based on the most appropriate strategy and negotiations within the organization, management can set goals. These goals are the starting point of the planning process. The goal setting can be top down or more participative and iterative, given the context of the organization. To achieve the goals, management has to acquire the right resources and use them in an efficient way. In this, teleol-



ogy theory differs from the lifecycle theory, in which development paths are deterministically determined.

### 3.1.3 *Entrepreneurial theories*

Partly overlapping the lifecycle theory and resource-based view is literature on entrepreneurship. In 1983, Stevenson introduced the term entrepreneurial management. He defined entrepreneurial management as a set of opportunity-based management practices that can help a company to remain vital and competitive. In this stream of literature, characteristics and behaviour of the entrepreneur is used to explain the growth of a company. The entrepreneurial management is not only relevant for the start-up of new firms but also relevant for older companies.

Entrepreneurship is a type of behaviour, which concentrates on the identification and exploitation of opportunities rather than resources (Hitt et al. 2001, Stevenson 1983). Davidsson (1991) introduced the concept of 'continued entrepreneurship' to explain the actual growth of companies. Part of the continued entrepreneurship is the opportunity scanning capability of the entrepreneur. The opportunity scanning is essential for selecting the right strategy and required resources and capabilities, especially for small and medium sized firms.

More recent Bhidé (2000) contributed to entrepreneurial theories in his book 'the origin and evolution of new business'. The author argued that there are critical tasks that entrepreneurs face in the transformation from fledgling to well-established firms. Bhidé (2000: 260) argues: "Transforming a fledgling enterprise into a large and long-lived corporation requires entrepreneurs to adopt a strategic rather than opportunistic approach." Formulating a long-term strategy for a fledgling business involves mental capacities that do not play a significant role in starting a venture. One of these mental capacities includes the imagination to envision a different kind of future for the corporation. The entrepreneur has to be able to create a future according to his long-term vision, and furthermore keep firm control over expenses and cash, and closely monitor operating performance. The interrelationships among these tasks make it difficult to delegate them. Nor can entrepreneurs easily transfer their knowledge, contacts, and legitimacy to another person. In this regard companies typically attain note-worthy size and longevity under the leadership of individuals who have an exceptional capacity and willingness to broaden their skills and roles. Bhidé refers to this as 'exceptional leadership' of the entrepreneur.

To integrate this perspective with the above-mentioned fields of strategic research, entrepreneurial theories will be further explored in the next section.

### 3.1.4 *Evaluation of theories*

Based on the theories presented above and the previous chapter, organizational development can be explained in multiple ways. An overview of the most influencing theories of the field is present in table 3 .

The perspective of organizational growth chosen for this study is on the broader level influenced by elements of all of these perspectives. Based on the lifecycle theory a pattern of incremental growth is expected with critical events that explain radical changes in the growth rate. Firms are expected to go through different stages of development, each stage with its own characteristics. In other words, the development stage of the company determines the importance of different management tasks and leadership styles. However, even if all firms progress through the life cycle phases, they are likely to

do so at very different rates and will probably enjoy different growth rates in each phase. The basic problem here is that the theory is build up around the view that there are secular (or long run) deterministic trends in the pattern of growth of firms. Furthermore, the causality between lifecycle phase and for instance management style is not clear. The phase can prescribe the management style (deterministic), but also a change in management style and ambition can lead to the firm entering another lifecycle phase.

**table 3 Perspectives on growth**

<i>Perspective</i>	<i>Main authors</i>	<i>Nature</i>	<i>Key arguments</i>
Life cycle theory	Greiner (1973), Welbourne et al. (1998)	Exogenous	Firms pass through different stages as they develop. Managers have to react to changes and crisis that are inherent to the distinctive and sequel stages of the companies (sequential and reactive).
Teleology theory	March and Simon (1958) Chakravarty and Lo-range (1991)	Endogenous	Management has to set goals for the organization and by taking actions and adaptation try to reach the goals.
Resource-based theory	Amit and Shoemaker (1993), Barney (1991), Penrose (1959)	Endogenous	Managers must constantly scan their environment for opportunities and search for competitive advantage by creation, acquisition and utilization of unique firm resources (proactive). Management capacity can be a barrier to grow.

*Source: EIM*

Based on teleology theory, the growth pattern depends on the ambitions of the firm, the goals it set. If a company wants to grow it needs (a bundle of) resources that are unique in the market and organized in an effective way. When the combination becomes less unique, the company will face more competition from other companies and will fall into a normal or stable growth. It is also possible that a firm will reach a stage that can only be broken by a trigger event (e.g. new goals, new management with new ambitions). If this event occurs the company needs to revise or recombine its resources. As brought forward by the evolution theory, a quick identification of opportunities and the redirection of the path of the firm will be influenced by the capabilities rooted in the company. Therefore, corporate growth is a path dependent process. Companies that are better able in getting a good fit between their own capabilities and the required capabilities based on the environmental niche, will have a better chance of growing faster (and survival) than other companies.

Penrose's (1959) classic study of the growth of firms contains two types of arguments: (1) the (endogenously) 'resource push' theory of growth and (2) 'managerial limits to growth'. The first argument is enlightened by the resource-based view in the previous chapter; the second argument is discussed here. Since, as the firm expands, it needs to recruit new managers, it must divert at least some existing managers from their current operational responsibilities to help manage the process of expanding the management

team. Since diverting existing managerial resources to training new managers carries an opportunity cost, the faster the planned growth of the firm is, the higher these costs are likely to be. Under these circumstances, firms are likely to smooth out their responses to current growth opportunities, sacrificing current profits but saving some of the costs of growth that they might incur if they do not train new managers (Geroski, 1998). With the new managers the firms can grow in the long-term. The growth of firms is also determined by the adjustments costs (and the rate at which these costs increase in the rate of growth). Since in the long run the development of the firm size is unpredictable, firms should adjust to shocks that it expects to occur in the near future.

Turning back to Penrose's first argument, when the right 'combination' of resources and capabilities is found a relative stable period can emerge until the following trigger event occurs. In other words there are periods of exploration and periods of exploitation (Van den Bosch et al, 2000). As explained in the previous chapter, in a period of exploration flexibility and scope are important; the ability of an organization is to internalise new capabilities and resources and/or a new combination of using the existing resources and capabilities. In a period of exploitation, "the refinement and extension of existing competencies, technologies and paradigms" (March 1991:85), are important.

In answering the question on "which factors determine growth and profitability", Uhlaner-Hendrikson and Psarouthakis (2001) stress the different approaches: the identification of environmental factors for growth (population ecology), owner/founder characteristics (entrepreneurial theory), firms go through inevitable stages of development (lifecycle theory) and internal actions taken by the founder and other managers (strategic approach). In conformity with these authors this study considers all these approaches to have merit. Although integrating dynamic elements of multiple micro level perspectives, this research subscribes most to the proactive (voluntaristic) approach of the resource-based view of the strategic management supplemented with the influence of the behaviour of the entrepreneur.

#### 3.1.5 *An integrative perspective: Strategic entrepreneurship*

Taking the notion of strategic management, a link can be made with entrepreneurial theories. While the fields of strategic management and entrepreneurship have developed largely independent of each other, they are both focused on how firms adapt to environmental change and exploit opportunities created by uncertainties and discontinuities in the creation of wealth (Hitt and Ireland, 2000, Venkataraman and Sarasvathy, 2001). As such, several scholars have recently called for the integration of strategic and entrepreneurial thinking (Hitt et al., 2001). McGrath and Macmillan (2000), for example, argue that strategists must exploit an entrepreneurial mindset and, thus, have no choice but to embrace it to sense opportunities, mobilize resources, and act to exploit opportunities, especially under highly uncertain conditions.

Entrepreneurship here is defined as the identification and exploiting of previously unexploited opportunities. Therefore, entrepreneurial actions entail creating new resources (exploration) or combining existing resources in new ways (exploitation) to develop and commercialise new products, move into new markets, and/or service new customers (Ireland et al., 2001). On the other hand, strategic management calls for choices to be made among competitive alternatives (Stopford, 2001). Alternative entrepreneurial opportunities constitute one of the primary arenas of choices to be made. Strategic management provides the context for entrepreneurial actions (Ireland et al, 2001). Entrepreneurship is about creation; strategic management is about how advantage is established and maintained from what is created (Hitt et al., 2001, Venkataraman and Saras-

vathy, 2001). Wealth creation lies in the core of both entrepreneurship and strategic management. Outcomes from creation (i.e. entrepreneurship) and exploiting current advantages (i.e. strategic management) while simultaneously exploring new ones can be tangible, such as enhancements for firm wealth, and intangible, such as enhancements in the firm's intellectual and social capital. This is the reason that entrepreneurial and strategic management perspectives should be integrated to examine entrepreneurial strategies that create growth, this approach is called strategic entrepreneurship: "entrepreneurial action with a strategic perspective" (Hitt et al., 2001: 480).

Advocating the perspective of strategic entrepreneurship the following section discusses literature on determinants for growth more in depth.

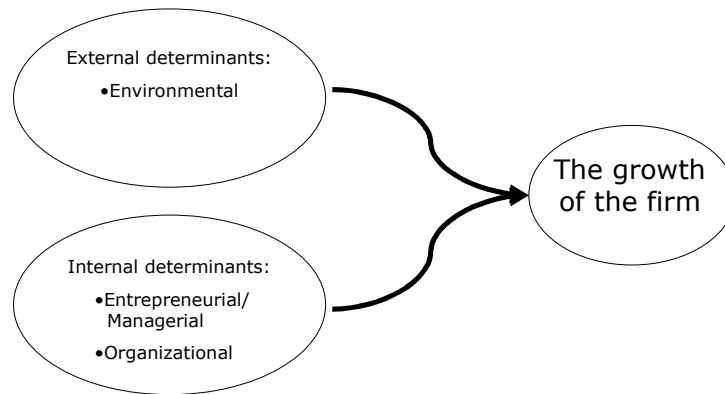
### 3.2 Determinants for small and medium-sized firm growth

Besides the schools of thought on pattern of growth there is a group of researchers that focus on concepts that explain growth, i.e. what are the antecedents of organisational growth and what are the consequences for the company itself? This section deals with answering the first part of second research question; "What are possible growth determinants for organizations?". Using the approach of the strategic entrepreneurship, occasionally supplemented with elements from the other perspectives of the previous section, this section tries to identify the determinants for growth from literature of strategic management focused on Small and Medium-sized Enterprises (SMEs). In this regard studies on growth, performed during the past two decades, are examined for both theoretical and empirical justification (see Annex I).

Analysis of the studies shows a wide scale of factors explaining growth. Concepts that proved to have an impact on the growth of SMEs can be classified in several groups of resources like human capital, social capital of the entrepreneur, financial capital, structure of the company, and environmental variables (Man et al., 2001, Davidsson, 1991). Other authors of recent studies have proposed that individual, organizational and environmental dimensions provide a more comprehensive prediction of venture development and growth than any one dimension in isolation (Almus and Nerlinger, 1999, Baum et al., 2001, Covin and Slevin, 1997, Lumpkin and Dess, 1997). However there has been limited examination of these multilevel models. To focus on the most important and relevant domains for this research, the variables for growth are pieced together in two areas: external –environment- and internal –organization and management- (see figure 2).

figure 2 Theoretical fields for growth determinants

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Source: EIM

*External determinants: Environment*

The lack of market power and the turbulent nature of newly emerging markets faced by many SMEs, often make them more vulnerable to external influences than larger firms. Barringer et al., (1997) found that fast-growing entrepreneurial firms operate in more munificent environments than slower growing firms, suggesting the positive influence of environmental opportunities. Other authors have taken a more proactive approach when considering the external factors. For example, Slevin and Covin (1995) suggested that continuous repositioning is needed for smaller new firms to anticipate and be responsive to the action of (larger) competitors. This leads to the conclusion that the influence of the environment on the firm's growth cannot be ignored.

Baum et al. (2001) consider external factors to be dynamism, munificence and complexity. Dynamism refers to the level of environmental predictability (rate of market and industry change and the level of uncertainty about forces that are beyond control of the individual businesses. Stable environments are easier to navigate which is positive for venture growth. High munificence enables an organisation to cope with challenges by obtaining outside resources and complex environments, composed of many firms, may be more difficult to comprehend and therefore will be difficult to grow in. Supplementing on these issues are the environmental factors presented by Almus and Nerlinger (1999): local characteristics and wage and salary rates. The authors point here at the population density and cost factor of hiring new employees that could influence firm growth. A study by Wijewardena and Cooray (1995) on determinants of growth in small Japanese manufacturing firms pointed at the importance of the type of industry and the nature of the competition. The authors argue that firms facing less competition may be able to generate more sales contributing to faster growth. In addition, the growth of firms may be attributable to the specific nature of the industry in which they operate.

External factors that influenced the growth per share of small U.S. manufacturing firms are industry growth, market concentration, value added per employee and the market segment (Pelham, 1999). Beal (2000) mentions environmental scanning and refers to external aspects that management should be aware of: industry sales growth, level of demand, stage of development of products, growth in distribution channels and adver-

tisement expenditures. Lau and Busenitz (2001) studied Chinese small business and emphasized the influence of difficulty in market conditions on the firm's growth. Difficulties can be caused by problems with borrowing, operational facilities, competition, policy change and labour. A study on performances of Irish small businesses pointed at the effect of capital requirements of the firm in combination with customer power and material shortages (Roper, 1999). Another European study is Wiklund's (2000) study on the role of entrepreneurial orientation on performances of small Swedish firms. He found the environmental dynamism, capital availability and type of industry to be relevant for growth in terms of sales and employment.

In the light of the strategic entrepreneurship perspective this study subscribes to the timely and comprehensive identification of Baum et al. (2001), thereby using the three dimensions of the environment that influence venture growth: dynamism, munificence and complexity.

#### *Internal determinants: Entrepreneurial/Managerial*

As stated in the previous section, in studies on entrepreneurial orientation the drive and abilities of the manager or entrepreneur are central (related with the ideas of the teleology theory). Especially for a SME, the process of achieving growth is strongly influenced by the key entrepreneurs or managers. The task of creating organizational capabilities and competencies is seen as one of the functions of the entrepreneur (Gartner and Starr, 1993). Muzyka and De Koning (1998) found that the opportunity orientation, organizational processes and knowledge management are important factors in explaining growth. Eggers et al. (1997) showed that leadership style differ in different stages of organizational growth. According to Davidsson (1991), growth is influenced by the need for achievement, ability, opportunity and growth motivation of the entrepreneur. Lau and Busenitz (2001) examined the growth intentions of entrepreneurs and found that an entrepreneurs' commitment, need for achievement, and social environment is important, but that a cognitive understanding of the environment has also deep impact on growth intentions. Baum et al. (2001) identified five different research domains that influence organizational growth. Three of these dimensions are focused on the entrepreneur: personal traits and general motives, personal competencies, and situational specific motivations. These dimensions are important for the successful establishment and operation of new ventures. Personal traits and general motives are the age, education, ambition and ambiguity of the entrepreneur. Individual competencies are competencies and capabilities that are required to perform a specific job (e.g. skills specific for the industry and opportunity recognition). Situational specific motivations refer to the strategic vision, business goals and self-efficacy. Specific, challenging goals lead to higher performance. Entrepreneurial processes that are brought forward by Lumpkin and Dess (2001) are innovativeness, risk taking, pro-activeness and aggressiveness.

Uhlaner-Hendrikson and Psarouthakis (2001) stress the important role of the CEO in the management of their extensive dynamic model of firm growth. According to the authors the leader of the firm needs to be visionary and have an open attitude to change. This last aspect is also stressed by Covin and Slevin (1997: 123), accordingly "the successful manager of the future will be much more inclined to accept and embrace the inevitability of continuous organizational change."

All these studies imply the influential role of the entrepreneur in the stimulation of the growth of the medium-sized firm. The entrepreneur has to set goals and take actions through assessing competitive scope and using organizational capabilities. In other words, the entrepreneur has to link the external environment and internal firm capabili-

ties. To ensure the long-term performance of the firm, the entrepreneur must set the direction for the company, be visionary, strategic and goal oriented. Furthermore, an entrepreneur also needs to possess strong commitment competencies, equipping him with the necessary drive and initiative to sustain efforts within the organization. Being persistent and committed to the task will enhance performance of the firm in the long-term (Mann et al. 2002).

#### *Internal determinants: Organizational*

As brought forward by the resource-based view of the firm, the internal factors of the firm are important for its performance. Lee et al. (2001) found that the technology-based ventures created value largely based on their internal capabilities. Specifically, they found that technological capabilities and financial resources were important predictors of a venture's growth. The results of the study by Yeoh and Roth (1999) show that the firms' resources and capabilities contributed to sustained competitive advantages in the pharmaceutical industry. Furthermore, Baum et al. (2001) report that a new venture's internal capabilities are the primary determinants of the venture's performance. Firm characteristics identified by the authors are age and size of the firm, endogenous internal factors here are strategy, available resources, financial situation, products, working methods, cooperation, profitability and innovative behaviour. Almus and Nerlinger (1999) introduced five factors of firm-specific characteristics that influence growth: age, size, liability, networks and diversification of products. Again pointing at the age and size of the firm is the research by Wijewardena and Cooray (1995). The authors further examined the influence of capital intensity, export orientation, advertisement expenditures, research and development expenditures and the number of skilled workers relative to the total number of employees.

Using a resource-based view, the study by Rangome (1999) points at the importance of innovation, production, and market management capabilities. In their book on 'Dynamic management of growing firms' Uhlaner-Hendrikson and Psarouthakis (2001) present a Dynamic Systems Planning model. Based on an open system theory and empirical research, the authors link the strategic significance of seven elements in the model –market strategy, resource acquisition, resource allocation, work flow, human relations, public relations and technical mastery to the creation of a stronger company. On an even broader level Covin and Slevin (1997) applied a 12-factor instrument to measure the 'total competitiveness' of SMEs, including the firm's structure, culture, human re-sources, product/service development etc. According to the authors, total competitiveness, in terms of specific firm behaviour, means scoring high on all competitiveness levels. Anecdotal evidence suggests that as business unit size increases, substantial managerial energies must be expended to sustain these 12 factors at their desired level (Covin and Slevin, 1997). According these scholars, one of the factors of organizational culture is considered to be the shared norms (unwritten rules of behaviour) as well as ideologies, values, attitudes beliefs and assumptions. Culture is expected to provide a social energy that guides peoples' daily behaviour.

Besides the factor of culture, knowledge is another critical firm-specific –intangible resource. Knowledge is generated through organizational learning (Hitt and Ireland, 2000, Hitt et al., 2000). Learning new capabilities helps firms to compete effectively, survive and grow (Autio et al., 2000). The accumulation of knowledge through learning constitutes a driving force in the development and growth of young firms (Penrose, 1959, Spender and Grant, 1996) because knowledge acquisition opens new 'productive opportunities' (Penrose 1959) and enhances the firm's ability to exploit these opportunities. The development and growth of young technology based firms are particularly

dependent upon innovatively combining their own firm-specific knowledge with that of external partners because of the resource constraints of young companies (McDoughall, Shane and Oviatt, 1994) and because young technology based firms depend on knowledge rejuvenation to survive and grow (Autio et al., 2000). Hoopes and Postrel (1999) suggest that integration leading to shared knowledge among firms is a resource that enhances a firm's product development capabilities.

Hitt et al. (2001b) found that the transfer of knowledge within a firm builds human capital (employees' capabilities) and contributes to higher firm performance. Furthermore, the firm's human capital is used to implement strategies that in turn enhance performance as well. Thus, human capital has direct and indirect effects on firm performance.

### 3.3 Summary

In this chapter an overview is presented of the perspectives in (strategic) management literature on the growth of firms. In the first paragraph the classic perspectives on growth -life-cycle and teleology - are combined with more modern views -resource-based view and entrepreneurial- into an integrative perspective of strategic entrepreneurship.

In the second section the adopted view is used in the analysis of a group of recent studies on growth of small and medium-sized firms. Not quite similar to large (multinational) corporations, these companies have their own specific factors that play a vital role in the expansion of the organizational activities. Although these studies suggest a large number of determinants for growth, still no strong explanatory factors have emerged. In this regard, this chapter has come to an explanation and description of variables that critically influence the growth of (small and) medium-sized firms. These determinants are related to the environmental characteristics, assets (resources and capabilities) of the organization and on the capabilities of the entrepreneurial top management. Considering the wide scale both external and internal factors that influence the performance of the firm, a deeper investigation appears to be required.

Comparing the determinants with the firm-specific capabilities of the previous chapter, the two fields of theory show a mutual influence (e.g. the resource-based view). In this regard it seems appropriate to place an effort in integrating the two sets of outcomes of capabilities and growth. To come to an agreement on the relation between the two fields of thought and their relevance for medium-sized firms, the next chapter presents a conceptualisation of the theories. In this fourth chapter variables for growth are selected on basis of their fit with a dynamic framework.







## 4 Conceptual framework

In the world of business, nothing ever stays the same. As Uhlaner-Hendrickson and Psarouthakis (2001: xxix) state: "In an era where product, service and retailing ideas can be quickly mimicked and rolled out to the market, building unique organizational capabilities into your company may provide you with a competitive advantage that assures more rapid sales growth or profitability."

The elaboration of theories on capabilities and growth in the previous two chapters has led to a firm-specific capabilities perspective in chapter two, and the strategic entrepreneurship perspective of chapter three. This chapter aims to integrate these perspectives and come to answering the third research question:

*How can capabilities and determinants for growth be combined into variables that (dynamically) influence the organic growth of medium-sized firms?*

An effort is made to combine the two fields of business research into a comprehensive -dynamic- framework of firm-specific capabilities that create organic growth for the firm. In this attempt the framework aims at defining the managerial and organizational processes that play a role in the management of growth, and the incorporation of environmental aspects.

In the first section of the chapter, dynamic elements are combined into a conceptual model for growth, focussing on the relationship between growth and capabilities. In the second section, two key-relations from this model are further elaborated by investigating the interrelationship between (1) the environmental characteristics and development of firm-specific capabilities and (2) the role of firm-specific capabilities for the growth of the firm. This analysis leads towards tentative propositions and a causal relation scheme of the inter-dependence between growth variables and capabilities. The reasoning of the chapter is closed with the summary.

### 4.1 Dynamic elements

In this section an overview is presented of the two fields discussed in the previous chapter: capabilities and growth. The discussion of the supplementary elements of the two fields leads the way for the attempt to present a conceptual model on this relationship.

#### *Compatibility of dynamic capabilities and growth*

Chapter two dealt with an overview of dynamic capabilities that discharged into four categories of firm-specific capabilities: managerial, input-based, transformational and output-based. Chapter three explored the wide field of theories on growth and searched for determinants of firm growth. Despite the interest and shared agreement on the theoretical perspectives, empirical research on these subjects is dispersed. Where the emerging concept of dynamic capabilities lacks maturity and is called tautological, the field of research on growth cannot seem to find agreement on determinants for the growth of small and medium-sized firms.

The review of studies on growth (presented in appendix A) assigns to the importance of using a sound theoretical framework in further investigating the relation of firm-specific capabilities and growth of medium-sized firms. According to Teece et al. (1997: 516): "A key step in building a conceptual framework related to dynamic capabilities is to identify the foundations upon which distinctive and difficult-to-replicate advantages can be built, maintained and enhanced". A capability is distinct if an activity to organise and get things done cannot be accomplished merely by using the price system to coordinate activity, i.e. through a market transaction (Zander and Kogut, 1995).

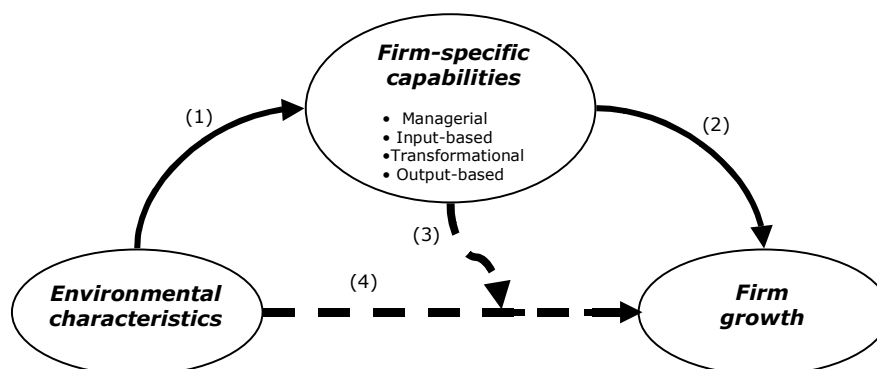
Firm-specific capabilities need to be understood mainly in terms of the organizational structures and managerial processes and routines that support productive activity. However, the content of these processes and the opportunities they afford for developing competitive advantage at any point in time is significantly shaped by the resources the firm possesses (position) and the evolutionary path it has adopted or inherited.

The firm's distinctive processes and positions collectively encompass its competencies and capabilities, they must be built because they cannot be bought. The management of the firm's growth necessitates this acquisition and development of relevant resources and capabilities, primarily performed by a visionary, committed and skilled entrepreneur in a favourable environment. The open-system-based organization perspective of this research, (i.e. multi-tiered social systems at individual, organizational, and environmental level all interact dynamically to impact organizational outcomes), is quite consistent with recent research in the field of entrepreneurship and strategic management of growing firms (Uhlener-Hendrickson and Psarouthakis, 2001). These systems show that interactions between individual, environmental and strategy variables provide more accurate predictions of (sales) growth than any one set alone.

#### *Conceptual model*

In line with the previous section, a conceptual model is created. In the view of this research, capabilities (managerial, input-based, transformational and output-based) are related to the growth determinants of a firm (environmental, organizational and entrepreneurial/managerial). Based on these building blocks of capabilities and growth determinants, a conceptual model for the organic growth of medium-sized firms is presented (figure 3).

figure 3 Conceptual model on relationship between capabilities and growth



Source: EIM

This model comprises of three elements, environmental characteristics, firm-specific capabilities and the growth of the firm. Environmental characteristics are the external factors that determine the firm's growth. Central to the model are the internal processes of the firm: the creation and refinement of firm-specific capabilities. These capabilities are based on the framework of Lado and Wilson (1994) and consist of four types of capabilities: managerial, input-based, transformational and output-based. The third element is the growth of the firm, measured by the increase of both revenues and employees.

On basis of the theoretical exploration, four relations are expected to occur in the model. (1) The creation and refinement of capabilities is expected to be influence by external characteristics. (2) Firm-specific capabilities are expected to influence the firms' growth. (3) The development of firm-specific capabilities is expected to influence the relationship between environmental characteristics and the growth of the firm. (4) Environmental characteristics are expected to influence the growth of the firm.

Although four relations are expected in the conceptual model, the further elaboration will be focused on two relationships that are key for this research. The first relationship (1) is the influence of the environmental characteristics on the creation of capabilities within the firm. The second relationship that is further examined is (2) the influence of the managerial-, input-based, transformational and output-based capabilities on the growth of the firm.

In the next section a deeper insight is created into the influence of the external characteristics and internal capabilities for growth.

## 4.2 The interrelationship of capabilities and growth-determinants

In this section the relation between environmental characteristics and firm-specific capabilities is further elaborated by incorporating determinants for growth, explored in

chapter three. To come towards measurable variables, a selection is made of growth-determinants that can be used in the light of the framework.

#### 4.2.1 *Determinants for growth*

The selection of determinants is based on analysis of 17 articles on the growth of small and medium-sized firms, published between 1991 and 2001 (see Annex I). The studies are based on theoretical insights of entrepreneurial-, strategic-, and growth management literature. Additionally empirical evidence is provided from world-wide re-search during the past two decades, on firm growth in e.g. profits, revenue and employees. The authors of the articles show to have used a large group of environmental- (20%), organizational- (30%) and managerial related (50%) determinants. A generic overview of the determinants that are mostly used in the articles are presented in table 4.

**table 4** Growth determinants

<i>Determinant</i>	<i>Source</i>
<i>External: Environmental characteristics</i>	
Environmental dynamism	2, 4, 5, 7, 8, 12, 14, 16, 17
Environmental complexity	4, 7, 8, 12, 16
Environmental munificence	4, 7, 8, 14, 17
<i>Managerial</i>	
Business skills of CEO	3, 4, 7, 8, 9, 10, 11, 14, 15, 17
Traits of CEO	1, 2, 3, 8, 14, 15
Motivation of CEO	4, 7, 8, 10
<i>Organization</i>	
Strategy formation	3, 6, 8, 9, 13, 14, 15, 16
Product/service innovation	6, 8, 12, 13, 14, 16
Marketing and sales	1, 3, 6, 9, 14, 15
Relationship networks	1, 8, 9, 15, 16
Financial management	3, 6, 12, 15, 16
Human (knowledge) development	1, 4, 7, 16, 17
Organizational size	1, 7, 16, 17
Organizational age	1, 2, 3, 4, 5, 6, 11, 12, 15

(1) *Almus and Nerlinger (1999)*, (2) *Beal (2000)*, (3) *Balje (1998)*, (4) *Baum et al. (2001)*, (5) *Chandler and Hanks (1994)*, (6) *Covin and Slevin (1997)*, (7) *Davidsson (1991)*, (8) *Lau and Busenitz (2001)*, (9) *Lee et al. (2001)*, (10) *Lumpkin and Dess (2001)*, (11) *Man et al. (2002)*, (12) *Pelham (1999)*, (13) *Rangome (1999)*, (14) *Roper (1999)*, (15) *Uhlahner-Hendrickson and Psarouthakis (2001)*, (16) *Wijewardena and Cooray (1995)*, (17) *Wiklund (2000)*.

*Source: EIM*

For the research in this study, determinants are selected that showed to be relevant in the presented growth studies. In the light of the research the determinants are further specified or combined. In this study, the formation of strategy is considered to be performed by the firm's top management team. Furthermore, the traits of the entrepreneur are characterized as either a business skill, or part of the ambition of the manage-

ment. The overview above is supplemented with two organizational factors for growth that are mentioned in the studies as well: organizational culture and organizational structure (Baljé, 1998, Covin and Slevin, 1997). These factors are incorporated on basis of their expected influence on the growth of Dutch ICT and life science firms, and furthermore show complementary fit for the capabilities framework. The growth variables organizational size and age are control variables. They are taken into consideration in the selection of the companies and therefore left outside the framework.

In this regard, this research considers the management of growth to include: the dynamism, complexity and munificence of the environment; the acquisition and development of financial, human and technological (knowledge) resources; transformation of these inputs into outputs by innovation, learning, organizational restructuring and an enacting culture; the output of products or services, reputation and relationship network; and an entrepreneurial management that is visionary, ambitious and skilled enough to lead an organization to organic growth. The relations between the elements of the two pillars of the theoretical framework, capabilities and growth determinants are displayed in table 5.

**table 5** Matrix of dimensions of capabilities and growth

<i>Dimensions of Firm-specific Capabilities</i>		<i>Dimensions of Growth Determinants</i>	
Type	Capabilities	External determinants	Internal determinants
Managerial	Managerial	Dynamism Complexity Munificence	Strategy formulation Skills development Ambition
	Input-based	Dynamism Complexity Munificence	Capital acquirement Human recruitment Knowledge acquirement
Organizational	Transformational	-	Innovation Learning Organizational restructuring Culture enactment
	Output-based	-	Reputation Product quality Network

Source: based on Lado and Wilson (1994)

A remark has to be made here that the presented combination above is still a tentative effort to link the 'most promising' growth-determinants to the capabilities concept developed by Lado and Wilson (1994). The following section will deal with the further elaboration of the combinations.

#### 4.2.2 *Capabilities for growth*

At this point the prerequisites for growth are formalized into the four areas of firm-specific capabilities: managerial, input-based, transformational and output-based. The evaluation of the growth dimensions leads towards definitions of the four types of capabilities. The influence of the environmental characteristics on the managerial and input-based capability, and the expected (causal) relationship of the capabilities with the growth of the firm, lead the way for tentative propositions.

##### *Managerial capabilities*

In a medium-sized organization the influence of the entrepreneur/ founder(s) is expected to be of significant importance (e.g. Baljé, 1998, Baum et al., 2001, Wiklund, 2000). Entrepreneurship is seen as the process of pursuing opportunities through new combinations of productive inputs. The characteristics of managerial competencies and entrepreneurship can be investigated from a process perspective, reflecting the actual behaviour of the entrepreneur and the fit into the long term oriented, dynamic, and controllable nature of the firm's growth. The previous chapter showed the agreement among entrepreneurial scholars of the magnitude of the entrepreneur's vision, commitment, ambition and skills (Davidsson, 1999, Man et al., 2002). These elements can be considered as higher-level characteristics, representing the ability of the entrepreneur to perform a job successfully (Lau and Busenitz, 2001) and encompassing personality skills and knowledge, which in turn are influenced by the entrepreneurs experience, training, educational background.

It may sound trivial but one of the most important managerial factors for growth is an entrepreneur's willingness to grow, the ambition. A large group of entrepreneurs actually do not have any growth ambitions and do not want to give up their autonomy. Davidsson (1999) argued that having growth ambitions is apparent by the perception of opportunities and possibilities. The ability to grow is considered to be partly influenced by the entrepreneur's ambition and the skills to bring these ambitions in practice. The other part of the ability is considered to be the environment in which the firm operates (see input-based elements) and the skills of the firm's management to exploit the approached opportunities.

Complementary to the vision of the entrepreneur or top management is the path along which the firm is managed, the strategy. Chandler (1962) provides a useful classification of strategies for growing medium-sized firms: volume expansion, geographic expansion, vertical integration and product diversity. On the subject of strategy formulation Mintzberg and Waters (1985) have proposed to distinguish between intended strategy and realized strategy. Where realized strategies were fully intended, these authors speak of deliberate strategy. Mintzberg and Waters also argue that strategy can come about despite, or in the absence of intentions, which they label emergent strategy. The notion of willingness/ambition of the entrepreneur is expected to influence the deliberateness or emergentness of the strategy formulation. The choice for a certain strategy can also be expected as an outcome of the entrepreneurs' or management's explorative or exploitative perception of the strategic alternatives and path ahead for the firm. On the integration of growth determinants into managerial capabilities, the following definition comes forward:

*Managerial capability:*      *A management's development of skills, ambition, and ability to articulate and communicate a clear strategy*



The previous chapter explored theories and empirical studies that suggested that organizations are affected by their environment (Almus and Nerlinger, 1999, Baum et al., 2001, Davidson, 1999, Pelham, 1999). Using the perspectives of strategic management, organizational behaviour and entrepreneurial theories, Baum et al. (2001) identified three dimensions of the environment that influence venture growth: dynamism, munificence and complexity. Dynamism (negative stability) refers to the level of environmental predictability; it is manifested in the rate of market and industry change and the level of uncertainty about forces that are beyond the control of individual businesses (Dess and Beard, 1984). Stable environments are easier to navigate; therefore this study expects environmental stability to be positively related to venture growth. Munificence refers to an environment's support for organizational growth (Dess and Beard, 1984). High munificence enables the firm to cope with challenges by obtaining outside resources. Complexity represents the concentration or dispersion of organizations in the environment (Aldrich and Wiedenmayer, 1993). Complex environment, composed of many firms, may be more difficult for the manager/ entrepreneur to comprehend and be negatively related with the firm's growth. However, an environment that impedes growth is expected to stimulate a manager's ability in his search for a 'fit' with the challenging environment. In this regard, the following is proposed:

*Proposition 1a: A dynamic, non-munificent and complex environment positively influences the management's ability to enact a beneficial firm-environment relationship.*

An important influence on the development of the medium-sized internal organization is expected from the firms' leader(s). A growing firm necessitates an entrepreneurial management team that is skilled, ambitious, visionary, and able to sustain a beneficial firm-environment relationship. Furthermore this top management will need to continuously develop these managerial capabilities, to lead an organization to organic growth. In this regard the second proposition comes forward:

*Proposition 1b: The development of the managerial capability is positively related to the growth of the firm.*

#### *Input-based capabilities*

The input-based factors brought forward by the capability framework of Lado and Wilson (1994) are: physical resources, organizational capital, human resources, knowledge, skills and capabilities. The individual influence of input-related assets for an organization is also brought forward by several empirical studies on growth (Baljé, 1998, Covin and Slevin, 1997, Lee et al., 2001, Uhlaner-Hendrikson and Psarouthakis, 2001). Evaluation of the studies leads towards three generic areas of resources that need to be obtained to create growth: financial-, human- and technological capital. These assets can be typified as key management concerns or potential problem areas during the growth process of medium-sized firms. In line with the resource-based view of the firm (Amit and Shoemaker, 1993, Barney, 1991) this research considers the different input elements to be idiosyncratic in the specific development of growing firms. The firm-specific combination of input-based capabilities is expected to be difficult to transmit or imitate.

*Input-based capability: The acquirement and utilization of financial-, human- and technological resources.*

Competition drives capability development both on the industry and the firm level. The dynamism, complexity and non-munificence of the environment already are expected to

positively influence the opportunity seizing of the entrepreneur. A contradictory relationship is expected for the acquisition of input-based resources. As suggested by empirical evidence (Lau and Busenitz, 2001, Pelham, 1999, Roper, 1999, Wijewardena and Cooray, 1995), environmental or industry specific variables have an impact on the growth of small and medium-sized firms. A stable, munificent and simple environment is expected to stimulate the firm's ability to acquire, develop and exploit its input-based capabilities and therefore to positively influence the firm's ability to create organic growth.

*Proposition 2a: A dynamic, non-munificent and complex environment negatively influences the organization's ability to develop input-based capabilities.*

The importance of capabilities for the firm's sustainable competitive advantage is generally recognized in the field of strategic management (Prahalad and Hamel 1990, Rangome, 1999, Teece et al., 1997) In line with the foregoing this research subscribes to this point, leading towards the following proposition:

*Proposition 2b: The development of the input-based capabilities is positively related to the growth of the firm.*

#### *Transformational capabilities*

According Lado and Wilson (1994) organizational capabilities require the firm to advantageously convert inputs into outputs including innovation, entrepreneurship, organizational culture and organizational learning. The concept of entrepreneurship used by the authors is largely dealt with by managerial capabilities of the management team. Furthermore entrepreneurship is, considering the topic of this study, expected to be of influence in all of the other three dimensions of transformational capabilities. The importance of innovation, organizational culture and learning for the growth is confirmed by empirical research on growth (Covin and Slevin, 1997, Man et al., 2002, Rangome, 1999). A fourth dimension for organizational growth is considered to be the firms' organizational structure (Baljé, 1998, Covin and Slevin, 1997)

Innovation provides the firm with the capability to generate new products and processes faster than competitors (Nelson and Winter, 1982). The ability to innovate is expected to positively influence the transformational capability. Strategic researchers have recognized organizational culture as a rent-yielding strategic resource that potentially generates sustainable competitive advantage (Barney, 1991, Shoemaker, 1990). Covin and Slevin (1997) expected culture -the firms shared norms, values, attitudes, beliefs and assumptions- to provide a social energy that guides people's daily behaviour. In this regard the enactment-based view of organizational culture in which organizational members proactively create, shape and respond to these values, is considered to be appropriate for growing medium-sized firms. Accordingly an enacting organizational culture may enhance a medium-sized firms' growth by reducing uncertainty and ambiguity on the firms' strategy and serve as a stimulating and encouraging factor for employees.

The importance of organizational learning is brought forward by researchers from the fields of organizational behaviour and the growth of the firm (Lau and Busenitz, 2001, March, 1991, Uhlaner-Hendrikson and Psarouthakis, 2001). Considering the relative lower availability of resources and younger character of medium-sized firms compared with larger firms, this research expects the notion of double-loop learning (Argyris and

Schön, 1978) to be of additional influence on the firm's growth. This concept permits organizational members to question and reassess the relevance of existing performance standards, work norms and underlying assumptions and beliefs, fields that are relatively underdeveloped in medium-sized firms. Double loop learning may enhance organizational flexibility and holds a greater potential of sustained competitive advantage.

A link here can be made with the notion of search behaviour of Cyert and March (1963) and the concepts of organizational innovation, culture and learning. In their search for capabilities in organizations it seems that firms show adaptive and proactive actions. The development of capabilities is not merely considered to be influenced by path dependent processes. According to Huygens (1999) it is explorative and exploitative search behaviour of firms that results in the creation and refinement of capabilities. In this regard innovation, an enacting culture and (double loop) learning seem to be more in line with explorative organizational behaviour and are expected to positively influence the firm's organic growth.

The fourth element that is expected to influence the transformational capability of the firm is the ability to build a flexible organization structure, which can be redesigned if necessary. The issue here is whether the firm can sustain control during the (strong) growth of the organization, without holding back organizational development. A study by Baljé (1998) on fast-growing firms in the Netherlands showed that these companies are better able to organize their internal organizational processes. In their exploration of successful continuous change of organizations, Brown and Eisenhardt (1997) speak of the creation of a limited structure (e.g. priorities, responsibilities) with extensive interaction and freedom to improvise. This combination is neither so rigid as to control organizational processes nor so chaotic that these processes fall apart.

The above leads to the following definition of the transformational capability for medium-sized firms:

*Transformation-based capability: The ability of the organization to stimulate innovation and learning by the employees, to redesign the organizational structure and to create an enacting organizational culture*

In line with the above, the expected influence of the capability with the growth of the firm leads to the following proposition:

*Proposition 3: The development of the transformational-based capability positively influences the growth of the firm.*

#### *Output-based capabilities*

Output based capabilities are the physical outputs and "all knowledge based, invisible strategic assets, such as corporate reputation or image, product service quality, and customer loyalty" (Lado and Wilson, 1994:708). These competencies entail large amounts of firm-specific investments, are developed over a considerable period of time and are not freely tradable. Therefore they can generate future streams of economic returns and be sources of sustainable competitive advantage. Empirical research on these issues in the field of growth theories is widely available (Beal, 2000, Covin and Slevin, 1997, Pelham, 1999, Rangome, 1999, Uhlener-Hendrickson and Psarouthakis, 2001). Theories on growth show that output-based elements are interrelated, showing mutual influence. A firm's reputation arises from the organizations dedication towards quality,

appreciated by its customers. Furthermore, forthcoming results make the firm more attractive to prospective customers, employees, shareholders and other stakeholders. External contacts and partnerships are expected to lead towards a relationship network that is beneficial for the firm as well (Lee et al., 2001). Networks are vital to the discovery of opportunities, the testing of ideas, and to garner resources for the formation of the organization (Aldrich and Zimmer, 1986). Despite these mutual influences this study strives to examine the direct influence of the variable on the growth of the firm. This reasoning results in the following definition:

*Output-based capability:*     *An organizations' physical outputs, reputation and relationships network.*

The expected influence of the output-based capability with the growth of the firm can be formulated accordingly:

*Proposition 4:*             *The development of the output-based capability is positively related to the growth of the firm*

#### *Idiosyncrasy*

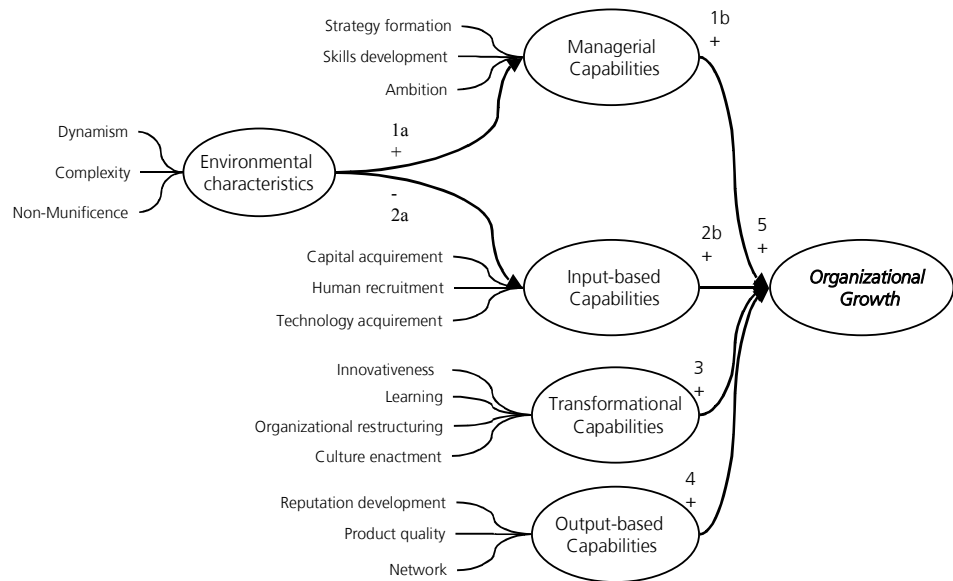
Despite the idiosyncrasy of firms in their organizational behaviour, competitive behaviour in the market tends to raise firms' uniformity (Huygens, 1999). On the one hand, organizational processes make sure that distinct, firm specific, capabilities arise in individual companies. On the other hand, forces of competition ensure that, in the end, firms search for those strategies that make their capabilities compatible to the rules of the competitive game. On the one hand explorative search involves the pursuit of alternatives far removed from previous competitive formulas and results in the foundation of novel capabilities. On the other hand, exploitative search behaviour involves the hunt for expansion in the neighbourhood of current competitive recipes and causes further proliferation of these capabilities (Cyert and March, 1963).

Since organizational capabilities must be continually replenished, upgraded and deployed in order for the firm to gain and keep a competitive advantage (Amit and Schoemaker, 1993, Reed and DeFillipi, 1990, Volberda, 1998), this study considers the paradoxical relation between individual and competitive behaviour of firms to stimulate the creating and refinement of capabilities. Baljé (1998) showed that fast-growing firms, on average, better organize their internal business processes compared with less fast growers. He argued: "Although there is no such thing as a blue-print for organizational growth, fast-growing companies more effectively break through their own perceived boundaries" (Baljé, 1998: 5). The presupposition of firm-specific combinations of capabilities that enhance the firm's growth leads towards the final proposition of this framework:

*Proposition 5:*             *Firms that facilitate the development and exploitation of their own unique combination of managerial, input-based, transformational and out-put-based firm-specific capabilities will have a greater likelihood of achieving fast growth than firms that lack the exploitation of these capabilities.*

The propositions deducted from the theoretical analysis lead the way for the causal relation scheme presented in (figure 4):

figure 4 Causal relation scheme



Source: EIM

### 4.3 Summary

Extant theories argue that a firm's survival and prosperity is linked to its proficiency at creating a "fit" between its internal skills and resources, and the external opportunities and threats in its environment. An open-system framework is suggested here since activities, functions and processes dynamically contribute to the development and utilization of firm-specific capabilities.

This chapter combine theoretical concepts of theory on capabilities and growth. To create better insight for the first, external and internal processes for growth are de-ducted from a list of determinants in studies on growth. These dimensions are related to the dimensions of capabilities for this research: managerial, input-based, transformational, and output-based. The interrelatedness of the two fields is further tested by tentative propositions that lead the way for the evolution of the initial conceptual model into the causal relation scheme presented above.

Besides combining four categories of firm-specific capabilities, an effort is made to organize existing theories and findings in entrepreneurial, organizational and environmental growth studies. By emphasizing processes for developing and utilizing firm-specific capabilities, this research integrally examines the strategic management view of dynamic capabilities and organizational behaviour, complemented with entrepreneurial theories of opportunity taking. The framework further emphasizes the important role of the managerial capabilities of the entrepreneur in determining organic growth of medium-sized firms.

A limitation of the model presented in this chapter is the exploratory nature of the conceptual model. The causal relation scheme is a tentative effort in developing dynamic variables that influence a medium-sized firm's growth, by the use of merely direct relations of external characteristics and internal processes. The model will be used in examining fast-growing companies of two sectors: the ICT services and life science sector. The next chapter presents the methodology for the research of medium-sized Dutch firms in these sectors, and the measurement of the variables of the presented relation scheme.

## 5 Research Methodology

In the previous chapters, we introduced our theoretical framework. For a further enhancement of this framework this research will examine the variables in actual business situations. Before testing the framework in an empirical setting, academic rigor demands an explicit discussion of the methodology applied in such an investigation in order to legitimate the study's results. The aim here is to answer the fourth research question:

*What is an appropriate research strategy in the light of the theoretical framework and how can the variables be measured in medium-sized Dutch firms in the ICT services and life science sector?*

This chapter starts with a reflection on the overall research design of the study as previously mentioned in the introduction chapter, and discusses the primary reasons for the adoption of this design. This section explores the empirical study's first component, a longitudinal sector analysis, in terms of data collection, and argues why such an inquiry is undertaken in the first place. These steps are repeated in the section that discusses the empirical study's second component, represented by a multiple-case study. Additionally the reliability and availability of the data are discussed. Both the data-analysis and multiple-case study involve the empirical setting of the ICT services and life science sector. The second paragraph of this chapter discusses the measurement of the variables.

### 5.1 Research design

The emphasis of the framework is on the development of firm-specific –dynamic- capabilities within organizations, considered here as a process instead of a state of being of the firm. In line with the endogenous perspective advocated earlier, it is further assumed here that this process is shaped by the actions of the focal company and its' competitors as they search for capabilities. It is important to recognize that it is the collective behaviour of the organizational members that matters (Pettigrew, 1992). Crucial in process research is how and why processes develop and change over time (Van de Ven, 1992). Because these actions, and therefore those of the firm, continue to evolve over time the relation between capabilities and growth is regarded as a cumulative sequence of events. In other words, the element of time is incorporated. On conducting a longitudinal study, Pettigrew (1990: 272) argued that it "allows the present to be explored in relation to the past and the emerging future".

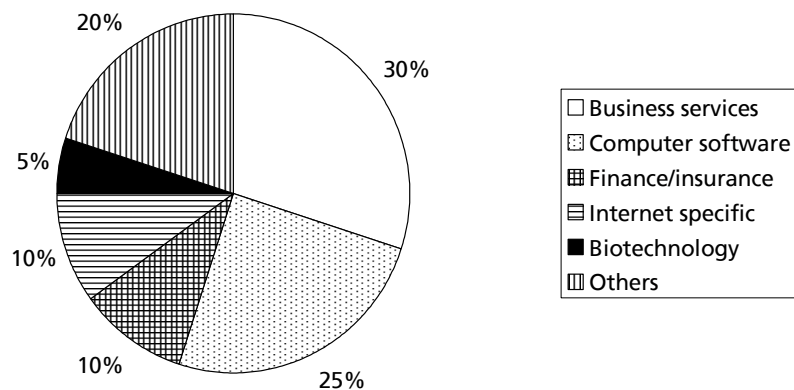
To investigate and come to a better understanding of the rather complex phenomenon of the relation between firm-specific capabilities and the growth of medium-sized firms, a combination of methods is seen as most advantageous for this study. The chosen approach consists of analysing both the industry and the firm level. According to Saunders et al. (2000) there are two major advantages to use multiple methods in the same study. First, different methods can be used for different purposes in a study. Before employing case studies for an in-depth analysis of the actual role of capabilities for firms, a better agreement on the key contents seems appropriate. An analysis, based on secondary data, provides a stronger foundation for the environmental variables in the theoretical framework. In this way, it is possible to comply the definitions of capabilities

and growth determinants in the both sectors, and give more confidence on the issues for the individual case studies. The second advantage of using a multiple approaches is that it enables triangulation to take place (Saunders et al., 2000). Triangulation of the different data collection methods increases the reliability.

### 5.1.1 Sector analysis

Considering the attention for resources and capabilities in the strategic management literature, the combination of capabilities and growth at first sight does not seem to be new. Still no sound empirical approach that deals with the four categories of capabilities and their relation with growth has come forward from the literature review in the previous chapters. In order to provide the conceptual framework a better foundation, deeper insight into this relation is generated through data analysis on the industry level. The subjects of research are two relative young and fast-growing sectors in the Netherlands: Information and Communication Technology (ICT) services and life sciences. One reason for examining medium-sized firms is the importance of these firms in the light of economic development (Audretsch et al., 2001, Verhoeven, 1998). Further, these firms have successfully survived their start-up phase, went through an interesting period of growth and are heading to become well-established firms. The successful period of growth is expected to encompass and reveal capabilities more clearly compared with general business situations, which makes it particularly interesting to investigate these firms. To attain a thorough analysis of firm-specific capabilities, two sectors that reached considerable growth in the past decade are examined: ICT services and life sciences. The Europe's 500 of the year 2000 (figure 5) is a list of firms with the fastest internal/ organic growth in the past five years combined with the controlling influence of the entrepreneur. The list of 2000 entails twenty firms from the Netherlands. Fourteen of these firms are active in the Business and ICT service sectors. A list of Dutch fast-growing companies is presented by Deloitte and Touche's Fast 50 (figure 6). The larger part of these firms operates in the Internet-related, computer software or the life science sector.

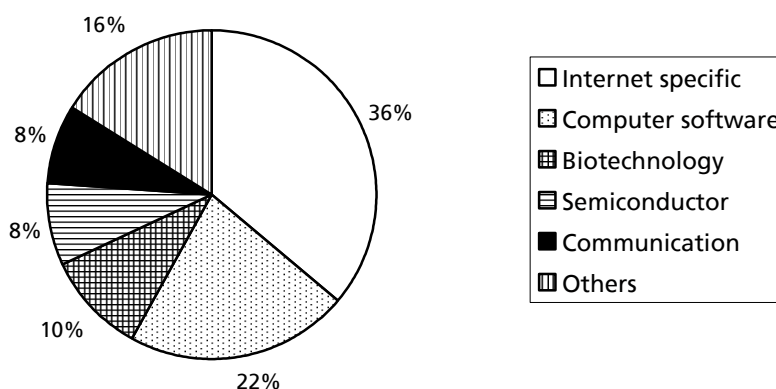
figure 5 Fast growth I: Dutch firms in Europe's 500



Source: Growthplus (2001)



figure 6 Fast growth II: Dutch fast 50



Source: Deloitte & Touche (2001)

#### Data collection

Secondary (quantitative) data has been employed in this part of the empirical study to illustrate and support the description of the environmental developments in the two sectors. The information is obtained from Centraal Bureau voor Statistiek (CBS), Centraal Planbureau (CPB), and from EIM research on the development of these sectors and (fast) growing medium-sized firms in it. Additional information on the evolution and revolution of capabilities, products, innovations and competition in the sectors is deducted from interviews with scientists with expertise in the two sectors. For the collection of further information, mainly secondary data are used for the period 1994-2001.

#### 5.1.2 Multiple-case study

Robson (1993:40) defined case studies as the "development of detailed, intensive knowledge about a single 'case' or a small number of related 'cases'. Looking at a business situation, the interest is at knowing what has been growing, how the firm succeeded to grow, and to provide an accurate description of this development. Description in Bernard's (1988) terms means "making complicated things understandable by reducing them to their components parts". The issue here is making a clear accounting of the phenomena at hand. Explanation, according to Bernard, means: "making complicated things understandable by showing how their component parts fit together according to some rules", the theory (presented in the previous chapter). A multiple-case study is particularly interesting in gaining understanding of the context of the research and the processes being enacted. In this respect this study subscribes to discover what Reymenyi et al. (1998:35) call "the details of the situation to understand the reality or perhaps a reality working behind them".

#### Data collection

For the multiple-case analysis of this research six fast-growing firms in ICT services and life sciences are selected that can be considered as 'best practices' in their own sectors. Recent research showed that among medium-sized firms in the Netherlands there are a relatively small number of firms that achieved fast growth (Verhoeven, 1998). The firms

involved in this research are interesting research subjects since they showed a fast growth in the period 1999-2001 and formed a sound basis for sustaining this growth. To contrast these best practices, also four companies are included that proved to have problems with sustaining their growth rate. In this regard can be referred towards the notion of replication (Yin, 1994). The aim here is that each carefully selected case either predicts similar results (literal replication) or produces contrasting results but for predictable reasons (theoretical replication). An important step here is the development of a rich theoretical framework as presented in the previous chapter. Considering the idiosyncratic point of view in the theory, the emphasis in this study lies on literal and theoretical replication.

Data from the cases is collected by semi-structured interviews and an analysis of secondary company data. The interview is held with the founding managers of the firms, or their representatives from the top management. The aim of the interview is to create understanding of the managerial and organizational processes that played a (important) role during the growth of the firm. The emphasis here lies on the growth in the past three years. The interview is organized according the managerial and organizational variables of the conceptual framework. During the semi-structured interview of one to three hours the manager/ entrepreneur is given the opportunity to enlighten the activities of the management, employees and external actors in the light of the fast growth of the firm.

The interviews formed the primal input for the single-case analysis. The in-depth interviews with the top management of the individual cases, are supplemented with secondary data from business plans, company presentations, analyses of financial experts, articles from newspapers or business magazines and information from the REACH databank. Furthermore information from previous research projects and a meeting with an employee are used for a further development of the description of the processes within the firm. Due to confidentiality of the sensitive firm information from the interviews and non-public secondary data provided by the firms, the full single-case analyses are not available in the appendixes. For the same reason pseudonyms are used for the names of the firms in ICT and life sciences (LSC).

#### *Data analysis*

To provide a thorough analysis of the growth of the firms, the developments since the start-up and primarily of the past three years are worked out in a single case study, based on the information of the semi-structured interviews and secondary data analysis. In order to reduce misinterpretations, the respondents, other members of the top management and one management consultant of the analysed firms, are given the possibility to react on the individual case study reports. After this evaluation a thorough analysis has taken place of the influence of the variables on the firm's growth for the single-cases. Additionally the individual reports are cross-analysed for similarities and differences.

Analysis of the case studies is performed by two researchers who independently provided a qualitative judgment on the influence of the internal variables of the conceptual relation scheme, on the growth in the single-case reports. This analysis enabled the tying of research questions or conceptual interests directly to the data, and created shared agreement on the variables within the interviews. A meeting with a scientific expert on the life science sector, and additionally the first single case study, enabled the refinement of the initial definitions of the external and internal variables. The processes in which these variables dynamically existed were handled interpretively on basis of

their contribution to the fast growth that the firms went through in the last three years. Eventually, the qualitative judgment is transformed into a five points scale, on basis of the influences of the dynamic variables in the single-case studies (from No relation to growth to Critical factor for growth).

The causal relations of the conceptual framework are tested by the confrontation of the empirical results with the theoretical model, to enable the further development of the framework according predictable reasons. The aim of the empirical study eventually is to provide the study with results of the analysis that provide more insight in the role that managerial-, input-, transformational- and output based capabilities actually played in the setting of the firms growth.

#### *Data reliability and validity*

Business situations, as a function of a particular set of circumstances and individuals, are complex and may considered being unique. Therefore, the problem of scientific generalization comes forward. When, as in this study, the environment is seen as dynamic (constantly changing) some value of generalization is lost (Saunders et al., 2000). Similarly, if it is accepted that organizations are unique to some point, this too renders generalization. On this subject Yin (1994:10) argued: "case studies, like experiments, are generalisable to theoretical propositions (as used in this study) and not to populations and universes." Therefore, the analytical generalization of the results of well-performed case studies can be a suitable instrument for the further development of the theoretical framework of this research. In this regard, generalization of the results is enabled by the use of the framework as basis for the qualitative judgments.

Posing the question: "Will similar observations be made by different researchers on different occasions?" assesses reliability of the research. Threats of subject error and bias to reliability are dealt with providing the entrepreneur the opportunity to choose a 'neutral' time and place for the interviews. A well-established flexible theme-list, re-evaluations of the single-case reports by the interviewees (and other knowledgeable persons), and independent interpretation by two researchers should prevent the observer bias and error as much as possible and increase the reliability of the judgments.

Since the global nature of processes within a firm are examined, it normally is required to consider both direct as indirect relations between the variable. Considering the time-frame and the broad nature of the theoretical topic, this study focuses merely on the direct relations. Indirect relations between the different processes certainly are expected to occur, but are left out the consideration here. Since top managers of successful firms are interviewed the 'goodness syndrome' of too positive representation of results can arise. The research deals with this syndrome by a critical review of the interview with focus on facts and actions. The same goes for the data collection, to prevent biases a distinction is made between corporate and more 'objective' documentation (e.g. press releases and reports of financial analysts).

For data interpretation, the results of the analysis are used against the tentative theoretical framework. The propositions are tested and related to the appropriateness of the assumptions in the framework

## 5.2 Measurement

This section discusses the measurement instruments. To enable cross-case comparison, in each case similar issues and topics are covered. In the light of the generalization, reliability and validity of the research, the operationalising will be based on the (successful) measurement of the same or comparable instruments of earlier studies on growth, with focus on entrepreneurial and high technology firms. Apart from the measurement of growth, the classifications of the instruments are based on the external and internal fields of the framework: environment, organization and management.

### *Growth*

Empirical studies show several measures of venture growth (see Annex I). Based on the extensive use, this research chooses sales and employee growth (Almus and Nerlinger, 1999, Baum et al., 2001, Davidsson, 1991) between 1999 and 2001 as dependent variable. Further, the research examines the firm's organic growth since growing through mergers and acquisitions is expected to have a too large influence on one firm's original tangible and intangible assets like organizational learning, culture and reputation. Especially the intangible aspects are considered to relate to the development of firm-specific capabilities on the longer term. Measuring the influence of these aspects in a newly created or joined venture is even more ambiguous than the measurement of capabilities in the 'original' firm.

### *Environmental characteristics*

This study uses three dimensions of the environment: dynamism, munificence and complexity (Baum et al., 2001). Dynamism (negative stability) refers to the level of environmental predictability, the movement within the industry; it is manifested in the rate of market and industry change and the level of uncertainty about forces that are beyond the control of individual businesses (Dess and Beard, 1984). Munificence refers to an environment's support for organizational growth (Dess and Beard, 1984). The complexity of the environment represents the concentration or dispersion of organizations in the environment (Aldrich and Wiedenmayer, 1993). These three variables are measured by developments in the sector on introductions of new products or technology, governmental and institutional support, and the number, average size and aggressiveness of competitors.

### *Managerial processes*

The entrepreneur is asked for the specific type of strategy that reflects the firms' policy and how it was developed. This study distinguishes four types of strategies: volume-expansion, geographic dispersion, vertical integration and product diversification (Chandler, 1962). The relative number of employees that are aware of the firm's strategy and vision measures the clearness of communication of the strategy and vision of the entrepreneur. According to Mintzberg and Waters' (1985) view on strategy formation, the large-scale plan is considered to be either deliberately or emergently developed.

The entrepreneurs/ manager's ambition is also determined by the chosen strategy, especially with the presence and communication of specific growth goals within the firm. Additionally the ambition of the top management is an outcome of distinguishable proactive actions (e.g. first mover actions) during the expansion of the firm (Lumpkin and Dess, 1996). The educational level of the entrepreneur, business experience, technical competencies and age are indicators of the level of skills of the entrepreneur (Davidsson, 1991).

*Organizational processes*

The investigation of organizational processes is a combination of available facts and actions, supplemented with the opinion of the manager/ entrepreneur. The availability of capital resources is measured by the perceived ease of attaining financial support for running the business, despite the environmental conditions. The recruitment effort is an indication of the availability of personnel; the level of education of the employees is an indication of the skills required within the firm. The availability of technology would be an outcome of the perceived ease of which technological data or reports on developments are attained from research institutes like universities or research organizations or developed within the own organisation.

Innovation is the introduction of new technologies or developments. The relative expenditures on research and development (R&D) resulting in new products, requests for patents, and number of R&D employees are considered to be an indicator of the organizations' innovative capabilities in high-technology firms (Lee et al., 2001, Lumpkin and Dess, 1996). Changing emphasis on activities and developing unknown skills are considered to be related to the organization's learning experience (Huygens, 1999). In this research, learning is the obtainment of competences within the organization, measured by development- and training expenditures for personnel (Lee et al., 2001). Organizational structure is defined by Covin and Slevin (1997) as the allocation of duties, tasks, responsibilities between departments and individuals. Organizational restructuring refers to the ability of the firm to redesign the formal structure of the internal departments, responsibilities and communication lines. Organizational culture is considered as the amount of shared agreement of (informal) norms and values throughout the organization (Covin and Slevin, 1997). Culture is expected to be influenced by the age and size of the organization, the motivation of employees (e.g. rewards, extra hours, sickness-rate) and activities of the employees outside the firm.

Product quality is measured by certification and monitoring of the quality of actions within the firm (Lee et al., 2001), and the distinction of the product compared to competitive firms. The firm's reputation is seen as the perception that customers have of the products and services of the firm (e.g. low cost, high quality, innovative) and the expenditures or developments on marketing and sales within the firm. The role of the organizations' or entrepreneurs' network is measured by direct and indirect cooperation with suppliers, competitors, research or financial institutes.

The elaboration of the different variables above, lead towards definitions of variables, presented in table 6.

**table 6** Definitions of growth determinants

<i>Instrument</i>	<i>Definition</i>
Growth	The increase of the firm's revenue and number of employees.
<i>Environmental characteristic</i>	
Dynamism	The level of environmental predictability; this is manifested in the rate of market and industry change and the level of uncertainty about forces that are beyond the control of individual businesses.

<i>Instrument</i>	<i>Definition</i>
Complexity	The concentration or dispersion of (competitive) organizations in the environment, and the perceived influence of competitive forces.
Munificence	The environment's support for organizational growth; high munificence enables firms to cope with challenges by easily obtaining external resources (people, technology, finance).
<i>Managerial variables</i>	
Strategy formation	The building, articulating and execution of a large scale plan in accordance with environmental characteristics and the firm's mission and vision; the communication of this plan throughout the organization.
Skills development	The evolution of the capability to manage an organization.
Ambition	The willingness to strive for or lust of a better realization of the firm's tasks.
<i>Input-based variables</i>	
Human recruitment	The enlisting and utilization of new skilled personnel.
Technology acquirement	The obtainment of external technologies or knowledge that are not brought in by employees.
Finance acquirement	The obtainment of financial resources.
<i>Transformational variables</i>	
Innovativeness	The introduction of new ideas for development of products, services or technology.
Learning	The obtainment of new skills by employees.
Organizational restructuring	The change in the allocation of duties, tasks, responsibilities between departments and individuals.
Culture enactment	The development of shared norms and values (socialisation) within the organization.
<i>Output-based variables</i>	
Product quality	The quality of the offered product, service or technology relative to the requirements of the industry.
Reputation	The perception about the firm and its products (including, services and technology) of the users.
Network	The collection of mutual connected organizations for the firm.

Source: EIM

### 5.3 Summary

In this chapter, the research design of this study is discussed. To test the dynamic capabilities in the model, two, relative young and fast-growing industrial sectors, ICT services and life sciences are selected. The open-system approach is incorporated by research on the managerial and organizational processes behind the growth of firms, in the multiple-case study. The use of both an external and internal perspective with primary and secondary data increases the reliability and validity of results. Generalization of results is stimulated by the selection of three fast-growing firms and two not so fast-growing firms in two different sectors. In this regard the firms can be considered to give insights in the best practices and obstacles for growth in their sector.

However, generalization of the outcomes of the research will have its limitations considering the study of a small group of firms during a relatively short period in time. In this regard the primal focus of the research will be to create better insight into the conceptual framework and to test the propositions of the causal relation scheme.

The following chapters present the environmental analysis of the two sectors followed by a multiple-case analysis of the ten fast-growing organizations.





## 6 Environmental analysis

Technology or science driven industries are dynamic and fiercely competitive arenas that require constant innovation to meet changing customers needs. "High technology products are complex and require the firm to possess knowledge and skills in multiple technological fields and have to be upgraded constantly in order to meet changes in market conditions and customer expectations." (George et al, 2001: 206).

The aim of this chapter is to provide an external perspective for the development of the internal processes of the individual case studies in the next chapter. In this regard, an overview of fast-growing technology firms in Europe is presented. The analysis of fast growth throughout Europe is followed by an overview of data on developments in two sectors in the Netherlands that have attained fast growth during the past decade: Information and Communication Technology (ICT) services and life sciences.

The figures and developments of the industrial environments are integrated into a cross-sector analysis in the final section. The main developments are summarized here to come towards a qualitative valuation of the environmental elements of the theoretical framework - dynamism, complexity and munificence – for the two sectors. In the final section the results are summarised.

### 6.1 Fast-growing technology firms in Europe

It is not merely in the Netherlands that the topic of firm growth currently finds itself in a 'growing' interest. Companies from the surrounding European countries that attained strong growth in the, economic favourable, five foregoing years, are increasingly showing interest in the reasons behind this growth in these times of evaluation and economic uncertainty. "Chief executives throughout Europe and around the world, are fending off the challenges of marketplace fluctuations and show increasing concern for their customers' businesses and the future growth of their company." (tornado-insider, 2002)

Some of the results of this increasing interest in firm growth are the previously mentioned Dutch fast 50 and Europe's 500 rankings of fast-growing companies. The Dutch fast 50 list of fast-growing technology firms currently has been further elaborated into the "Deloitte & Touch European Technology Fast 500". This new ranking, administered by Deloitte's Technology, Media & Telecommunications industry professionals, covers Europe and includes all public and private companies engaged in technology, including Internet, life sciences, and computers. Entrants are judged on three-year percentage growth in revenue between 1998 and 2000, according the accounting and consulting firm the most objective standard on which to determine the fastest growing firms.

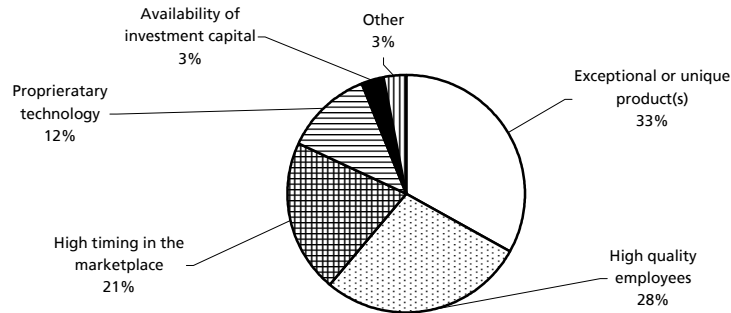
During February and March 2002 289 technology entrepreneurs (CEO's or their representatives) from 22 European countries were interviewed for critical success factors, challenges and outlook (trends) in technology (Baukema and Melchior, 2002).

#### *Critical growth factors*

figure 7 shows the factors that contributed most to the growth of the firm in the period. The exceptional or unique product of the firm is the most important factor that

contributes to the growth of the company (33%). Secondly, the high-quality employees are named as important for the expansion of the corporation (28%). Accessibility to and availability of investment capital is considered not to be an issue.

figure 7 Critical factors for growth in Europe

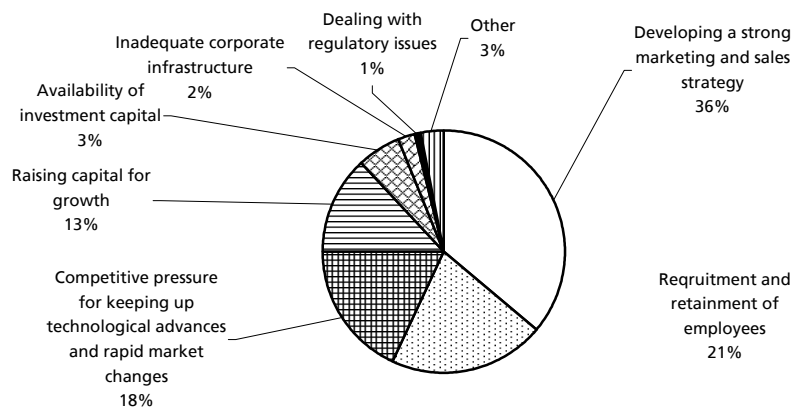


Source: Baukema and Melchior (2002)

### Challenges

figure 8 shows the biggest challenges in managing the companies' growth. The major challenge to maintain high revenue growth lies in developing a good marketing and sales strategy, mentioned by more than one third of the respondents (36%). One-in-five of the companies sees the biggest test in human resources, especially finding, hiring and holding on to personnel. Dealing with regulatory issues is not considered a threat to managing the companies' growth.

figure 8 Challenges for managing fast growing firms in Europe



Source: Baukema and Melchior (2002)

The highest challenges in the marketing of the products of the firms are developing and bringing new products to the market (24%), short term economic conditions (21%) and managing customers relationships (21%). The majority (68%) of the European technology firms have invested in marketing and sales to protect their company from the cur-

rent economic uncertainty over the next 12 months. Also half of them have cut the general and administrative costs (55%). Pushing out capital investments and downsizing their workforce is an alternative for fewer companies.

### *Outlook*

According to the EIM study of Baukema and Melchior (2002), almost 60% of the respondents are extremely or very confident of the sustainability of the high level of growth over the next twelve months. Another 32% is somewhat confident and only 5% is pessimistic of the outlook. Almost half of the managers expect a growth of their industry sector of 20% or more. Two third of the firms is determined to stay the course and grow internally. The other firms are counting on external growth by takeover (16%), merger (11%) or initial public offering (3%). Almost all companies (87%) anticipate an expansion of their workforce. No high expectations are expressed here about the overall growth of the labour force.

On trends in technology the study showed that Software is, with one quarter of the respondents, the industry segment with the highest growth potential the upcoming year. One-in-five companies mention life sciences, Internet and communications. The largest technological challenge lies in improving existing land-based internet access, named by 28%, followed by adoption of wireless access technologies (22%) and deployment of 3G wireless technologies (14%). Revolutionary scientific advances in life sciences are expected by 14% of the entrepreneurs.

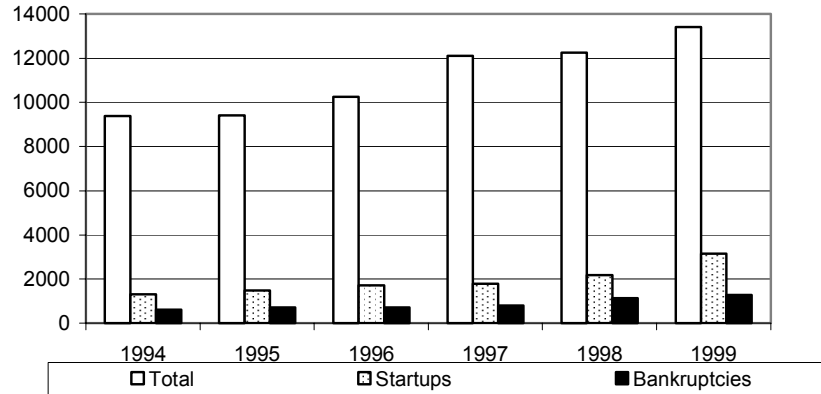
In 2002, the outlooks of the economy in general and both sectors became less positive. After this view on fast growth of firms in Europe, the following sections present an analysis of the two sectors of this study: ICT services and life sciences.

## **6.2 Sector analysis ICT services**

Information- and communication technology has become increasingly important for economic development in the Netherlands since 1995. As a result of this growth, there are diverse definitions and notions developed within different sector researches. The business activities within the industrial sector can be generally divided towards the offering of ICT products (ICT industry) and services on the area of telecommunications or computer services. In this study the sector analysis restricts to computer-service and information-technology companies (SBI 72). The primal activities here are consultancy on automation and the development of (computer) systems.

## 6.2.1 Figures

figure 9 Number of firms in ICT services



Source: CBS (2001)

figure 9 shows a strong growth in firms, start-ups and bankruptcies during the last six years of the 90s. On average, the total number of firms increased with 671 every year. The annual growth is 8% with a strong growth of 18% in 1997. Compared with 1994 the number of new start-ups has increased with 141% (an annual average of 20%). A strong increase in the start-ups of ICT firms has appeared in 1998 (23%) and 1999 (44%). During the period of 1994-1995 the number of bankruptcies has grown less strong compared with the start-ups with an average annual percentage of 16%. The strongest growth here was in the year 1998 with 40%.

Under influence of the less favourable international economic conditions, the volume growth of the ICT sector dropped from 13,3 % in 2000 to 10% in 2001, in 2002 the growth of the sector is expected to drop to 7% (CBP, 2001). This current growth is still high compared with other sectors in the Netherlands.

More recently another research among small ICT services firms of information supplier Marketons shows a strong growth of bankruptcies in 2001. Accordingly, after the large firms, even the smaller ICT firms now have problems to survive. The research showed a strong growth of bankruptcy in the ICT sector: from 185 in 2000 towards 430 firms in 2001 (an annual growth of 232%). This is the highest number of bankruptcy in ICT ever (206 in 1996). Furthermore there are a number of 650 firms –mostly small firms- that ceased their activities without a bankruptcy. With 261 companies ICT service providers are the largest group (61%) of bankruptcy in the total ICT sector. In 1995-1999 the number of bankruptcies was low, less than 1%. During the last year the number of ICT services firms that went bankrupt has increased towards 4%.

table 7 Number of revenues and employees in ICT services

	Net revenue (mln €)	(Growth %)	Employees	(Growth %)
1994	4,210		44,693	

	<i>Net revenue (mln €)</i>	<i>(Growth %)</i>	<i>Employees</i>	<i>(Growth %)</i>
1995	4,712	12	48,693	9
1996	6,015	28	63,584	31
1997	7,752	29	74,219	17
1998	9,572	23	87,237	18
1999	11,184	17	96,141	10

Source: CBS (2001)

Revenues during the last five years have increased with an average annual rate of 22% with a strong growth in the period 1996 –1998 (23 to 28%). The number of employees in the sector of ICT services has grown less strong than revenues, an average of 17%, indicating a growth in productivity within the firms. In 1999 the average revenue of Dutch ICT service firms was € 834,300. With an average number of 7.1 employees per firm the revenue per employee in that year was €116,300. The table shows a stronger growth of revenue compared with the increase of employees. According an earlier report of the Dutch Centraal Bureau voor de Statistiek (CBS, 1999) in the period 1995-1998 the productivity of the computer-service organizations nearly doubled with an increase of 92%.

#### 6.2.2 *Developments*

As mentioned in the previous section the sector of ICT services, the offering of electronic information and communication resources, showed an explosive growth between 1994 and 1999. As a result, the sector has been one of the most mentioned industries during the past five years in the Dutch media. In the period 1995-1998 there was an 'ICT hype' with promising Dutch companies like Baan, WorldOnline and Newconomy, that revolutionary evolved into the 'collapse of the bubble' with decreasing stock markets and bankruptcies in the period of 1999 -2001. After successfully entering the new millennium in 2000, the Dutch Centraal Planbureau (CPB) in 2001 predicted further growth of the production for this sector on basis of stimulus of the Euro conversion, e-business projects and further investments in communication networks (UMTS-net and extension of data-transmission capacity).

During the mid-nineties the number of suppliers and applications in hardware and software increased as well, forcing the firms' employees to flexibly build ICT solutions. Since large suppliers faced difficulties during the economical setbacks, the strongest survived. This has led towards more standardization, mainly in software applications and programs of large suppliers like Microsoft and SAP. Because of the strong growth of the sector, ICT firms approached difficulties in finding and attracting skilled personnel during the second part of the 90s. This resulted in high salaries for ICT consultants in this period. According the ICT marktmonitor of 2001-2002 the shortage of employees currently has declined, still leaving a shortage of over 3,000 vacancies. Responsible for the demand of ICT personnel were both large foreign ICT and consultancy firms (e.g. Cap Gemini, Deloitte and Touch, and Accenture), who offered a broad package of solutions, and an increasing number of entrepreneurial firms with specialized services.

In a broader international perspective, the Netherlands does not perform badly in terms of investments in information technology. During the 90s these investments were the highest in Europe after the United Kingdom. The figures and numbers confirm that ICT has become increasingly important for economic development in the Netherlands since 1995. In 2000 the total ICT sector (including telecommunication companies) accounted

for nearly a quarter of annual economic growth in production and labour (CPB, 2000). The Dutch government acknowledged the growing importance for ICT as well by the introduction of investment-impulses from the "Fonds Economische Structuurversterking". This fund is used for scientific research and the building of networks to stimulate the knowledge development in the Netherlands by system innovations and ICT. The influence of these figures and developments on the dynamism, complexity and munificence of the ICT sector is discussed in the final sector.

Another theme in the investment-impulse plan of the Dutch government is the research for health, food and life science breakthroughs. These topics are dealt with in the third section of this study: life sciences. After the analysis of this second fast-growing sector in the Netherlands, follows the cross-sector analysis.

### 6.3 Sector analysis life sciences

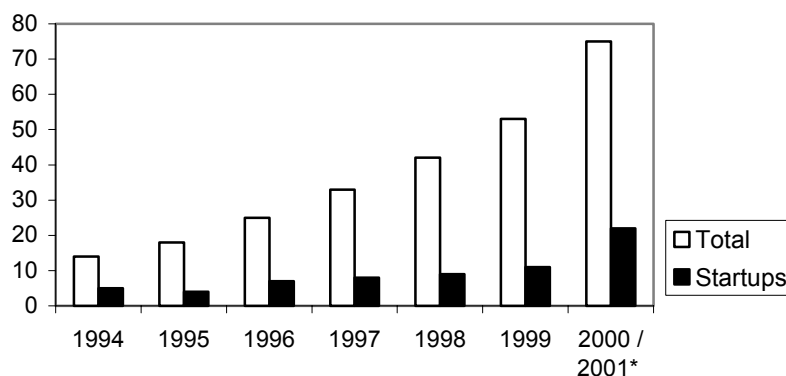
The industrial sector of Life sciences -in the media also referred to as Biotechnology – is a relatively young sector. The growth potential of the sector is expected to be high considering a recent statement of the Dutch government: "Life sciences is one of the most important fields and most competitive business sectors for the 21st century"(BioPartner, 2002).

#### 6.3.1 *Figures*

In March 2001 the life science industry in the Netherlands contained 75 ventures. Together they employ 1,014 persons. Company sizes range from 1 to 130 employees, with an average of 14. Most companies are small, employing less than 11 people (65%); 24% of the companies employ 11 to 25 people; and only a small fraction of the companies employs more than 25 people (BioPartner, 2002).

figure 10 shows a significant expansion in start-ups in the life science sector; 22 companies were established in 2000 and 2001, raising the number of entrepreneurial life science companies from 53 at the end of 1999 to 69 at the end of 2000 and 75 in March 2001. With a 30% increase since 1999, the Netherlands outperformed the average growth rate of 15 percent for European start-ups as a whole (Ernst & Young, 2000).

figure 10 Number of firms in Dutch life sciences



Until March 2001.

Source: BioPartner (2001)

Within the sector a distinction can be made of firm activities in three categories: Agri-food (e.g. food, animal and plant), Human health (e.g. therapeutics and diagnostics) and General life sciences (e.g. supplier, contract research/custom services, platform technology). The majority of the 75 companies are involved in activities in the general life sciences (45%) or human health (44%). Compared to these sectors the agri-food sector is somewhat underdeveloped with 11% of the companies. This could be attributed to the fact that this sector is particularly sensitive to the public opinion towards genetic modification. A high number of new ventures in life science ventures are dedicated to diagnostics and platform technologies. This reflects a global trend of firms that focus in this area, since time-to-market for these market segments is much shorter compared to the development of products that require clinical trials.

The founding of these firms is in 39% of the case an effort of one entrepreneur while more than 50% of the life science firms were founded by entrepreneurial teams of two or more founders. Twelve percent of the new life science companies originated from reorganizations, mergers or spin-off activities of existing organizations. Of the entrepreneurs the average age is in the mid-40s at the time of founding. This relatively high age may be accounted to the long 'preparation time' for becoming a life science entrepreneur (university education, graduate school, research experience). The life science entrepreneurs are highly educated; most (93%) have achieved a Master of Science degree in a field of life sciences (biology, biochemistry, medicine), over 52% also hold a PhD and 20% have reached the level of professor (BioPartner, 2002).

### 6.3.2 Developments

The first life science firm in the Netherlands was founded in 1990 by the name of Pharming. The company developed promising technologies on genetic manipulation for the production of medicine. Because of internal development setbacks, a growing public resistance against the use of transgenic animals and the Dutch regulatory in life sciences, the firm had to move its developments to Finland and the U.S. In 1998 an U.S. firm, NovaZyme Pharmaceuticals, made up its arrears and won the race for the medicine, causing Pharming to nearly go bankrupt (Volkskrant, 2002).

The story of Pharming is striking for the development of the life science sector in the Netherlands. It seems that in the '90s the hesitance of the Dutch government has led to the situation that the Netherlands has lost its initial head start in the field, compared with life science sectors in the surrounding European countries. It also seems that there has been a turnaround in the availability of public equity. During the nineties the sector seemed promising and the market capitalization of public firms were rising. In the end of the year 2000, about the same time when the ICT industry collapsed, the positive public perception of life sciences diminished. At this point it became hard for firms to find financial support through an I.P.O.

In contrast with the Dutch government, the German and Belgian authorities kept on investing in life sciences. Compared with the life science sector in the U.S.A. the arrears are even larger. In 2000 there are 1,300 life science firms in the U.S.A. compared to 700 firms in Europe. Experts of the Dutch Life Science Association (Niaba) and BioPartner argue that the Dutch life science sector currently still possesses a great deal of knowledge (primarily rooted in universities) that is under-utilised compared to other nations.

According to Prof. Dr. Janszen, specialized in the field of life sciences (PhD in bio-chemic), life sciences is a highly scientific driven industry. Life science firms tend to congregate in and around centres of excellence represented by knowledge institutes, such as universities and research institutes. The obvious advantages here are the cooperation with these institutes, infrastructure, talent pools (skilled students and researchers), lead users and potential clients. Furthermore, the sector is characterized by a large number of developments that are eagerly secured in patents. Only a small part of the research projects makes it to the final stage of product development. Besides the high level of development, there is a very high risk involved in doing business in this sector. Firms that succeed in developing a product risk the chance of a take-over by larger (Pharmaceutical) firms in a later stadium. Janszen generally distinguishes between three stages of product development within the industry: initiative, unfolding and development (table 8)

**table 8**      **Developments in life sciences**

	<i>Phase</i>	<i>Place of development</i>
1	Initiative	University
2	Unfolding	Life sciences firm
3	Development	Pharmaceutical firm

*Source: Janszen (2002)*

On the developments of life science firms, Janszen remarks that large firms have a great deal of knowledge but act very bad on the utilization of this resource. Medium-sized firms have great difficulty in acquiring resources (e.g. finance) and it is more difficult for these firms to develop a core competence because of the high risks involved with the developments of technologies.

After years of discussion whether life sciences needed either support or stronger regulation, the Dutch Ministry of Economic Affairs launched in 1999 the Action Plan Life Sciences. This is an initiative that aims at realizing the full potential of the Netherlands to become a leading life science region in Europe. BioPartner is founded to stimulate en-



preneurship in life sciences by providing life science start-ups information, advice, facilities and financing (€ 45 million) during the entrepreneurial stage.

The growing interest for life sciences is currently also witnessed among investors on the stock markets. In 2000 the European stock exchanges witnessed 29 IPO's of which two from the Netherlands, IsoTis and Crucell. Niaba argues that in the near future life sciences is expected to be an important 'labour engine' for the Netherlands, developing 35% of all medicines.

The analyses of the individual sectors are elaborated in the cross-sector analysis of the next section.

## 6.4 Cross-sector analysis

In this section an overview of the sector analyses is given, supplemented with a qualitative judgment of the environmental dynamism, complexity and munificence for ICT services and life sciences in the Netherlands.

The two sectors analysed in this chapter shown strong growth in revenues and employees since the mid 90s, and show to be interesting in the light of this study. Since ICT services and life sciences are both young sectors, the industries are characterized by a relative large group of small and medium-sized firms with an entrepreneurial drive for growth. The strongest difference between the two sectors is the increase of the growth. A declining growth in demand for computer services and information technology shows that ICT is starting to enter the maturity stage in the industry life cycle. In contrast, life sciences experienced its 'boom' in the past two years and stands at the beginning of the industry life cycle, apparently heading for a strong growth.

### *Dynamism*

In this study dynamism refers to the rate of market and industry change and the level of uncertainty about forces that are beyond the control of individual businesses.

During the past five years the ICT services sector has shown strong growth in the number of firms and productivity of the employees, however annually declining towards a more stable growth. In the period the sector faced difficulties with increasing customer demand and the lack of clear industrial standard in automation. Furthermore, the sector faced the problem of the new millennium, which was successfully dealt with. Increasing governmental support and general acceptance of the necessity of the services for automation, and the importance of it for labour productivity, currently show a more stable outlook for the sector after a period of high dynamism.

Compared with the forgoing five years, the outlook of the economic environment for life sciences in the Netherlands is becoming more prospective as well as possible use of the technology become clearer and concrete. Biopharmaceutical developments that result in the production of medicine could be of great importance for a more positive perception of the industry. However, the public remains sceptical towards the animal testing and genetic manipulation of food within the sector. The uncertainty within this sector is also evident from the strong accent that the firms place on the requirement of patents. The missing of standards for pharmaceutical production within the life sciences increases the unpredictability. These developments and the relative strong growth of the number of firms, indicate a very high dynamism for this sector.

### *Complexity*

The perceived complexity of the technology firms is caused by the concentration or dispersion of other competitors and new entrants.

The competition in the ICT services during the past five years has not been merely focused on the acquirement of projects. Because of the boom in the demand of ICT services during the mid 90s the competition in the sector has been characterized by the search and battle for skilled and experienced employees. This resulted in high salaries and attractive secondary offerings. The combination of difficult to acquire employees with the competitive forces, formed by large firms and the increasing number of starting firms, caused a rather highly complex environment for the individual businesses.

As a result of the young character of life science industry, the field for developments of products is widely open. This results in a great number of possibilities for firms to engage and results in differences between current firms. Because of these differences in products and the costs of development, there is a great amount of cooperation among life science firms and their clients, the (larger) pharmaceutical firms. Still, companies are very cautious with the knowledge of the firm's researchers, resulting in continuous search for patents. Despite the high growth number of new firms, the number of firms is relatively low compared to the rising demand for biotechnological applications. In line with this reasoning the industry's complexity is judged as medium.

### *Munificence*

The munificence of the industries is formed by the environmental support for the organizations in it, in other words the availability of skilled people, knowledge and money.

Because of a strong increase in demand of ICT services a shortage arose in the availability of skilled personnel. During the late nineties this shortage slightly reduced and training and development enabled the firms to increase productivity of their employees. Furthermore the transparency and flexible nature of the ICT consultants enabled a quick utilization of existing technologies that required no large investment. Therefore, the environmental munificence of the past five years in ICT is valued medium.

The industry for life science firms in the previous five years has been relatively supportive. Accordingly universities throughout the Netherlands have been providing sufficiently biotechnological and biomedical research for possible product developments. Furthermore, the universities are responsible for the delivery of skilled personnel. Despite the vacancies, there have been a great number of skilled students and researchers that were available for the firms. As a result of the lack of public knowledge of the industry and the large amount of cash needed for developments, most life science firms faced difficulty finding financial support. The relative ease in recruiting personnel, the difficulty with financing activities and the availability of knowledge in universities, in sum, lead towards a medium valuation of the munificence for life sciences.

## **6.5 Summary**

The aim of this chapter was to provide an external perspective for the development of the internal processes of the individual case studies in the next chapter. In this regard, an overview of fast-growing technology firms in Europe is presented followed by an

overview of data on developments in ICT services and life sciences on dynamism, complexity and munificence.

The interviews with chief executives of fast-growing technology companies in Europe show to value their (1) exceptional and unique product(s), (2) skilled personnel and (3) timing in the marketplace as critical factors for the growth of their firms. Furthermore the interviewees in the study claim to see (1) a strong marketing and sales strategy, (2) the recruitment of skilled personnel and (3) keeping up with technological developments as the largest challenge for further growth of their firms.

The analysis of the environmental variables results in the following scheme (table 9):

**table 9** Environmental characteristics

<i>Variable</i>	<i>ICT services</i>	<i>Life sciences</i>
Dynamism	High/medium	Very High
Complexity	High	Medium
Munificence	Medium	Medium

*Source: EIM*

The scheme shows that the two sectors are equally valued on a medium environmental support by means of the availability of resources. The two sectors differ in the competitive context and dynamism of the industries. The younger sector of life sciences is confronted with a medium level of concentration and competitive power, compared to a high level for ICT services. The environmental turbulence in ICT services is shifting from high to medium. Life sciences firms deal with strong forces beyond the control of individual business.

The valuation of the environmental dynamism, complexity and munificence are confronted with the propositions of the theoretical framework in chapter eight. The next chapter discusses the multiple-case analysis of ten firms within ICT services and life sciences.



## 7 Multiple-case analysis

The previous chapter showed the analysis of the environmental characteristics. This chapter explores the internal processes that stimulated growth of the firm. For the study on these processes a qualitative analysis of six fast-growing and four less-successful growing<sup>1</sup> companies from ICT services and life sciences is presented. The chosen approach here is a cross-case analysis. The reason for this choice is to increase generalisability of the single cases, reassuring that the events and processes in one well-described setting are not wholly idiosyncratic (Miles and Huberman, 1994). At a deeper level, the aim here is to see processes and outcomes across many cases, to understand how they are qualified by local conditions, and thus to develop more sophisticated descriptions and more powerful explanations. Furthermore the ten cases are confronted on type of growth differences across the sectors of ICT services and life sciences.

Before the cross-case analysis is explained per sector, the description of the analysis of the individual cases is presented. The findings of the empirical research are standardized and laid side by side in the course of the analysis. The studies across the cases are combined in the fourth section that provides an overview of the findings. The chapter closes with the summary.

### 7.1 Single-case analysis

In the single-case analysis the internal managerial and organizational processes are analysed for six fast-growing companies: ICT Total, ICT Holding, ICT Government, Biocell, Biodelivery and Biotissue; and four 'less-successful' growers: ICT Medium, ICT Trade, Biopeptide and Biogene (see table 10). These ten Netherlands-based companies are examined with a focus on their organizational development in the period 1999 to 2001.

table 10 Case studies in ICT services and life sciences

<b>Sector &amp; Company</b>	<b>Main Activity</b>	<b>Average yearly growth (1999 – 2001)</b>	
		<b>Revenues</b>	<b>Employees</b>
<i>ICT Services</i>			
ICT Total	The offering of company-broad ICT solutions in automation of organizations.	117%	105%
ICT Holding	Holding for five ICT organizations, each offering their unique functional service in automation.	160%	92%
ICT Government	The offering of ICT solutions aimed at government-related	22%	20%

<sup>1</sup> 'Less-successful' growing companies are considered to be firms in ICT services and life sciences with a maximum average growth of 10% per year, in both revenue and employees during the period 1999-2001. This growth is considerably lower than the expansion of the six fast-growing firms (with a minimum of 15% growth on both revenues and employees. One exception in this assumption is Biopeptide. This company achieved an average yearly growth larger than 10% but nearly went bankrupt in 1999. That is why this company is classified as a *less-successful* growing organisation.

<b>Sector &amp; Company</b>	<b>Main Activity</b>	<b>Average yearly growth (1999 – 2001)</b>	
	institutions.		
ICT Medium	The offering of ICT solutions aimed at medium-sized organizations.	13%	-8%
ICT Trade	The offering of ICT solutions aimed at trade and production - related companies.	-20%	-21%
<b>Life Sciences</b>			
Biocell	The offering of Biotechnological research and products based on the technique for reproduction of human cells.	51%	15%
Biodelivery	The offering of biotechnological research and services in drug delivery.	46%	42%
Biotissue	The offering of biotechnological research and products based on the technique of production of human tissue.	25%	69%
Biopeptide	The offering of biotechnological research and products based on the technique of peptide scanning.	70%	24%
Biogene	The offering of biotechnological research and products based on the technique of gene mapping.	19%	9%

Source: EIM

Of the fast-growing firms ICT Total and ICT Holding are founded in 1998. The firms in the cases of ICT Government and all fast-growing life science firms are founded in the period 1993 – 1995. These firms show a strong growth in their early years as well. All ICT and Biodelivery are privately owned; Biocell and Biotissue are publicly owned and listed on stock exchanges (Euronext and Nasdaq). Five firms have reached their fast growth autonomously; Biocell is a result of a merger of two Netherlands-based firms. Of the less-successful growing firms ICT Medium and ICT Trade are founded around 1975. Biopeptide founded in 1993 and Biogene started its businesses in 1989. The less-successful growing firms are all privately owned, of which Biogene is a joint venture of five agricultural companies. All firms are medium-sized and employ between 25 to 200 people.

The research consists of ten interviews with the strategic leaders of the firms. The top managers were interviewed at the headquarters of their firms during the period April-September in 2002. In four cases (all fast-growing ICT and Biodelivery) the interviewees are the original (co-) founder. In ICT Total, ICT Holding and Biodelivery the entrepreneurs still occupy the position of Chief Executive Officer (CEO). The founder of ICT Government stepped out of the top management of the firm and stayed involved with general decisions as owner. The interviewee of Biocell is Executive Vice President and occupied with Business Development. The respondent in Biotissue is Chief Financial Officer (CFO). All interviewees of the less-successful growing firms are general manager in the

period of analysis, of which in ICT Medium the interviewee is owner of the company. All these people have been responsible for the strategic management of the firm during the period 1999-2001.

The ten case studies are analysed on the influence of the variables for the growth of each individual firm during the past three years. The procedure of the analysis consists of the counting of the number of remarks on the specific variable, added to the analysis of the quotes of the respondents. The remarks are supplemented with the respondent's own idea of the importance of the elements for the firm's growth. Furthermore secondary data is used to supplement the story of the respondent to create a larger context in which a qualitative interpretation can be made of the role of each variable in the growth of the firm. This interpretation is evaluated with a second researcher who analysed the single case study as well. The result of the judgments on the variables' influence on growth is presented in the figures per capability, separate for each case.

The outcomes of the qualitative analysis on the relative importance of the variables for the cases, is described per sector in the following two sections. For each variable a distinction is made between fast and less-successful growing firms. In the final section of this chapter the outcomes of the cross-case analysis on the variables are confronted on the type of growth and sector, and elaborated for their contribution towards managerial, input-based, transformational and output-based capabilities.

## 7.2 Cross-case analysis ICT services

The analyses of the individual cases are reconciled with the need for more general understanding of generic processes that occur across cases. The firms in the ICT service sector all deliver ICT solutions for clients in the Netherlands. The fast-growing firms attained an average growth of 100% in revenues and 73% in employees. At the time of the interview ICT Total and ICT Holding employ respectively 35 and 36 employees, ICT Government enlisted 85 employees on its payroll. The two less-successful growing firms were confronted with an average decline of 7% in revenues and 15% in employees. In 2002 ICT Medium consisted of 35 people, and ICT Trade employed 90 people before its bankruptcy in August of that year.

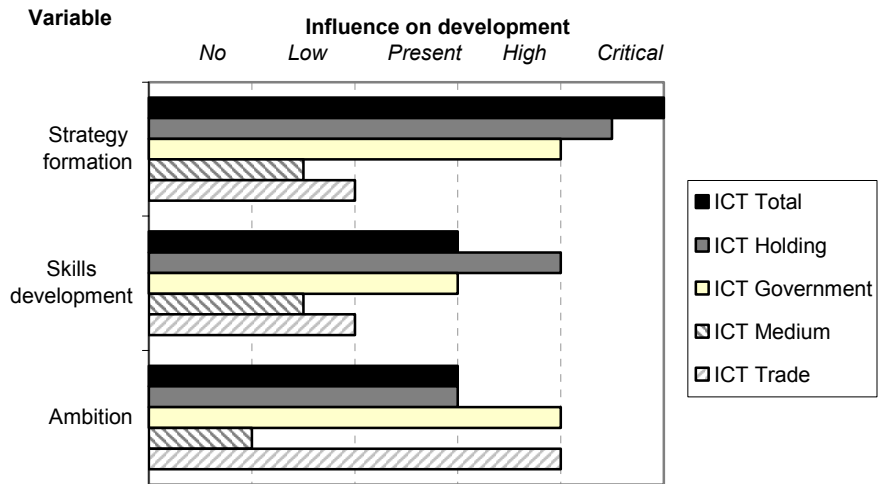
Each variable at first is discussed on the three cases of fast growth. After this analysis the results are confronted with the two less-successful growing companies.

### 7.2.1 *Managerial capabilities*

The formation of a strategic plan, in accordance with the development of skills and ambition of the founders /top management are responsible for the largest influence on the fast growth of medium-sized ICT firms, during the past three years. Within these variables for the firm's managerial capability, strategy formation had a critical influence on the firm's growth. This variable is followed by an above average influence of the evolution of the skills and ambition of the founding managers (see figure 11).

The managerial capabilities of less-successful growing firms showed the lowest influence on the organizational development. Especially the formation of strategy and skills development was less clearly available in the organizational processes.

figure 11 Managerial capabilities in ICT Services



Source: EIM

#### Strategy formation

Strategy formation contains the formulation, articulation and communication of the trajectory towards the firm's goals. The clear formulation of this strategy, in general, is valued as critical for the stimulation of the growth of the firms. In the three fast-growing cases the founders formulated the firm's mission before the take-off of their company and based it on their personal vision on ICT organizations. In all cases the formulation of the ICT service strategy was well thought of and formed deliberately. The founding managers stuck to the direction of their original plan and merely placed a few steps beside this trajectory. The strategy in all three cases can be typified as volume expansion, the increase of sales with the current services and software applications. Key elements in the formation of the strategies are clearness, quality of services and a focus on results. Furthermore, the respondents consider the continuation of the organizational activities to be more important than the firm's growth. The top management of the fast-growing firms did not take every opportunity that came ahead and, if necessary, was prepared to strive for a less strong growth. Profitable activities were rejected if there was no fit with the corporate strategy.

"When we were repeatedly confronted with the demand of our customers of an application for salary administration, we consciously choose not to develop this service. The service did not fit our corporate strategy and furthermore there were other firms that already offered excellent applications on this area."

Respondent ICT Government.

The formation of the strategy of ICT Total is characterized by the strong vision of the entrepreneur. According to the CEO, the firm strives to maintain its status as trendsetter in ICT solutions. In ICT Holding the respondent remarked that the personal drive for a successful start-up of an ICT firm, was key in the formation of the strategy. The current strategy of the firm enables large individual freedom for the employees, controlled on results. In ICT Government the founders are no longer active as manager. As own-



ers, the founders still participate in the strategic sessions of the firm. The strategy has functioned as key factor in the organizational activities. Already in the early years of the firm multiple trajectories were developed. After screening in strategic sessions the most-promising plans were realized. In all of the three fast-growing case studies, there was a direct communication of the strategy with the employees. For ICT Total this communication was interactive (two-way). Half of the total group of employees was directly involved in the formulation of the strategy. In ICT Holding and ICT Government the strategy is formed with a select group of top and middle management and communicated one-way towards the organizational members (the employees were informed what the strategy was).

The analysis shows a strong difference between fast and less-successful growing firms in the clear formation of a strategy.

In contrast with the high level and influence of strategy formation with the fast-growing firms, the strategy of the two less-successful growing firms on average was present on a lower level. Although ICT Medium's manager showed to be able to define a long-term action plan according the personal vision, the strategic plan lacked a clear formulation and communication of this business plan throughout the firm. The top management of ICT Trade formed its strategic plan in accordance with a consultancy agency. Despite this thorough formation the execution of the strategy did not enable the firm to grow between 1999 and 2001. In the period of analysis the company faced difficulties in matching the technology and organization with the strategic vision. What followed was a disagreement among management about the long-term trajectory for ICT Trade that eventually led to a split in the organization. From both case studies of less-successful growth firms it seems top management was unable to present a clear communicated vision and strategy that could stimulate the firm's performance.

#### *Skills development*

The skills of the founding top management had an above average influence on the growth of the three fast-growing firms. A striking outcome here is the strong combination of technical (ICT) skills and business skills, which is valued high by the interviewees. Furthermore the respondents of these firms emphasize the importance of fun in working, creative thinking, and the willingness to succeed as important characteristic for an ICT entrepreneur. The start-up of the ICT firm for all founders is the first experience of starting a new business. All founders claim to have developed the skills for building a growing company during the actual start-up phase of their firm. Without exception, the interviewees value the practical experience as most important in the development of their business skills.

The founder in ICT Total studied electronics on a medium-technical school (MTS) and gained technical and business experience in ICT during previous positions, from help-desk employee to project manager. By creatively stimulating innovations the CEO considers himself to be the largest drive behind the entrepreneurial processes in the firm.

"I see myself as a Commercial Idealist."

Respondent ICT Total.

The founders of ICT Holding and ICT Government have an academic background from a technical university. The CEO in ICT Holding received further education from a business study on information technology. Practical experience is gained as business consultant in a small consultancy firm, and as ICT project manager in a larger ICT firm. The founder used elements of both working experiences during the start-up of the firm: a business

model and the improvement of working conditions for employees. In ICT Government the founder studied business technology and co-started the firm with a fellow student. The interviewee remarked that in the beginning there was a gradual expansion of ICT assignments, according to the vision of the two founders. Technical skills were learned 'on the job' on basis of the knowledge available within the firm. Currently, this trajectory of 'trail and error' is still used by enabling skilled employees to apply for a position in the top management.

The less-successful growing firms both showed a low influence of the skills development of the firm's management. Compared with the important role this capability fulfilled in the expansion process of the faster growing firms, it seems that the ability to manage a company in a dynamic environment is underdeveloped in these two less-successful companies. Although both managers had previous management experience in related firms, both ICT Medium and ICT Trade had their own difficulties with the capability to manage their organization. In ICT Medium the CEO, supported by two division managers, had difficulty to transfer the strategic intentions towards the organization. According to the respondent this resulted in a situation that the management saw the 'blank spots' in its organization, but failed to deal with them. In ICT Trade the CEO was confronted with duality in the organization about the focus in product development. In addition personal circumstances for the CEO led to a decrease in managerial attention. This absence in combination with internal duality and a decreasing customer demand led to a bankruptcy in August 2002. According to the CEO this could have been prevented with better focus on market demand and the internal organization.

#### *Ambition*

Ambition was clearly present in all of the cases of fast growth and rooted in the founders' strive for a successful company. However, the case studies of fast growth show the willingness to growth was never more important than the quality of the firms' services. Growth goals of a minimum growth of 10% were set and the strategy and investments were adjusted to these growth goals.

"I prefer quality and a less fast growth, rather than risking downsizing or a merger."

Respondent ICT Total.

In ICT Total the founder has already denied financial takeovers and is eager to stick to the firm and grow at a steady pace towards approximately 100 employees. The entrepreneur of ICT Holding claims to be in it for the creative process of starting a company. The founding manager aims for reaching a healthy size with the current firm so it can be sold for a good price. The founders of ICT Government left their CEO position in the late 90s. According to the respondent it was time for a new challenge. Furthermore the founders were of the opinion that their employees had to receive the opportunity to attain a managerial position in the firm. The founders still own the company and co-develop the generic strategy for the firm aiming for an annual growth of 20%.

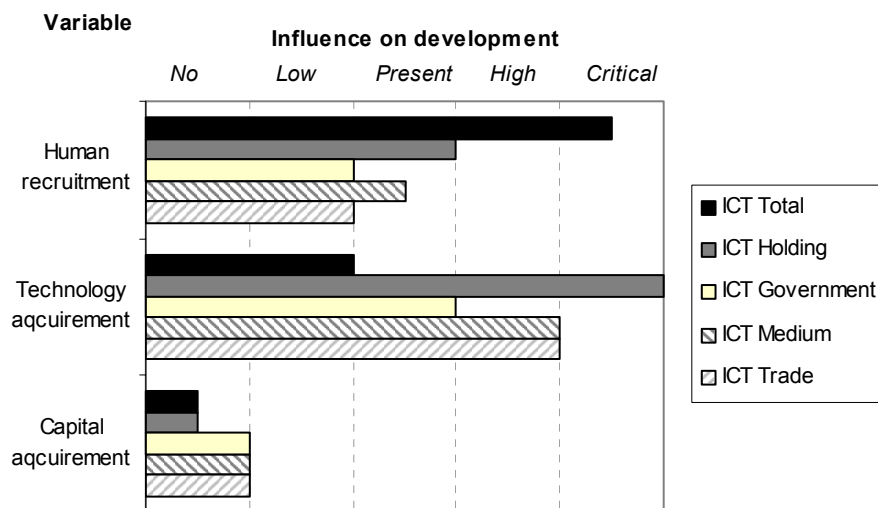
The level of ambition showed different results in the two firms that were less successful. In ICT Medium the entrepreneurial spirit had taken place for realism. According to the CEO the firm had to wait for better environmental circumstances before a new period of growth could start. ICT Trade showed much more ambition with yearly growth goals of 20%. Furthermore, a firm's organizational structure was developed for a company twice of the size of the company in the period of analysis.

### 7.2.2 Input-based Capabilities

The ability of the fast-growing firms to acquire human, technological and financial capital showed different results. A high influence on growth is found for the ability to obtain skilled personnel. The acquirement of external knowledge/technology is valued even higher. In contrast with these results there was a low influence for the firm's ability to obtain financial resources (see figure 12).

The less-successful growing firms experienced a high influence of the ability to obtain external technology and a rather low influence on the recruitment of skilled personnel. Similar to the fast-growing firms there is no influence distinguished of the ability to acquire financial resources.

figure 12 Input-based capabilities in ICT Services



Source: EIM

#### Human capital

The founding managers of the fast-growers argue that the employees of their firms play a key role in the development of the organization in the last three years. Nevertheless the firms show a strong difference in the role that the recruitment of skilled personnel played for the growth of their firms.

The entrepreneurs of ICT Total and ICT Holding recruited the first employees already before the firm was started. The selection of these people was dealt with during the position of these founding managers as unit manager in an ICT organization. The recruitment was based on a combination of personal relations with the founders and technical and communicative skills of the employees. Skillful people were gathered and (gradually) persuaded to join in the challenge of building a new company. Not only did the founders mention the advantages of a young and flexible firm, they did also make use of the disadvantages and restrictions of the current activities. The founder of ICT Total even went further and made use of a number of law-trials and financial settlements to release the employees from their responsibilities towards the former employer. The founders in ICT Government made use of connections with the university at the

time of starting their firm. The management faced difficulties in attracting skilful people during the years of strong growth in ACT, 1997 and 1998. Of the three cases, ACT Government witnessed the most difficulties in obtaining skilful people during the last three years. The respondent blames this to the relative large size of the firm and difficulties in the market. In contrast, thanks to 'mouth on' promotion the firms of ICT Total and ICT Holding have been noticing an increase of applications for vacancies during 2000 and 2001. The founders of ICT Total and ICT Government state that the first employees played a key role in the early growth of activities. In ICT Holding the CEO argues that the organizations could have established the same result with another group of skilled employees.

The ability to enlist and utilize new skilled personnel did not play a large role in the organizational development of the two less-successful growers. ICT Medium's CEO showed to be creative by attracting new and skilled personnel by training unemployed people as part of a municipal social plan. ICT Trade made use of its' attractiveness to skilled people in its region (East-Netherlands) that did not want to move to the business area of the country. In either case the ability to attract personal did not play a role in the organizational development since both firms experienced a decrease in staff level. ICT Trade even discouraged its people leading to a yearly walkout of 30 employees.

#### *Technology*

Similar to the role of human recruitment, the influence of technology or knowledge acquirement on the fast growth of the firm is rather dispersed. Although the founders uniformly state that the larger part of the acquired technology or knowledge is considered to be in the heads of the professionals of the firms, two firms made use of external knowledge.

ICT Total did not make use of specific external technologies besides standard applications from large software providers (e.g. Microsoft, Novell, Lotus), that are used in all cases and may considered to be general tools in the ICT services sector. In contrast, ICT Holding used a scientific business model that was acquired by the founder during previous work experience. The founder internally further developed this model for his own business situation and made it the central concept for all of the firms ICT services. This business model combined technical and organizational factors and enabled the firm to offer customer-specific services. The model played a critical role in the firm's growth. In ICT Government the acquired external technology was the result of the co-development of a software tool. This application is eventually taken over by the firm and turned out to be important for the offering of ICT solutions in the past three years.

The attraction of external technology showed to be highly important for the development of the less-successful growing firms. In both cases the role of the suppliers of technology played an important role for the organizations' knowledge position. Besides the delivery of hard- and software applications, these firms also provided product information and training for the firm's employees. Both ICT Medium and ICT Trade safeguarded this relationship with their suppliers.

#### *Financial*

The least amount of input-based influence on the firm's growth in the ICT sector is the acquirement of financial resources. The start-up of the three fast-growing firms is financed with no or small personal bank loans. Therefore, none of the three cases had any difficulty with finding financial resources. Furthermore the balance sheets of the firms have never shown long term loans. The reason behind this lack of need for finance lies in the relative limited capital that is required for the start-up of an ICT firm. After the start, the three firms quickly created a cash flow for further investments

through result driven projects. After seven years ICT Government arranged its first bank loan for the financing of organizational restructuring in 2002.

Similar to the fast-growing firms, the less-successful growing firms engaged little problems in attracting financial resources. The CEO of ICT Medium claimed money played no primal role in the performance of the firm. In ICT Trade the providing of business capital led to extra influence of the stockholders in strategic decisions.

### 7.2.3 Transformational capabilities

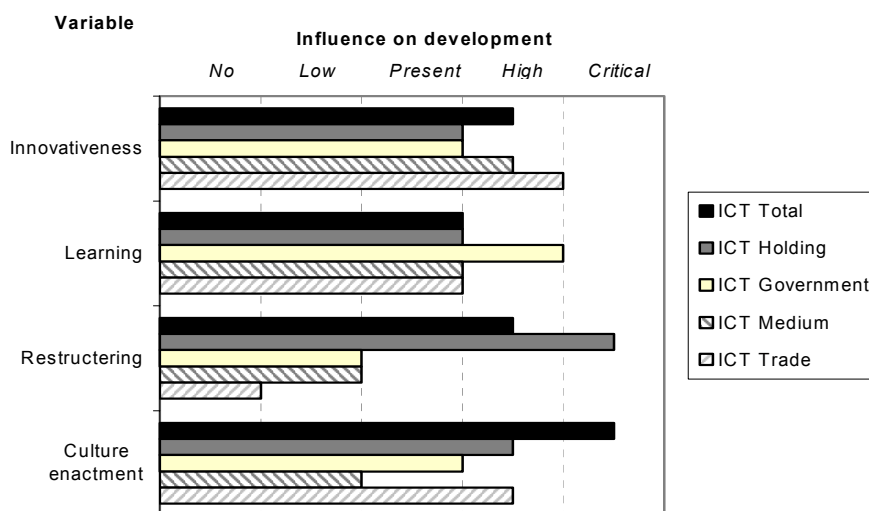
The variables of the transformation of the acquired resources into outputs show resemblance across the cases in their, above average, influence on the fast growth. Innovativeness and learning within the organization are valued highly in the light of the firm's quick expansion; the firm's enacted culture stimulated this development even more (see figure 13).

In the less-successful growing ICT firms, a medium to high influence on the organizational development is found for the innovativeness and the obtainment of new skills by employees. The cases show an average influence for the ability to create an enacting organization culture. The flexibility of the organizational structure proves to have an influence on the firms' performance.

#### Innovation

The innovative capability of the firm is showing an above average influence on growth for the three fast-growth cases. For these firms the introduction of new services and applications is largely dependent on the customers needs. By cooperating with clients new ideas for a custom-made solution are generated and further developed during the projects.

figure 13 Transformational capabilities in ICT Services



Source: EIM

ICT Total shows the highest value on the innovative capability. The invention of new applications by employees is stimulated by an internal stock exchange system, controlled by an 'Innovation Board'. Every employee can generate an idea for an application or service and try to obtain an internal 'patent'. When this patent is granted, the idea can be sold to -or co-developed with- colleagues. ICT Holding has a separate research and development department where all employees build on new applications. In customer projects the business model plays a key role for the development of new services. In the case of ICT Government the companies' employees try to build new applications during existing projects with clients. In this way the required developments from the firm itself can also be incorporated into the application. ICT Holding and ICT Government are shifting their attention from custom-made services to the standardization of product development. The reason for this is to increase the usability of applications that were initially developed for individual clients.

Despite what their performance might imply, the less-successful growing ICT firms showed to be quite capable of introducing new ideas for the development of automation services. According to the CEO of ICT Medium the firm was very capable in developing an ICT program that enclosed the latest application on the area of automation of business processes. Besides the firm's R&D department, new ideas for applications are presented by the management as well. Central to the innovativeness of ICT Trade was the firm's production platform. Initiated in 1994, this platform was constantly developed and implemented in practice with new releases until 2000. After this year, the firm was forced to reduce investments in the development of the program.

#### *Learning*

The three fast-growing companies recruited employees with experience in ICT and an open and result-driven attitude towards ICT solutions. These terms stimulated the development of new skills within the organizations. This organizational learning turned out to be an important factor in developing a broad range of ICT services, but not critical or distinctive for growth. Considering the fast changes of applications within the ICT sector and the tailor-made offered services of the firms, the employees have to be flexible and able to use different skills. In this regard, the larger part of these competencies is learned "on the job". Furthermore, the firms offer their employees courses and training for the enhancement of skills based on both corporate and individual preferences.

According to the interviewee of ICT Total, the personal development of the firm's employees is stimulated by creative processes and a flexible 'Human Resource Model' with a budget for individual education. The development and expertise of the employees is controlled by 'personal balanced score cards'. Central for the development of employees' skills in ICT Holding is the business model. In the starting years, the founder teaches this model to new employees. When this group gained experience with the approach in the field, they taught the method to new employees. The progress in the skills development is monitored and evaluated during monthly 'mentor-meetings'. The employees of ICT Government are trained 'on the job' in the early years of the firm. Currently the company uses an introduction training of one month and a personal training budget. However, important experience is still gained by the guidance of experienced employees.

Both ICT Medium and ICT Trade stimulated the individual skill development of their employees. ICT Trade encouraged the learning of employees. With the employees a personal development plan was created in accordance with the knowledge areas required for the tasks within the organization. In ICT Medium the CEO claims to highly value the learning attitude of the members of the organization. Both with investments

and extra attention the company protected its knowledge position in the market. The high level of skills is necessary for the development of the high-tech automation programs that are fine-tuned to the unique customer situations.

#### *Structure*

Although the firms in all cases focus on total ICT solutions, the organizational structures differ. ICT Total is aiming for growth with a flexible internal organization. For the firm's activities, project teams are formed based on the required and available expertise within the firm. Projects are monitored by a 'heli-team' consisting of experienced personnel. ICT Holding tries to maintain the entrepreneurial spirit within the organization by dividing the main activities into five small and independent firms, firms that operate according to the strategy of the holding company. The smaller firms have business unit managers with operational freedom. In the end, the CEO monitors the firms on the basis of forecasts. ICT Government currently shows a larger and more mature organization scheme relative to the other ICT cases. The main activities are divided over a development and implementation department.

"I'm in it for the process of starting a company. After reaching 50 employees there is no further challenge for me in this company. At this point I expect too much structure and politics, I'd rather sell the company and start a new one."

Respondent ICT Holding.

In the two cases of less-successful growth the organizations both engaged difficulties with their organizational structure, causing an impediment on the organizational development. The structure of ICT medium is product-focused and aims on hardware applications and projects for implementations of software applications. The CEO claims that this structure has led to a neglect of the focus on customer demands. In the case of ICT Trade the firm faced an organization structure that would fit an organization of 300 to 400 people, instead of the 90 people the organization employed in 2001. The organization structure is too 'heavy' for the current company. The fast growth of the organization until 1998 –at that time the organization employed 150 people- is the most important cause for this situation

#### *Culture*

Most important transformational variable for fast growth turned out to be the enactment of strong firm norms and values: the culture. The three fast-growing ICT Companies pay significant attention to this intangible resource of the firm. The method of working played an important role in the opinion of the customer and with the recruitment of new personnel. The culture for all cases is generally described as "open, informal, no nonsense and result-driven". All firms find the employee at least as important (sometimes even more important) than their customers. In line with this attitude all founding managers valued the "pleasure in activities" as a key factor for the activities of the employees.

ICT Total and ICT Holding (and ICT Government when the firm was of the same size) use distinctive tools to provide an extra stimulus for the employees. ICT Total showed the strongest binding culture. In this case, the entrepreneur developed a 'firm-specific house style' and placed this central for all its ICT solutions. Furthermore, the internal Innovation Board stimulates employees to develop new ideas for their employer in their free time, resulting in a weekly overtime of 6 to 8 hours. The employees of ICT Holding work in 'virtual offices' at home and meet with their colleagues at monthly mentorships. In its activities the firm is strongly committed to the focus on results in combina-

tion with the central business model. ICT Government emphasizes its employees' 'no nonsense' and 'down to earth' approach towards its clients of governmental institutes. According to the former CEO, this approach is appreciated by the employees as well. As a result of these efforts the motivation and commitment of the personnel seems high since there are hardly employees leaving the firms. Furthermore, ICT Total and ICT Holding show a sickness leave percentage of less than 1%. ICT Government signals a clear shift of sickness leave of 1-2% in the early years up to currently 5-6%. The respondent blames this growth to the increase of organizational levels and decrease in commitment. In this regard it seems fair to link the size of the firm to the positive influence of a shared firm culture as well. All firms motivate their employees by letting them free to decide on their individual working conditions: working hours, working place, personal studies and free days. ICT Total even gives its employees the possibility to decide on the height of their salary. The listing of the incomes on the intranet enables a social control of the salaries.

The enactment of a stimulating organizational culture was also present in the cases of less-successful growing ICT companies. This element was most strongly present on the organization of ICT Trade. According to the CEO the organizational culture was one of the reasons that the firm was much more viable than the bankruptcy in 2002 might imply. The organization had a low sickness leave number in combination with high employee motivation. However, the stimulating culture could not prevent a split in the organization when in the management two contrary perceptions on the firms' strategy arose. In ICT medium the CEO describes the company culture as 'technically, innovative and modern'. Despite the technical aspect of the culture, the CEO regrets that the employees lack commercial capabilities required for a healthy business situation.

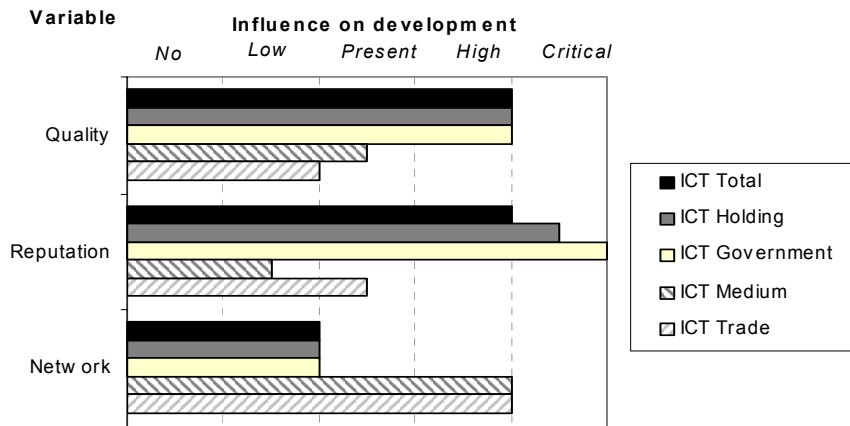
#### 7.2.4 *Output-based capabilities*

The analyses of the output-based capabilities of the fast-growing ICT cases show strong resemblance on product quality, reputation and their relationship network. High influence on growth is found for the quality of the ICT services. The reputation that the firms build and enjoyed in the period of analysis is valued even higher in the light of the fast growth. The fast-growing firms' network with suppliers, customers and played a role in the expansion of activities, however its stimulus has been outweighed by the two other variables (see figure 14).

The less-successful growing firms show contradicting results. Both on the quality of the offered services and the reputation by clients the two cases show a lower influence on their organizations development. A remarkably higher influence came forward from the role of the two firms relationship network.



figure 14 Output-based capabilities in ICT Services



Source: EIM

### Product quality

The three cases of fast growth showed large effort in acquiring a high level of quality into their services. Without exception the firms state to continuously and critically monitor the internal processes and in this way created a distinguishable quality in the market for ICT services. For all firms, the quality of services largely depends on their employees who need to be skilled and customers oriented, but also always keep in mind their companies vision behind the services. By implementation and evaluation of result driven customer projects the firms stimulate their own progress in services.

ICT Total states to be primarily known among its customers for its high quality products. All developments have to be compatible with the firms' strive as 'total solution provider'. With these developments the firm aims for quality, followed by innovation and clarity. ICT Holding has proven to its customers to be three times as fast as competitive firms with providing solutions. A strong reason for this is the business model underlying at the services. Mentor meetings monitor quality where the employees exchange experiences. Furthermore, the employees individually check the quality and progress of their projects, on a weekly basis. More recently, a third form of control is formed by the developments of standards in software applications. Quality in ICT Government is maintained by flexibility and focus on the end result. In its market for governmental institutes the firm distinguished itself from large ICT services firms by being faster and listening better to its customers. This attitude with a combination of automation and organization knowledge stimulates control on services.

The less-fast growing ICT firms both showed strong attention for the technological aspects of the automation services that were offered, and safeguarded quality by using ICT products of leading software firms. This focus enabled the firms to offer state of the art services, however not without inefficiencies. According to the CEO, ICT Medium offered services with higher technology relative to competitors. The lack of strong norms in the industry, however, prevented the firm from developing a standard procedure for quality checks. As a result, the employee's own judgments prevailed in decisions on quality. The technological developments of the ICT service of ICT Trade put the

company for an even large challenge. The firms' engineers tried to develop a modular system for custom-made solutions in automation projects. When this development got stuck in 2000, it forced the firm to downsize the functionality and quality of its ICT services.

#### *Reputation*

The most critical variable that was found in the case studies of fast-growing ICT firms is the perception of their firm in the market: the reputation. The three cases thank part of their reputation on the quality of their services that are implemented by skilled personnel. However, this quality was not the most decisive factor for the firms' success. The analysis shows a strong importance, confirmed by all cases, of the marketing efforts that were used. The managers of the firms showed to have used a strong combination of technical and commercial skills, a combination that is more rare in the market than one might expect.

According to the three firms their reputation is build by fresh, young and result-driven employees that offer high quality services with a 'no nonsense' attitude. Key to all firms' market awareness has been 'mouth on' promotion by customers. Of secondary importance were other communication instruments, such as adds, fairs or sponsorships. In all cases, marketing has primarily been taken care of by the founding managers. Besides strong quality and marketing, ICT Total has build a strong name based on its distinguishable firm identity. The firm's house-style appeared to be of extra influence for the unique firm character. According to the respondent, the strong orientation on quality, for both customers and own employees, is by some customers seen as arrogant but proved to be successful. ICT Holding distinguishes itself by looking at the larger picture and convincing their clients of the goal of their own organization. The visiting of fairs and advertisement in the Dutch primal soccer league created increased awareness for the organization of ICT Government.

"The core of our strength is our approach: result-driven and flexible."

Respondent ICT Government.

A below average influence on firm performance is found on the commercial strength of the two less-successful growing firms. The CEO of ICT Trade typified its commercial activities more as 'public relations' than 'pure marketing'. Accordingly the firm's services are characterized by a solution-driven attitude and realism, which was appreciated by clients. Initially the firm lacked the presence of 'pure salesmen'. To boost the companies' reputation in the market after a decrease in revenue growth in 1999 and 2000, the firm tripled its investments in Marketing & Sales, but it didn't work out. ICT Medium's CEO claims the reputation to be the firm's largest challenge for survival of the firm. Apparently the relative low influence of the firm's reputation is mainly caused by a strong attention for the technological aspects of the services. Furthermore the orientation on the firm's product has led to situation that the employees simply lack the commercial competencies the firms increasingly requires.

#### *Network*

The relationship network from the three fast-growing cases in ICT showed to be of a minor influence on the growth of the companies in the past three years. The firms thank the larger deal of their assignments to mouth on promotion, in this regard relations with existing customers created potential with new contacts. For two cases, there was an important contact with a firm for the delivery of knowledge. Furthermore, none

of the fast expanding firms used further contact with suppliers, educational or research institutes.

The founder of ICT Total formed important contacts already in the start-up trajectory by incorporating suggestions and ideas of potential customers into its' own business plan. In the case of ICT Holding the customers of the firms are companies from small to medium-size as well as departments within multinationals. Since ICT Government has been primarily active in the governmental sector, the firm mainly uses its current customers to form an entrance to other governmental institutes.

A high influence of the firm's relationship network is found in the cases of less-successful growers. ICT Medium's network of medium-sized firms with Dutch Reformed religion as background, brought the company a large deal of orders for automation projects. Furthermore, the firm made use of contact with educational and governmental institutions for as well automation orders as for the acquirement of skilled trainees. ICT Trade held close contact with (large) Dutch accounting and consultancy agencies that ensured the firm of a large pool of orders. Once the clients of these firms were in need of an automation service, ICT Trade was contacted. The company cooperated with the agencies for a company-broad ICT solutions and held close contact for knowledge sharing.

The outcomes of the variables for the four managerial and organizational capabilities are presented in section 7.4. The following section deals with the cross-case analyses of the variables in the sector of life sciences.

### 7.3 Cross-case analysis life sciences

Four companies in life sciences, Biocell, Biodelivery, Biotissue and Biopeptide, conduct R&D on biomedical products and applications for (larger) pharmaceutical companies. Biogene conducts research for its five stockholders in the agricultural sector, supplemented with contract research for gene mapping of plants. Although all firms have some products on the market, the larger part of the business activity are developments in pre-clinical or clinical stage. Biocell was initially founded in 1993 and merged in 1999 with another Dutch biomedical company<sup>1</sup>. At the time of the interview, the firm employs 200 people. Biodelivery is founded in 1995 and houses 55 employees in 2002. Biotissue started in 1996 and has grown towards 150 people nowadays. Biopeptide was started in 1993, moved back to the initial mother company in 1996 and became independent again in 1999. Currently the firm houses 23 employees. Biogene was founded in 1989 and gradually grew towards 93 people in 2002.

The founders of all firms are scientists and approximately three-fourth of the employees are researchers with a scientific background in biotechnology. During the period 1999 – 2001 the fast-growing companies showed an average growth of 71% in revenues and 58% in employees. The less-successful growing companies still show significant growth figures but combine this expansion with a near bankruptcy (Biopeptide) or decrease in revenues and employees in 2001 (Biogene).

<sup>1</sup> The respondent typifies the merger as actually a takeover.

Similar to the previous section, the variables are interpreted here for their influence on growth of the firms. To come towards an identical figure of the influence of the variables in life science firms' growth, the same procedure is followed as in the previous section. Again, first will be dealt with the three cases of fast-growth, followed by a confrontation with the two less-successful growers.

### 7.3.1 Managerial capabilities

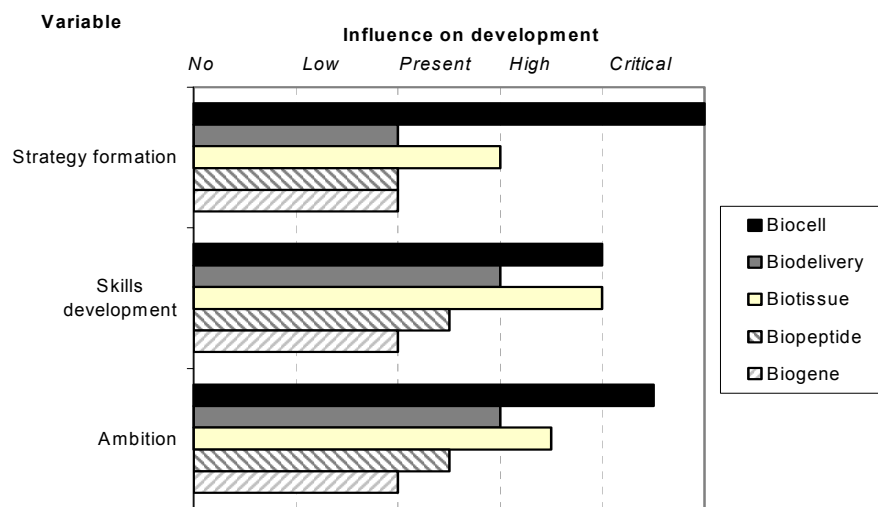
On basis of the commentary of the strategic leaders of the fast growers on the three elements of managerial capabilities, strategy formation, skills development and ambition, the influence on the fast growth in total is valued high. Across the cases the effect of the variables seems to be in balance with a slight higher importance for the entrepreneurs and top management' skills development and ambition. However, strong differences are shown for the three variables within the cases (see).

The two less-successful growing firms in life sciences show a balanced outcome in influence, generally somewhat lower than the fast-growing companies.

#### Strategy

The remarks of the respondents indicate a high value for the firms' strategy formation on its role in the fast growth of the life science companies. However, within the cases the articulation and communication of a large-scale plan is valued differently.

figure 15 Managerial capabilities in life sciences



Source: EIM

In Biocell the influence of the strategy formulation, in line with the firm's developments, is valued as critical factor for the firm's growth during the past three years. Considering the risks involved in developing life science products and production platforms, this company has created a combination of product diversification and vertical integration. The fields for product developments here are different but all related to pharmaceutical drug development. The activities within the firm currently are technology development

and (pre) clinical product development. In the future the firm aims for the production and sales of own medicines. Key in this strategy development has been the focus on targets related to the generic strategy, communicated throughout business plans for each business unit.

“The success of this firm is built on the strong parallel between business strategy and research. Just brilliant R&D won’t make it. Three years ago nearly all developments got stuck and look where we are now.”

Respondent Biocell

The strategy of Biodelivery was initially aiming for custom-made services. During the past three years the focus has been slightly moving towards technological development of products and production platforms. The company's services were a distinguishing factor within the sector. However, the firm's top management started to foresee larger potential in the development of applications for the life science and pharmaceutical industries. In search for more focus, the accent has shifted towards in-house development.

The interviewee of Biotissue states that the firm’s strategy is still formulated according to the initial mission of the two founders. However, the strategy towards this mission has been emergently shifting focus from broad research towards a product development based on seven product areas. Important for the strategy formulation was the influence of the firm’s supervisory board, which stimulated the firm to make key strategic choices.

For all fast-growing firms, the top management team, occasionally assisted by a supervisory board, develops the strategy. Although the firms' philosophy behind the strategy are communicate throughout the firm, no middle management or employees are directly involved into the strategy formulation

Strategy formation showed to be of relatively low influence on the organizational expansion of the less-successful growing life science firms. In the case of Biopeptide, the firm’s strategy only got form with the entrance of the new CEO in 2000, by forming a two-track policy for focus in technology and product development. It was only then that the ideas within the management of the firm were constructed into a large-scale plan that was consciously developed in 2001 and ready for implementation in 2002. In the case of Biogene, the CEO describes the firm’s policy as a ‘strategic alliance’ between management and the five stockholders of the firm. In this regard the top management faced difficulties with forming a sound business strategy since the five owners of the joint venture had their individual objectives. The strategic leaders gradually managed to incorporate contract research for third parties into the large-scale plan of the firm.

### *Skills*

In life sciences both scientific and managerial skills are required for the successful growth of the three firms. The statements of the respondents show differences in the awareness for these aspects.

Biocell shows strong awareness of the position it is in and the role of scientific and managerial skills. The firm eagerly attracts managers and scientist with top academic background and strong reputation within both fields and keeps the original founders in key positions within the organization as Chief Executive Officer (CEO) and Chief Scientific Officer (CSO). The management has gained experience in the field of life sciences largely in the leading market of the United States. Furthermore, the firm distinguished

between the activities in order to enable both disciplines to reach full potential in their own field. However, the top management of the firm claims to face more difficulty in maintaining the growth than reaching it. The firm has to deal with the inheritance of positions within the firm, based on skills necessary for growth in the past years but less required now.

The original founders of Bidelivery are still forming the top management of the firm. Here the CEO is primarily responsible for the managerial activities. The CEO has an academic background in the field of life sciences and gained managerial experience during working 'on the job' at previous work for an American life science firm. The CSO is also strongly occupied with academic research and publications. Three academic managers/scientists assist the founders with managerial activities.

The top management team of Biotissue consists of the two founders with a scientific background and the CFO. Furthermore, the management team is complemented by the recruitment of experienced managers from three other necessary disciplines: commercial affairs, regulatory affairs and product development. When the founders attracted investments, the venture capitalists demanded the fulfilment of these positions. According to the CFO, there was a large influence of the monthly meetings with the supervisory board during the forming of the management. The expertise and experience of members of the board showed to be valuable to the firm, despite the experience of the CEO and CSO with previous founding multiple life science firms.

In the less-successful growing firms the ability to develop managerial skills shows a relative low influence on the firms' performance. In the case of Biogene, the CEO joined the management team in 1998. The management team's background is mostly characterized by a scientific background and experience in biotechnology. The CEO considers himself to be the sole manager with general business experience and capabilities. Until 2001 the firm showed no clear interest in further developments on the managerial capabilities. More recently, the head of business development is participating in a MBA course. During the period of analysis awareness of both the lack and necessity of a skilled management team has grown within Biopeptide. The strongest stimulus for these skills was the hiring of a new CEO with a strong reputation and experience in management of biotechnology firms. Furthermore, important management positions were filled enabling the firm to deal with the future challenge of managing the potential of the technology platform.

#### *Ambition*

The fast-growing firms show strong ambition for growth. The ambition is the strongest in Biocell. This is not only shown by strong growth goals, but also in the firm's IPO and cooperation with leading pharmaceutical firms in the United States that search for qualitative strong life science firms. Bidelivery is aiming for a growth that is less strong than Biocell. During the previous years, the firm furthermore showed to continuously outperform its' own growth goals by growing stronger than the targets that were set. According to the CFO of Biotissue the firm is ambitious in its' strive to become a global leading company in biological products, however, the firm lacks clear growth goals. The research for a sound basis for product development is valued higher than the continuation of the strong growth in revenues and employees.

"Of our employees, 75% has a option package of this company. This is a professional company, if you start to talk about a pension arrangement during your application you just don't belong here."

Respondent Biocell.

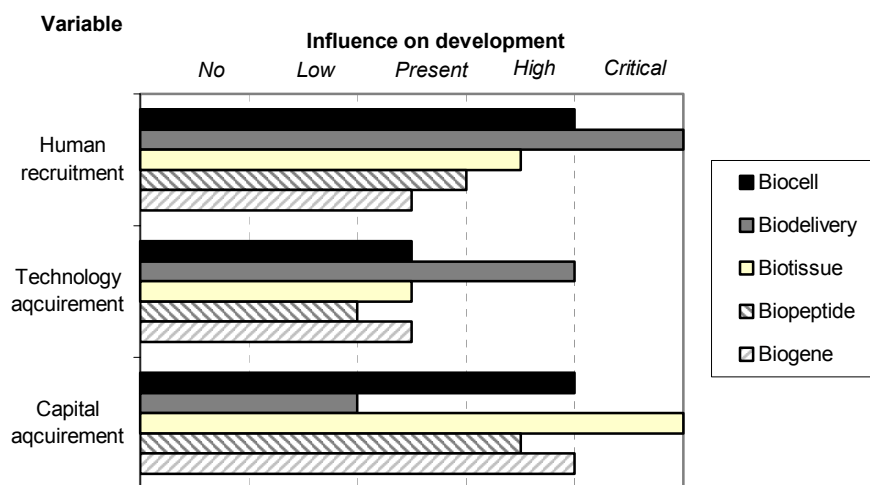
Compared with the fast-growing firms, a lower level of ambition comes forward from the cases of less-successful growing life sciences firms. In the case of Biopeptide, the firm experienced an increase in ambition with growth goals and product development after the new CEO entered the firm. Not only has the technology matured, the articulation of a sound strategic plan has convinced investors about the potential of the company. Biogenes' ambitions are largely determined by the five owners of the firm. Only recently the firm's management has been able to convince the stockholders to focus on contract research for third parties as well.

### 7.3.2 Input-based capabilities

The ability to acquire human, technological and financial capital for fast-growing life science firms show an equal total amount of importance for growth as the managerial capabilities. However, the values of the variables for the firms show larger difference. Based on the interpretation of the interviews the recruitment of skilled personnel is the firms' most important input-based capability. Furthermore, the acquirement of capital is valued high, followed by an above average influence for the entrance of external technology or knowledge, other than in the heads of the employees. These last two elements show the largest differences within the cases (see figure 16).

The two less-successful growing firms show the same proportions on the three elements of input-based capabilities. However, on average the influence on the firm's development shows a medium level.

figure 16 Input-based capabilities in life sciences



Source: EIM

#### Human recruitment

The most important variable for the input-based capability of the fast-growing firms in life sciences is the recruitment of skilled employees. According to the respondents all firms searched for highly educated and skilled personnel in life sciences, recruited either from (Dutch) universities or within the industry of life sciences or pharmaceutical companies.

Biocell searches for its' personnel among other high quality firms and, if possible, with a background in the life sciences market of the U.S. In this search, the firm made use of setbacks of other firms with recruiting researchers of life science firms and managers from consulting firms. According to the vice president business development, for top management or research functions the firm's management personally searches for top-managers, -scientists and lawyers or makes use of headhunters. In the past three years, the firm has engaged greater ease with attracting employees because of its listing on the stock markets. (75% of the personnel are offered a stock option package). According to the CEO of Biodelivery, the recruitment of skilled personnel in the early years of the firm has been the most essential factor for the firm's growth in the later stadium. During the start-up phase, the CEO only attracted skilled personnel with experience within the field of life sciences. Since the firm offered services, mainly to large pharmaceuticals, these employees enabled the firm to offer these services and generate cash flow for further investments. In a later stadium the same people trained new employees of related firms and graduates from life sciences studies of Dutch universities.

"This company grew strong through the knowledge and experience of the employees. From the beginning they managed to intelligently perform in the market and to grow the business."

Respondent Biodelivery.

In Biotissue the two founders initially used contacts and equipment of their university for their 'spin-off'. During the past three years, the founders recruited 'high potential' students from several countries from their universities. These graduates formed the larger part of the firm's research team. According to the CFO, the firm engaged more difficulties with finding skilled managers and other staff functions as a result of the economic favourable conditions in the end of the nineties.

The recruitment of skilled personnel in the less-successful growing life science firms showed an average influence on the growth of the firms. Biopeptide enjoyed the advantage of being cut loose from its mother company in 1996. Employees from this firm that were specialized in humane biotechnological research, gradually were transferred to the company. This provided the firm with skilled technical personnel. Commercial personnel were attracted externally. Biogene experienced little trouble with attracting skilled personnel as well. The firm made use of contacts with universities to attract researchers. The firm engaged more difficulties in attracting foreign experts for their specific terrain of research.

#### *Technology acquirement*

The acquirement of technology within life science firms that attained a fast growth turned out to be not as high as might be expected for companies in this sector. Although there is an influence on the growth of the firms of this variable, most of the technology that enabled the firms to grow appeared to be developed inside the firms. The respondents hardly buy technology or outside knowledge from third parties (in-licensing). Knowledge was gained by cooperation with a number of universities, clients or suppliers. However, in all firms the CEO and CSO both have a scientific background in life sciences. In this regard, all firms acquire scientific knowledge and research by cooperating with Dutch universities and advisory of internationally acknowledged experts in the field of biology and related sciences, as members of the board. Furthermore, the firms are involved with Dutch governmental research programs. Biocell and Biotissue make use of contacts with universities outside the Netherlands as well. Biode-



livery extracts important additional knowledge from the cooperation and co-development of services with pharmaceutical and life science customers.

A similar influence of technology acquirement on growth comes forward from the analysis of the less-success growing cases in life science. In both cases the firms share their knowledge through the CSO, both part-time connected to Dutch universities. Furthermore, Biogene makes use of technological partners with acquiring input for its research and development activities. In general, the technological resources are mainly situated in the heads of the employees and are further developed internally.

#### *Financial acquirement*

The acquirement of financial capital shows relevance as input-based capability, but appeared not to be of equal importance for all three fast-growth cases.

Biocell and Biotissue are a spin-off of a Dutch university. For Biocell capital of this university and additional support from a research institutes made sure starting capital was available. Still the most important developments appeared in the late 90s and therefore a larger amount of capital was needed. In 2000 an initial public offering was placed that enabled the firm to obtain a large amount of extra capital. The firm uses this capital as backup and strives as much as possible to finance the developments by the selling of licenses and royalties to pharmaceutical companies. Biodelivery is financed with personal capital of the two founders. Since the firm started out with offering services that immediately created cash flow, the company did not need additional finance until 1999. In that year, the firm shifted its focus more towards technology development, which brought higher risks and capital requirements. For this reason the firm searched for financial support by investments of venture capitalists and the Dutch government. After the initial finance in the case of Biotissue came from the university, the founders realized that further capital was required for the recruitment of researchers and continuation of the research. The involvement of multiple venture capitalists has been important for the financing of activities. According to the CFO and CEO of the firm, the finance turned out to be the firm's most critical asset during the growth in the end of the nineties. The firm placed an IPO in 2000, which created financial freedom for the firm's R&D.

“Money was a strong necessity for the existence of this company. It was required for the acquirement of scientific personnel and the stimulation of developments.”

Respondent Biotissue.

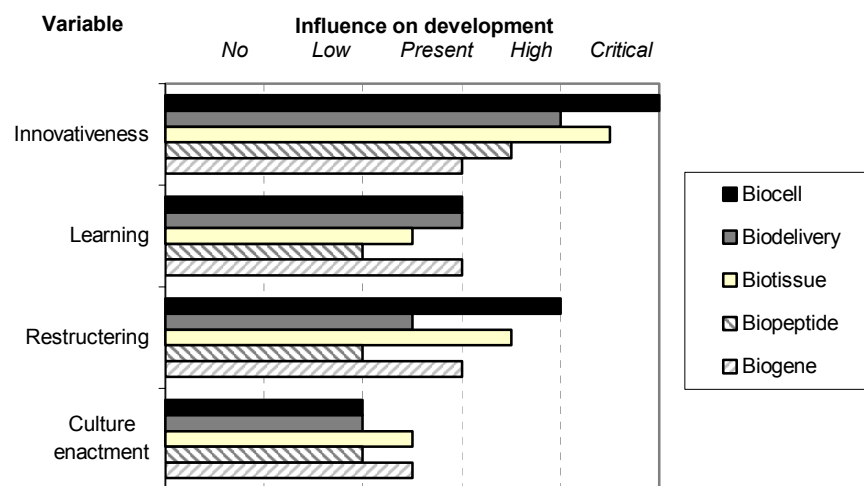
Compared with the fast-growing firms, the less-successful growing firms have experienced a larger influence of the ability to acquire financial resources. In the case of Biogene, the high influence of this variable is caused by the importance of the five stockholders for the policy of the firm. Not only did the stockholders initiate the start-up of the joint venture, the interdependence between the parent companies and Biogene also played an important role in the knowledge position that firm has developed. The role of financial resources played an important role for Biopeptide as well. In 1999, investments by a venture capitalist enabled the firm to get loose from its parent company. In 2000 extra capital injections were required before the firm could continue its activities. The firm also makes use of governmental subsidies to acquire the required capital for the expensive biotechnological research.

### 7.3.3 Transformational capabilities

The qualitative analysis of the case studies shows a medium relative importance for the transformational capabilities in the fast growth of life science firms. Individually, the variables show the large differences in outcomes. In general, for the fast growth of the life science firms the influence of an enacting culture is valued low and the development and learning of skills is considered to be of an average influence. The capability to innovate is valued to be the most important variable for the growth of life science firms (see figure 17).

No large differences are found when contrasting the influence of transformational capabilities with the less-successful growing firms. In the two cases a lower influence is found on the innovativeness and organizational restructuring. On enactment of an organizational culture and the learning ability of organizational members, these firms show an average influence on growth similar to the fast-growing firms.

figure 17 Transformational capabilities in life sciences



Source: EIM

#### *Innovativeness*

The development of new technologies, applications or products in the life science cases is of critical influence for the fast and successful growth of the firms. Since generally there is a lack of standards for these assets within the sector, the firms see the acquisition of patents and licenses as key for the firms past and future development. For all firms innovations are generated by researchers that increase the knowledge on production platforms and drugs by a continuous process of trial and error. The organizations are characterized by the scientific drive of the researchers, who are keen on the stimulating of inventions. An approached obstacle for innovations is the worldwide governmental regulation. The firms deal with this topic in different ways.

The ideas within Biocell are brought under a master plan for each business unit. The individual business units are led by researchers and enjoy freedom in developments. However, forecasts have to be met, otherwise the senior management will redirect the unit. The initial strong R&D expenditures (in 2001 189% of the revenues) are expected

to grow less strong compared to the firm's revenues. Furthermore, the firm stimulates inventions by physically separating the quality control department and incorporating the influence of the founders to maintain the 'entrepreneurial spirit'. Bidelivery encourages innovations by cooperating and co-developing services and technologies with customers and universities. Since the firm works together with a group of customers at the several applications, the firm considers itself to be a 'knowledge centre' for its customers. The innovative capacity has increased during the past three years by investments in in-house developments of applications for pharmaceutical industry. The interviewee of Biotissue states that the innovative capacity has been one of the firm's most essential factors in its development during the past three years. The firm is characterized by large freedom for the researchers who enabled the development of ideas in a broad area. Both internally and in cooperation with universities worldwide the firm managed to build an increasing number of patent-families.

"The most important driving power of our innovations was the initial group of researchers who consciously sought for refinement of technologies and applications of biomaterials."

Respondent Biotissue.

The introduction of new ideas for technology development showed an average influence on the organizational performance of the two less-successful growing firms. In both cases, a constant level of new developments have occurred, some of them protected by patents. Biopeptide has put large effort in better focus on the developments of new ideas in biotechnology. The researchers of the company experienced a rather large freedom in their work that brought forward a large group of possible technologies in peptide scanning. By matching the research closer to the firm's strategy, the CEO hopes to make better use of the growing R&D activities. In the case of Biogene the firm showed a constant focus on research efforts. The firm also benefits in research by the close cooperation with the parent companies that have been the primal users of Biogene's technology.

#### *Learning*

The internal development of skills of employees is valued equally important in the fast growth of the firms during the past three years. In all cases there is a clear individual training program for new employees that incorporates the firms' philosophy as well. Furthermore, the increase of skills and stimulation of thinking is handled by internal courses given by the firms' researchers.

The learning capability of the employees of Biocell is high from the start considering the high standards the firm sets for new employees. The management is positive about the analytical skills and research capabilities of its employees. However, the firm has been confronted with difficulties in the developments of research projects. The firm's employees are strongly focused on their research, the management approached difficulties in directing inventions towards the business plan. The new employees of Bidelivery are trained internally as well, focusing here on the firm's processes, the quality and business plans. Furthermore external training and development projects train employees with customers. The importance for learning has increased here during the years. The respondent of Biotissue remarked to have approached difficulties with the teaching of management skills (e.g. project-management) to the firm's researchers. New employees were given the opportunity to attain the firm's unique research approach individually during the first half year on a 'trail and error' basis. The attainment of the necessary

experience showed to be the largest obstacle for the firm during its strong growth of the past three years.

The obtainment of new skills by organizational members showed to have a little below average influence on the performance of the less-successful growing firms. Both Biopeptide and Biogene showed to value the learning attitude of their employees. In the case of Biogene the attention for personal development got a boost after the hiring of a head Personnel and Organization. This manager put a more systematic focus on the human resources policy that previously was underdeveloped in the company. The CEO of Biopeptide claims that the firm stimulates the skill development on basis of initiatives of employees. This more passive approach is chosen to primarily stimulate training that is connected to the business activities.

#### *Structure*

The organizational outlook and comments of the respondents of the three cases of fast-growth firms showed different approaches for the (re)design of the organizational structure.

According to the organization design of Biocell and comments of the respondent, the firm has distinguished between managerial activities and scientific R&D in order to enable both disciplines to reach full potential in their own field. During the period of growth the firm divided its business activities into three business units with individual responsibility. In Bidelivery the respondent states to largely have held the same organization structure during the growth of the firm. The firm is organised according to the main activities, development and services. The CFO of Biotissue remarked that the firm had to restructure the organization to maintain control over the developmental processes. In its initial approach the organization provided a too large amount of freedom for the employees' research, which stimulated the forming of groups and hindered the progress in research and development.

The two less-successful growing firms both chose an organizational structure that divided the technology development and offering of services through contract research. The larger organization of Biogene is further molded into four business units, each acting independent in the direction of their technology or service. This design is developed by the management of Biogene in accordance with assistance of external consultants. Biopeptide's organization finds itself in an earlier stage of development and is focusing more on the filling in of the required business processes in life sciences. At the time of the interview the start was made with the commercial department within the company.

#### *Culture*

In the dynamic environment of life sciences a minor influence on fast growth is found for the shared norms and values of the firm. The respondents' comments on culture indicate to have individual characteristics that stimulate employees to identify themselves with the firms, but in general the case studies do not reveal synergy effects among the members of the organization. The three firms for the largest part consist of young people. Although the top management in all cases has more than ten years experience in the field, the average age of the firms' employees is beneath thirty years. Furthermore, high potential and motivated people characterize the cases (e.g. a sickness leave percentages of less than 2%).

The respondent of Biocell describes the organizational culture as 'a young IT firm'. The firm uses professionals that work freely and opportunistic. The motivation for skilled personnel to work for the firm is primarily based on its stock options program ("Here's no room for a pension plan"). According to the respondent the entrepreneurial spirit

from the beginning has diminished but is still present in the firm. Bidelivery's culture is described as informal, flexible and hectic. The interviewee adds to these terms the employee's result-driven attitude towards customers. Employees are offered a large number of secondary labour incentives like personal study, profit sharing, patent reward, option plan and part-time working. In contrast with the other two firms that are located in a bioscience business park, Biotissue is located in an old hospital in the woods. The informal atmosphere is brought forward by remarks of multiple employees within the firm. The interviewee describes the firm's culture as young, international (researchers from multiple nationalities), intellectual and sometimes ingenious. Outdoor activities of the firm are characterized by several (team) sports.

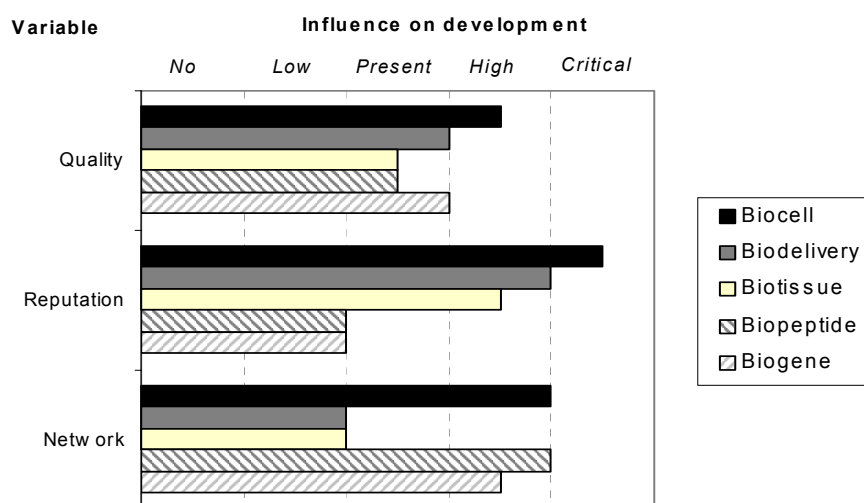
Just like the fast-growing firms, the less-successful growing firms show no strong organizational culture that enabled expansion of the two companies. Both life science firms also have a young and motivated group of employees. According to the CEO of Biopptide, the firm is characterised by the government culture of the former mother company where most of the employees are coming from. For this reason extra attention on the accountability is put on the employees' performance. In this way the firm is trying to stimulate commercial thinking in the organization. Biogene's CEO claims to be noticing a larger turnover of employees during the past three years. With the current size of the firm the entrepreneurial spirit of the early years seems to be less present among employees.

#### 7.3.4 *Output-based capabilities*

In the cases of the three fast-growing life science firms the output-based capabilities showed a high stimulus for the growth of the firms in the period of analysis. A significant influence is expected from the firms' relationship network, an even higher value is caused by the attention for quality in the development processes and the respondents valued the reputation of the firm as a nearly critical factor for growth (see figure 18).

Although the output-based capability played a clear role in the organizational development of the less-successful growing firms, the accent in influence of the three elements showed to be different than those with the fast-growing firms. The influence of quality in research is almost similar, with an average influence on development. A difference was found with the firms' reputation and relationship network. The former merely had a low influence and the latter showed to be of relatively high importance.

figure 18 Output-based capabilities in life sciences



Source: EIM

*Product quality*

The firms' occupation with quality naturally is a necessity in the strongly regulated life sciences sector. In this regard the required attention for quality seems to have hindered the innovation processes. Within the cases the firms showed different tactics with building competitive technologies, services and products.

Biocell has been aiming strong at the development of technology based on its own production platform. However, during the past three years the firm has intensively applied for patents with a strong influence of quality control and assurance. After acquiring patents the firm aimed at the selling of licenses for its technologies towards pharmaceutical companies. Furthermore the firm developed a unique production platform and managed to make it an industrial standard. With this technology the firm distinguishes itself from other life science companies. The firm placed quality control outside the company to maintain its 'entrepreneurial' spirit.

"We moved our Quality Control department to the other side of the street. These activities are a necessity, but we don't want this department to be too strongly present since it has a negative influence on the entrepreneurial spirit of the company"

Respondent Biocell.

Biodelivery developed services and technology for applications in life sciences. In the offering of services the firm cooperates with its customers, usually on a project base. In these projects the firm uses a basic quality standard. An important factor for this standard is the experience of the employees in offering the requested service according regulations. This experience, the technology and flexible 'niche' services in applications for pharmaceutical firms are the firms' strongest activities. In the case of Biotissue, the firm follows a strict quality control according the globally highest standards. The uniqueness from the product development is the firm's largest difference with competitors.

Both less-successful growing firms show to pay attention to the level of quality of their products. Both Biopeptide and Biogene secured the quality level by patenting inventions. For Biogene the patent on the number 1 technology platform formed the most important protection on the firm's technological position. Extra focus on the quality of the research is preserved by internal report books. In the case of Biopeptide the firm focuses on the satisfaction of the customers when monitoring the quality of services.

#### *Reputation*

The perception of the firms turned out to be one of the key elements for fast growth in the case studies of life sciences. All three firms value their business-to-business marketing and promotional activities strongly for the building of a corporate reputation in their industry that is characterised by scientific developments.

Biocell uses a strong marketing and sales department. This department has enabled the firm to build a strong reputation in the market and to establish strong industrial contacts. According to the management, the firm's R&D activities are of the strongest influence on its reputation. In the pharmaceutical market the firm is relatively unknown but shows large potential with developments for medication for life threatening diseases. Financial analysts in the Netherlands and the U.S. value the firms' stock price as – strongly- undervalued. For Biodelivery customer research brought forward the firm's reputation as high tech, flexible and expensive. The flexibility of the firm is a result of the range of activities that the company offers: drug delivery company, pharmaceutical company and contract developer. Commercial activities are initially formed by the CEO and taken care of the director business development. The firm's reputation is spread primarily by mouth on promotion among customers. Marketing and sales played an important role in the reputation of Biotissue. With their business-to business marketing, increasing awareness of the firm's products was created among customers, industrial partners and investor relations.

The two less-successful growing firms experienced a lower influence of their firm's reputation on the growth of their firms. In both cases the firms are well known in the market for exclusive and reliable products. However, at the same time the firms both lack the commercialisation of their biotechnological knowledge. A growing confidence in the firm's technology and the increase of the managerial capability in Biopeptide, have led to a larger awareness of the necessity to focus more on marketing and sales. The CEO of Biogene also claims to be aware of the fact that the firm has been mainly driven by research and therefore was unable to focus more on the commercial activities.

#### *Network*

The influence of the firm's relationship network showed a growing importance during the fast growth of the life science firms. However, the importance differed in the past three years. The firms have agreements with a number of –mainly Dutch- universities and life science and pharmaceutical firms in Europe and the U.S.

For Biocell the network with large U.S. pharmaceutical firms turned out to be important for the support in its developments. Cooperation with these larger firms offers the company extra finance, knowledge and even juridical knowledge for the acquirement of patents. Furthermore, the firm has research agreements with universities and life science firms in the Netherlands and Belgium. Having a commercial or research agreement with larger firms also stimulated the opinion of shareholders that are waiting for developments to evolve into medicines. Dutch universities and pharmaceutical customers throughout the world primarily form the relationship network of Biodelivery. Cooperation with customers occasionally evolves into the development of a production

tion with customers occasionally evolves into the development of a production platform. Since the firm increased its focus on –more complex- technology development (instead of services) the importance of the relationship network rose as well. However, the management of the firm does not consider the network as of large influence for the growth in the past three years. The CFO of Biotissue typifies the firm’s relationship network with universities and life science companies worldwide as in its 'building stage'. Although the network has not been too strongly influencing the firm's growth, it is expected to become more important in the future. In contrast with the other two cases, the firms stated to have intensive contacts with suppliers as well for the delivery of high quality raw material.

The life science firms that went through a less-successful period of growth showed an above average influence on growth of their relationship network. Biopeptide experienced a strong influence of its contacts with the university where the CSO of the firm has a position. The firm also maintained relations with other universities for the development of pharmaceutical research. Furthermore, the relationship networks of the different members of the management team of are influence on the firm’s development as well. Finally, an important role was played by the former mother company that delivered both human and technological resources. Biogene’s actively developed its network. Beside the important contact with the five stockholders, the firm co-develops technologies together with Dutch universities. Biogene has since the start-up also been involved in research programs of the European union.

## 7.4 Capability development in ICT services and life sciences

In this final section of the multiple-case analysis, an overview is presented of the relative influence of the variables and capabilities on the fast and less-successful growth of the cases in ICT services and life sciences. The paragraph starts with an overview of the confrontation of variables per sector. In the second part of the paragraph, this overview results into a more general outline on the four types of capabilities and their importance in the organizational development within the ten cases. The discussions are supplemented with interesting findings on combinations of elements. In the presentation of the findings the methodological limitations of the research are taken into consideration as well.

### 7.4.1 *Variables for growth*

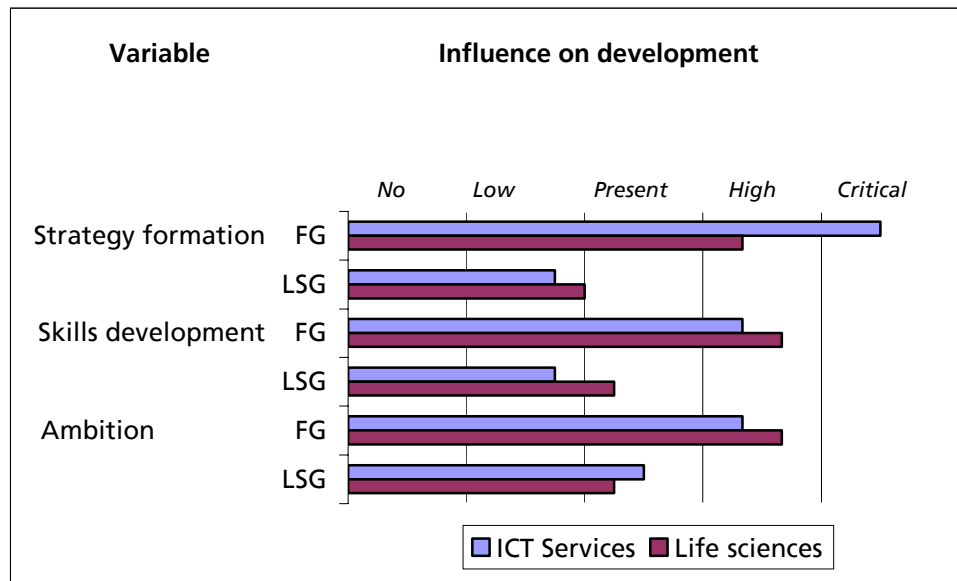
Within the single cases the elements of firm-specific capabilities are found in different settings. Comparing the influences on growth of the firms of both ICT services and life sciences, interesting comparisons between the sectors rise as well. The comparisons are dealt with per category of capability.

#### *Managerial variables*

The figures below show the total values of the variables of the two sectors for the Managerial Capability, confronted on fast growth (FG) and a less-successful growth (LSG) (see figure 19).



figure 19 Variables of Managerial Capabilities total



FG = Fast Grwoing; LSG = Less-Successful Growing

Source: EIM

On the variables for managing growth for an organization in a turbulent environment, the figure shows that for fast growth the three variables of the capability all are valued high for fast growth. The less-successful growing firms in total show a low to moderate influence from the three variables.

For fast growth the ability to formulate, articulate and communicate a strategic plan is found most influential. Within the two sectors this variable is valued higher in ICT services. The contrast with the less-successful growing firms here is rather large. Both the development of managerial skills and ambition show a high influence on fast firm growth, valued to the same amount in the two sectors. The development of managerial experience and competencies shows a low influence among the less-successful growing organizations. A slightly lower difference in valuation is shown for all firms' ambition. Still the less-successful growing firms show to poses less eagerness to actually expand their business.

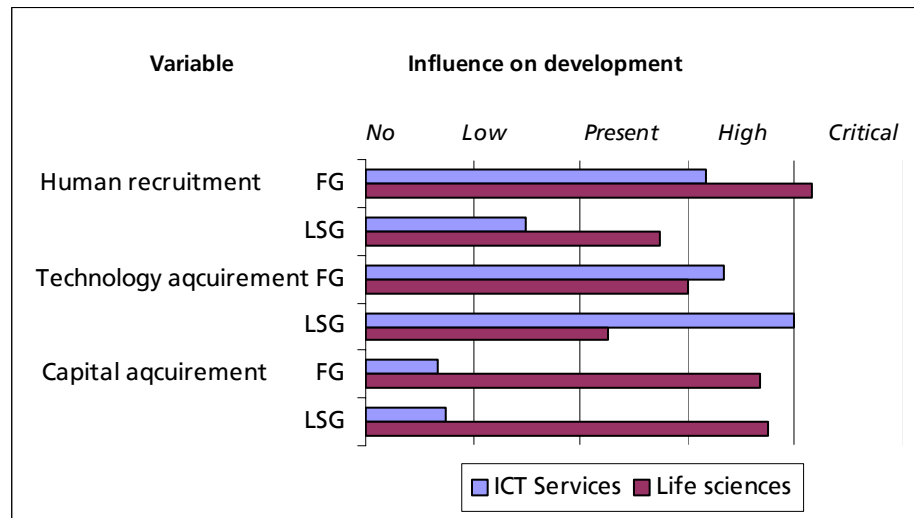
*Input-based variables*

The total outcome per variable for the ability to acquire human, technological and financial capital is illustrated in figure 20. The figure shows a moderate to high influence of the variables for both fast and less-successful growing firms.

From the three variables the ability to acquire skilled personnel is valued highest for the fast growth, especially for the firms in life sciences. The case studies of the four less-successful growth show a low to moderate influence of this variable on their organizational performance, valued higher among the life science firms as well. The analysis shows the acquirement of technology to be in balance for the two types of growth, with a moderate to high influence on growth. A difference occurs here for the two sectors, the figure shows a larger influence of technology acquirement within the firm of ICT services. A similar finding comes forward from the influence of the acquirement of capital. In general this variable is valued medium, however, within the sectors a rather

high influence is found in life sciences. This finding contrasts with the lack of influence of external financial resources for all cases of ICT services.

figure 20 Variables of Input-based Capabilities total



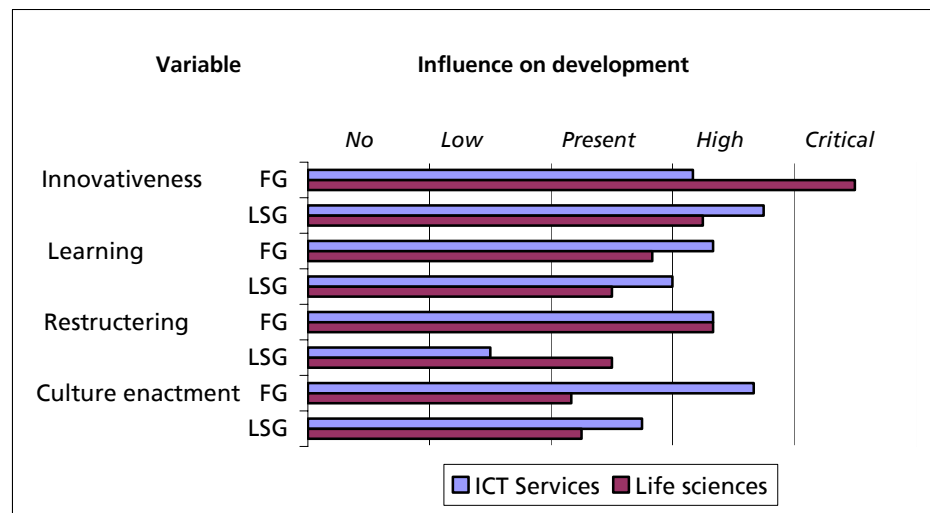
FG=Fast Growing; LSG= Less-Successful Growing

Source: EIM

*Transformational variables*

figure 21 presents the totalised results for the four variables of the transformational variable.

figure 21 Variables of Transformational Capabilities total



FG= Fast Growing; LSG= Less-Successful Growing

Source: EIM

In general the figure shows no large contrasting findings between the fast and less-successful growing firms, with an average from medium to high influence of the variables. The highest influence on growth comes from the innovativeness of the firms, primarily the three cases from fast-growing life science firm. For fast growth high influences are also found for the ability of learning and restructuring within the organiza-



*Concluding remarks on variables*

To come to a general overview of the variables that differentiate most between fast-growing companies and less-successful growing companies are listed in table 11, in order of importance. If applicable, a distinction is made for the specific sector.

**table 11** Variables differentiating between fast-growing and less-successful growing firms

	<i>variable</i>
Fast growth	Reputation
	Strategy formulation
	Human recruitment
	Skills development
	Restructuring (ICT)
	Quality (ICT)
Less-successful growth	Network
	Technology acquirement (ICT)
	Innovation (ICT)

*Source: EIM*

Most distinguishing variable for the fast growth of the firms in both sectors is the reputation of the companies. The ability to commercialise the developed applications is valued as a key factor for the growth of ICT and life science firms. Furthermore fast-growing firms show a strong influence of the building, articulation and execution of a strategic plan in accordance with their turbulent environment. This is combined with an attention for human recruitment and skills development. The fast-growing firms in ICT services also paid extra attention on the product quality of the offered automation services. Besides, restructuring proves to be important in the ICT sector that becomes more mature.

The focal point in the organizational development of the less-successful growing firms has been lying on the network. Both in life sciences and ICT services a strong influence of the development comes from the relationship network of the firm, a variable that showed a rather low influence among the fast-growing firms. Furthermore in ICT services the firms relied on their suppliers for the acquirement of technological applications and innovation.

Considering the above the variables indicate a relative importance for the fast growth of six firms that is contrasted with four cases of less-successful growth. A remark is made here on the interrelatedness of the outcomes. The analysis in this chapter aims at the examination of the direct relation of the variable with the growth of the firm. This does not mean that no indirect relations are expected. On the contrary, a firm's reputation is not merely build on marketing activities, but also influence by product quality or innovative members of the organization. Still, to focus on the processes that noticeably influenced the growth of the firm, this approach is used. A deeper investigation of the individual variables requires a different research design.

In the next section the consequences for the influence of the capabilities on growth are elaborated.

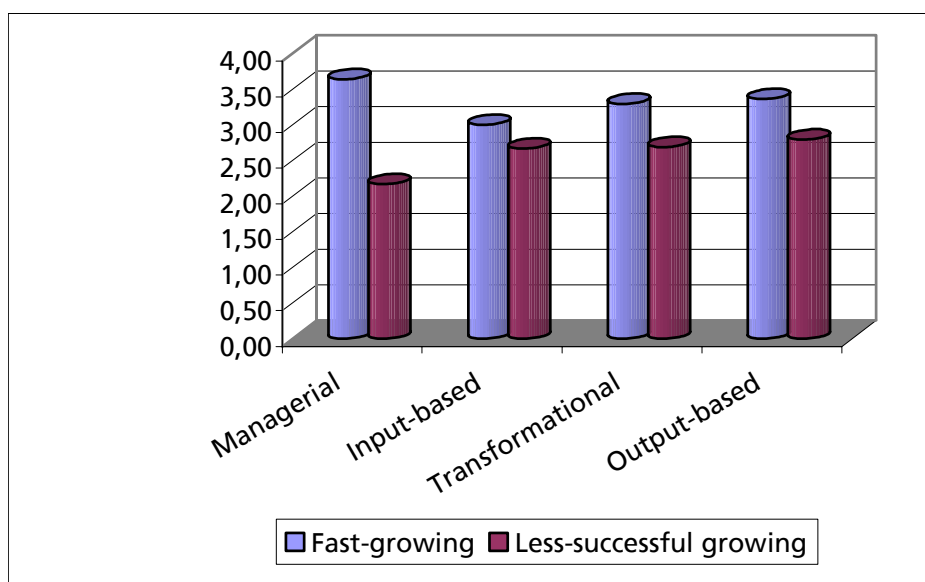
#### 7.4.2 Capabilities for growth

In this section the outcomes of the cases from the two sectors are analysed for their contribution to the four types of capabilities that are found. In the first section the development of capabilities that was found among the six cases of fast growth is presented. In the second section, the four types of capabilities in the less-successful growing firms are discussed. The paragraph is ended with a confrontation of results between the two types of growth.

##### *Capabilities for fast growth*

Totalising the outcomes of the different elements into the four categories of capabilities for the both sectors, leads to the following figure (figure 23). A distinction is made between fast-growing and less-successful growing firms. The score is calculated by averaging the scores of the individual companies for the different dimensions of each category of capabilities. All dimensions and companies are equally weighted.

figure 23 Overall Capabilities for growth



Source: EIM

The managerial capabilities show to be most influential for the fast-growth of the firms, in absolute terms and relative to less-successful companies. The formation of a clear strategy according the corporate vision, the development and presence of managerial skills and the willingness to achieve growth by the entrepreneur and top management, in sum, show to be the primal conditions for the fast growth among the six firms. In second comes the influence of the output-based capability on the growth of the firms, followed by the transformational capability. In total the relative least importance is found for the input-based capabilities of the firms. The difference between fast-growing firms and less-successful growing firms is biggest for managerial capabilities and smallest for input-based capabilities.

Examining these results deeper across the two sectors, a strong difference is found for the input-based capability. The ability to acquire human, technological and financial capital is, by far, valued least important in ICT services and during the same period seen as most important capability for growth in life sciences. Apparently, firms in life sciences depend more on skilled personnel, financial capital and the acquirement of external technology and knowledge for strong growth, than their colleagues in ICT services. The importance put on this may have to do with the dynamism of the life sciences sector (see chapter 6). In the life sciences sector there is a lot of uncertainty about the development of the companies and their R&D. It is therefore difficult to acquire enough capital and the right employees. Therefore, the input-side of the company must receive a lot of attention from the management.

Besides this difference in the input-based capability three interesting areas of conclusions come forward from the cross-case analysis:

- Growth with vision  
The six fast-growing firms choose not to grow unless the quality of the services or products was warranted. Furthermore, the top management showed to be selective in the choices for growth and did not take every promising alternative that came on their way. The strategic business plans of the firms are all well thought of and coupled to a deliberately formed strategy.
- Commercial technologies  
The firms in the multiple-case study show to have been able to combine high quality product or service development with an excellent marketing strategy. The firm's strategic leaders primarily stimulate this mixture of technical and commercial skills.
- Creativity needs space  
The knowledge-intensive firms of this research experience strong entrepreneurial influence and characteristics within the organization. In general, the firms show to be aware of the strength of these aspects and are eager to maintain the entrepreneurial spirit by redesigning the organization when necessary.

Confronting the two different types of growth discussed in this research, in total the figures of the capabilities show a difference in importance that the capability has fulfilled in the development of the firms. In general all capabilities showed a higher influence for the fast-growing firms relative to the cases of less-successful growth. Confronting the individual categories of capabilities a striking difference appears at the managerial capability. This capability is valued as most important for fast growth and is found to be the least influencing factor on the firm performance in of the cases of less-successful growth. The relative difference is smaller between the input-based and transformational capabilities. The smallest difference between the two types of growth is found on the output-based capability. However, for this last type of capability the causes of the outcome are contrasting as well. As physical and invisible outputs the fast-growing firms focused on their reputation and the quality of the products and services. In the same period the less-successful growing firms focused primarily on the third variable of the capability, the relationship network.

## 7.5 Implications for the theoretical framework

The confrontation of the empirical findings in the previous sections with the theoretical propositions lead towards the scheme in table 12.

The environmental characteristics, munificence, dynamism and complexity, show partial influence on the managerial capability (1a), since support is only found in ICT. The dis-

persed influence of the elements rejected expected relation of the input-based capability with growth (2a). On the one hand, despite the empirical support, a relation for environmental characteristics and the formulation of a corporate strategy is still expected. On the other hand, the firm's ability to acquire human, technological and financial capital seems not to be influenced by the environmental circumstances when developing the input-based capability. A logical explanation for this finding seems to be the voluntary nature of the firms' entrepreneurial management team. Apparently the strategic vision, skills and ambition of the top management outperform the external factors in their search for resources for a fast-growing organization.

**table 12 Support for propositions**

<i>Proposition</i>	<i>ICT services</i>	<i>Life Sciences</i>	<i>Total</i>
1a: dynamic, non-munificent and complex environment influences management's ability to enact a beneficial firm-environment relationship	Supported	Partly supported	Partly supported
1b: development of managerial capability is positively related to the growth of the firm	Supported	Supported	Supported
2a: dynamic, non-munificent and complex environment negatively influences organisation's ability to acquire input-based capabilities	Rephrase	Rephrase	Rephrase
2b: development of input-based capability is positively related to the growth of the firm	Partly supported	Supported	Partly supported
3: development of transformational-based capability is positively related to the growth of the firm	Supported	Supported	Supported
4: development of output-based capability is positively related to the growth of the firm	Supported	Supported	Supported
5: firms that facilitate the development and exploitation of combination of capabilities have a greater likelihood of fast growth than firms that lack the exploitation of these combination	Supported	Partly Supported	Partly Supported

*Source: EIM*

After confronting the theoretical propositions with the empirical results, empirical evidence is found for the positive influence of managerial (1b), transformational (3) and output based capabilities (4) on the growth of medium-sized ICT service and life science firms in the Netherlands. A positive influence for the input-based capability (2b) is also found in the three life science cases. This influence is expected to play a role in growth for the ICT cases as well, although in the research no full support is found. The research enabled the support of the necessity of development of a unique combination of capabilities (5), for the fast growth of the firm ICT services. In life sciences the results show no full support which in total leads to the partly support of the proposition.

On the influence of the variables for the four types of capabilities and their unique combinations in general only a partial support is found. Still, in the cases support is found for the management's development of business skills and ambition. Furthermore, support is found for the organizational innovativeness, restructuring, and reputation. Partial support is found for strategy formation, human recruitment, technology acquirement, culture enactment, product quality and the organization's relationship network. This group is expected to influence the fast growth but lacks a full support across

the cases. Therefore a further, deeper, investigation seems required to gain support. The influence of finance acquirement is rejected for the ICT sector and partially supported in life science. The difference between the two sectors is the importance of investments. These are a necessity in life sciences. Firms in ICT services show to be able to circumvent this resource. In this regard it seems appropriate to distinguish between the two sectors in a further investigation of this variable.

The confrontation of capabilities and their variables between fast-growing and less-successful firms shows interesting results on the extent to which capabilities are critical for fast growth. The most striking finding is the high influence of the managerial capability on fast growth, that the less-successful growing firms miss. Especially the ability for strategy formation and managerial skills development are missing in the medium-sized firms that obtained a less-successful expansion of their revenues and number of employees. Another striking difference is found for the firms' reputation. This output-based variable was valued highly important for fast growth and merely shows a low influence on organizational development in the four cases of less successful growth. Totalising these variables, the research shows that strategy formation, managerial skills and firm reputation to be prerequisites for a fast and successful growth.

The relative influence of the elements of the capabilities in fast growth for each sector shows an interesting outcome. The influence pattern of the elements in ICT show to be more homogenous compared to life sciences. In the latter sector the influence of the variables appear more divers. An explanation for the higher heterogeneity of capability-elements in life science can be found in the market environment of the two industrial sectors. Relative to the Dutch ICT services sector, life science is a smaller sector (in revenue and number of companies) and shows more potential for growth. The sector is also characterised by more uncertainty. Based on the empirical findings in this research, it seems that while an industrial sector evolves - moves up in the industry life cycle- the creation and refinement of capabilities is performed more homogenously. This is in line with the premises of Huygens (1999:242) that "Firms coexist and search in a competitive ecology, in which the creation and refinement of capabilities at individual rival firms impacts the foundation and proliferation of capabilities that shape their industry."

After confrontation three propositions are supported, partial evidence was found for another three propositions and the findings for one proposition did not stand the test of empirical evidence. Proposition 2a on the influence of the rapidly changing environment on the firm's growth, was not supported. In this regard it seems reasonable to emphasize the role of the entrepreneurial management in acquiring resources. Apparently the opportunistic behaviour and ambition brought forward by studies on entrepreneurship (e.g. Davidsson 1991, Baum et al. 2001) provides a more realistic explanation for input-based causes of medium-sized firm growth. Refinement of the proposition should incorporate this posture in accordance with a reduced influence of environmental characteristics.

On basis of the theoretical exploration proposition 5 is the most appealing suggestion on the relation between firm-specific capabilities and growth. The six cases of fast growth show unique combinations of capabilities. The confrontation with the less-successful growing firms show that these firms seem to lack these unique and strong combinations. In ICT services merely a moderate influence is found for all capabilities, in life sciences for all but one. The idiosyncrasy negatively influences the ability to generalize the results of the environmental and multiple-case analysis, to conclusions or predictions for the situation of other firms in the two sectors. Still, this tentative proposition



based on research by Huygens (1999) and Baljé (1998) should remain in sight. The idiosyncratic and voluntaristic posture adopted in this study showed to be challenging for field research and generalization. The findings justify further efforts in examining the search for commonalities in capability building across firms.

In this regard the validity of the causal relation scheme cannot be sustained in its current form. However, the results of the empirical research do provide support of the relation of three of the four capabilities, and show reasonable influence for the input-based capability to influence growth as well. If the propositions are rephrased it seems reasonable to sustain the causal relation scheme for more extensive empirical research.

## 7.6 Summary

The aim of this chapter was to attain deeper insight into the processes within and across the cases, to understand how they are qualified by local conditions, and develop more sophisticated descriptions and reasonable explanations for growth.

The analysis of the multiple-case study in this chapter shows that the four categories of firm-specific capabilities all played a role in the fast growth and less-successful growth of the ten firms in the period 1999 -2001. The individual variable that was most influencing fast growth in the two sectors was the reputation of the firms. In accordance with these commercial skills, the fast-growing ICT service firms showed a strong influence of the strategy formation within the firm. The variables most important for fast growth in life sciences is the innovativeness of the organizational members, in second here comes the firm's ability to recruit skilled scientific personnel. Most influencing variable on the organizational development of the less-successful growing firms was the relationship network. In ICT services these firms focused on the acquirement of technological capital. In the two cases in life science that experienced a less-successful growth, the acquirement of financial resources highly influenced the organizational development. Across all cases the organizations all witnessed different critical factors for their growth.

In general, the four types of capabilities are all valued higher in the fast-growing cases compared with the medium-sized firms that achieved a less-successful organizational expansion. The strongest influence on fast growth is performed by the managerial capabilities of the firms. Furthermore, this capability contrast strongest with the cases of the less-successful growth where it is valued as least influential. Secondly, the output-based and transformational capabilities of the organizations played an important role in the fast growth of the cases. On a lower level these capabilities are valued in the same sequence for the less-successful growing firms. A larger difference is found for the input-based capability that played a comparative lesser role in the firms' fast growth. This is mainly caused by a lower importance of this capability for the firms in ICT services. The difference of the input-based capability with the other capabilities is smaller in the four cases of the less-successful growing firm. The outcomes show three interesting fields of combinations for fast and a successful growth: (1) growth is realized according a clear strategic vision of the entrepreneurs, (2) the top management was able to combine both technical and commercial skills, (3) the firms were able to find a balance between organizational innovativeness and managerial control.

In the next chapter the results of the environmental and multiple-case analyses are presented in the light of the theoretical framework, by confrontation of the results with the propositions from the fourth chapter.





## 8 Conclusions

The previous chapters showed the theoretical and empirical exploration and description of the relationship between firm-specific capabilities and the growth of the firm, resulting into the confrontation of the two fields of research. In this final chapter the implications of the confrontation for this study are presented in accordance with its limitations and recommendations. The aim here is to provide an answer to the central question of the investigation:

*What is the relationship between firm-specific capabilities and the growth of medium-sized Dutch firms in ICT services and life science, between 1999 and 2001?*

In the first part of this chapter the initial research questions and external analysis of the previous chapters are re-evaluated on their contribution to the answer of the central question. The second section of this chapter critically reviews the limitations and the contribution of this research for both academics and practitioners. The study is closed with an elaboration of suggestions for further research.

### 8.1 Conclusions

The research in this study has brought forward interesting results on the relation between firm-specific capabilities and the growth of the firm. Both on theoretical and practical field has been contributed on the understanding of why firms realize fast growth. An overview of the provided research is created by re-evaluation of the initial research questions.

#### *Theory on capabilities*

The first research question: "What do theories contribute to firm-specific capabilities and which categorization can be made to increase insight on the topic?" is dealt with in chapter two.

In this chapter an overview is presented of four main streams of theory on capabilities: the resource-based view, the dynamic capabilities view, the behavioural theory of the firm and the competitive context. The perspectives show to be complementary and provide an interesting contribution for the building of a theoretical perspective on capabilities. In the synthesis of the perspectives a primal influence comes from the dynamic capabilities view. This perspective considers the competitive position of the firm to rest on distinctive processes, shaped by the firm's specific asset position and the evolution path it has inherited or adopted. In this study the firm is considered to be idiosyncratic with its own set of unique capabilities. However, these capabilities are build in an industry environment were they compete with other rivals and therefore show commonalities across firms. In the view of this study, firm-specific capabilities are to be created and refined by this search behaviour for capabilities in the market environment, and adaptation through learning.

This perspective enables the use of the capabilities framework on sustained competitive advantage of organizations, presented by Lado and Wilson (1994). The authors provide four categories of capabilities, which show a good fit with the point of view, advocated

in this study. The categories are managerial, input-based, transformational and output-based capabilities. Managerial capabilities refer to the unique competencies of organizations strategic leaders to articulate a strategic vision, communicate this vision throughout the organization and empower organizational members to realize this vision. Furthermore this capability consists of the ability of the top management to enact a beneficial firm-environment relationship. Input-based capability contains to the ability to acquire the physical resources for the firm: human resources, financial capital, technology, knowledge and skills, for the transformational processes of the firm. The transformational capability refers to the organizational capabilities, required to advantageously convert inputs into outputs. This includes harnessing innovations and entrepreneurship, promoting organizational culture and fostering organizational learning. The fourth category is the output-based capability. This capability is defined as all knowledge based, invisible strategic assets such as corporate reputation, or image, product or service quality, and customer loyalty. These presented categories are an indication of the managerial and organizational processes that influence the performance of firms. These capabilities do not merely accrue to the firm, but may consciously and systematically be developed by the wilful choices and actions of the firm and its strategic leaders.

#### *Theory on growth*

Chapter three deals with the second research question: "What do theories contribute to the different growth processes, and what are possible determinants for growth of small and medium-sized organizations?"

Insight into theories on growth is created with an overview of different perspectives used on growth. Classic theories on growth -life cycle and teleology- are combined with modern strategic management literature on growth: resource-based and entrepreneurial theories. Considering the research topic of this study, medium-sized firms in dynamic sectors, the analysis results in an integrative perspective on growth: strategic entrepreneurship. In this view it is argued that strategists must exploit an entrepreneurial mindset and have no choice but to embrace it to sense opportunities, mobilize resources and to exploit opportunities, especially under highly uncertain conditions.

The perspective is used in the selection and analysis of seventeen, mostly recent published, articles that particularly focused on the growth of small and medium-sized firms. The studies show a large set of determinants that play a vital role in the expansion of the organizational activities of these firms. The growth factors can be categorized towards environmental, managerial and organizational determinants for growth. The overview of the determinants does, on first sight, not show strong unitary and explanatory factors for growth. However, the theoretical exploration of growth shows a resemblance and overlap with the theory on capabilities. To come to an agreement on the relation between the two fields of thought and their relevance for medium-sized firms, the overview of determinants is further elaborated in the confrontation of both theories in chapter 4.

#### *Conceptual framework*

This chapter deals with the third research question of this study: "How can capabilities and determinants for growth be combined into variables that (dynamically) influence the organic growth of medium-sized firms?"

To answer this question the chapter aims at the creation of a dynamic model for growth of medium-sized firms. The chapter starts with a further elaboration of this ambition by presenting dynamic elements that should be incorporated into the model. An open-

system framework is suggested here since activities, functions and processes dynamically contribute to the development and utilization of firm-specific capabilities. Based on the elaboration of the dynamic capabilities view of Teece et al. (1997), the foundations are provided for the building of the model upon distinctive and difficult-to-replicate advantages that can be built, maintained and enhanced. The conceptual model considers multi-tiered social systems -at individual, organizational, and environmental level- that all interact dynamically to impact organizational outcomes. In the view of this research, capabilities endogenously relate to the growth determinants of a firm. On basis of the building blocks of capabilities and growth, a conceptual model for the organic growth of medium-sized firms is presented which comprises of environmental characteristics that influence the development of firm-specific (dynamic) capabilities that in turn influence the firm's organic growth.

To create better insight on the model, external and internal processes for growth are deduced from the determinants in studies on growth. The growth dimensions are related to the dimensions of capabilities for this research: managerial, input-based, transformational, and output-based. The interrelatedness of the two fields is further tested by tentative propositions that lead the way for the evolution of the initial conceptual model into the causal relation scheme. The causal relation scheme is a tentative effort in developing dynamic variables that influence a medium-sized firm's growth, by the use of merely direct relations of external characteristics and internal processes.

A further enhancement of the framework is provided in chapter five, that strives to examine the variables in actual business situations and provide empirical evidence for the framework.

#### *Methodology*

In the fifth chapter the methodological justification provides an answer to the fourth research question: "How can variables for growth be measured in the strategy of medium-sized Dutch firms in the ICT services and life science sector?"

The design for the empirical research contains an environmental and multiple-case analysis. The first analysis aims at gaining insight at the external characteristics - dynamism, complexity and munificence- that are expected to influence the development of capabilities. In this regard characteristics of fast-growing firms in Europe are reviewed. Furthermore, on the basis of secondary information, an analysis is conducted on the two 'dynamic' sectors in the Netherlands: the Information and Communication technology (ICT) services, and life sciences. The developments in the two sectors are analysed for the period 1994 - 2001.

The second element of the empirical research design is a multiple- case analysis of ten firms. This part of the research aimed for deeper understanding of the managerial and organizational processes that internally influenced the fast growth of six companies, equally divided over the two sectors. The variables of the causal relation scheme are used to form a semi-structured, in-depth, interview of their influence on the growth of the firm. The results of the six fast-growing firms are confronted with the influence of the variables in four less-successful growing firms, examined according the same research design. The founding chief executives of the ten firms, or their representatives, are interviewed on the role of these variables in the growth of the firm during the period 1999 -2001. The information of the interviews is supplemented by public and non-public secondary company data to form single-case study reports.

The use of both external and internal research with primary and secondary data increases the reliability and validity of results. Generalization of results is stimulated by the selection of firms that created a fast and sustainable growth during the past three years, and in this regard can be considered as 'best practices' in the two sectors. Insight on the criticalness of the variables for fast growth is enlarged by contrasting the outcomes with the variables of less-successful growing firms. However, generalization of the outcomes of the research will have its limitations considering the study of a small group of firms during a relatively short period in time. In this regard the primal focus of the research will be to create better insight into the conceptual framework and to test the propositions of the causal relation scheme.

#### *Environmental analysis*

The analysis of information on fast growth of technology firms in Europe, shows that chief executives show to value their (1) exceptional and unique product(s), (2) skilled personnel, and (3) timing in the marketplace as critical factors for the growth of their firms. Furthermore, the interviewees in the study claim to see (1) a strong marketing and sales strategy, (2) the recruitment of skilled personnel and (3) keeping up with technological developments as the largest challenge for further growth of their firms.

The analyses of the two sectors show a declining growth in demand for ICT services, indicating a shift towards the mature stage in the industry life cycle. In contrast, life sciences showed a strong growth in the past two years and seem to stand at the beginning of the industry life cycle, heading for a strong growth. Environmental dynamism is valued moderately high in ICT services and very high in life sciences. The complexity of the competitive arena of both industries is valued high for both sectors. The analysis of the availability of resources furthermore shows that the two sectors seem to be equally supported by their industrial environment, resulting in a medium valued munificence.

#### *Multiple-case analysis*

In the multiple-case analysis, the reputation appeared most influential for fast firm growth across the two sectors. A critical factor for growth in ICT services has been the formation of strategy. In life sciences the most critical factor for growth appeared to be the innovativeness of the organizational members, followed by the recruitment of skilled personnel. Financial acquirement and the relationship network, which were valued moderately high in life sciences, showed of low value in the cases of the ICT services. Organizational culture showed an opposite outcome with a moderate importance in life sciences and high influence in ICT services. Mutual agreement is found on the high influence of development of skills and the ambition of the management. Furthermore, a strong influence is found for technology acquirement, organizational restructuring and learning, and the output of physical products or services with high quality.

The four fields of capabilities are all well presented in the fast-growth of firms in ICT services and life sciences. The total influence indicates that the managerial capabilities of the firms are valued highest in the light of the organizational growth during the past three years. In second come the firm's output-based transformational capabilities. The relative lowest influence is found for the input-based capabilities. The analysis of the six fast-growing firms brings forward three interesting fields of outcomes: (1) growth is realized according a clear strategic vision of the entrepreneurs, (2) the firm's top-management were able to combine both technical and commercial skills, (3) the firms were able to find a balance between organizational innovativeness and managerial control.



The confrontation of capabilities and their variables of the fast-growing firms with the four cases of less-successful growth show interesting results on the extent to which capabilities are critical for fast growth. The most striking finding is the high influence of the managerial capability on fast growth, which the less-successful growing firms miss. Especially the ability for strategy formation and managerial skills development are less influential in the development of the medium-sized firms that obtained a less-successful expansion of their revenues and number of employees. Another large difference is found for the firms' reputation. This output-based variable, highly valued for fast growth, merely shows a low influence on the organizational development in the four cases of less-successful growth.

#### *Confrontation of results*

The environmental characteristics, munificence, dynamism and complexity, show partial influence on the managerial capability (1a), since support is only found for ICT services. The dispersed influence of the elements rejected the expected relation of the input-based capability with growth (2a).

After confronting the theoretical propositions with the empirical results, empirical evidence is found for the positive influence of managerial (1b), transformational (3) and output-based capabilities (4) on the fast growth of medium-sized ICT service and life science firms in the Netherlands. A positive influence for the input-based capability (2b) is also found in the three life science cases. This influence is expected play a role in growth for the ICT cases as well, although in the research no full support is found. On the influence of the elements of the four types of capabilities in general only a partial support is found. The confrontation of fast growing with less successful growing firms, enabled the support of the necessity of development of a unique combination of capabilities for the fast growth of firms in ICT services (5). In life sciences no full support is found for this proposition, resulting in a partial general support.

After confrontation three propositions are supported, partial evidence was found for another three propositions and the findings of one proposition did not stand the test of empirical evidence. Rephrasing of the proposition seems required, but the research shows that the causal relation scheme can be sustained for further empirical research.

#### *General conclusion*

To come to the general conclusion of this study, the central research question needs to be answered:

*What is the relationship between firm-specific capabilities and the growth of medium-sized Dutch firms in ICT services and life sciences?*

The research in this study shows that there is indeed a strong influence of the firm-specific dynamic capabilities on the (fast) growth of Dutch medium-sized firms in ICT services and life sciences, during the period of analysis.

After confrontation of the results between fast and less-successful growing firms, the managerial capability showed to be most differentiating capability for a fast and sustainable organizational growth in a dynamic environment. In both sectors the relatively highest influence on fast growth is performed by this capability, compared with the lowest influence among the less-successful firms. The research shows that strategy formation and managerial skills seem to be prerequisites for a fast and successful growth. All fast-growing firms show to have created a beneficial firm-environment relationship

and were consciously forming a clear strategy to attain their goals. The ambition of the entrepreneurial management team to grow appeared to be present, although the larger part of the firms chooses a focused organizational growth over fast expansion of activities. In ICT a strong combination comes forward of the technical and commercial skills of the entrepreneurs. In life sciences the combination between science and management appeared to be a larger challenge for the firms.

In second comes the influence of the output-based and transformational capabilities on the growth of the firms. A third prerequisite for growth here is the output-based variable of the firms' reputation. This variable turned out to be the most important element for fast growth. Furthermore all fast-growing firms strive for high quality in their services and applications, and in general show a relatively low use of their relationship network for realizing growth. In life sciences the innovativeness appeared the most important element for the transformation of the acquired resources into the development of products. In ICT services the firms paid a relative strong attention to the corporate culture in stimulating organizational development. The larger part of the researched firms in both sectors showed to be able to flexibly redesign the organizational structure when necessary.

The influence of the input-based capabilities showed to present in the fast-growth of the life sciences firms, and was only partly supported in ICT services. Both sectors show a large importance for the recruitment of skilled personnel. Acquirement of financial capital seems to be of a low influence on the successful growth of the firms in ICT services. A logical explanation for this finding seems to be the voluntary nature of the firms' entrepreneurial management team. Apparently the strategic vision, skills and ambition of the top management outperform the external factors in their search for resources for a fast-growing organization.

Fast-growing firms each develop their own unique combination of capabilities and show different critical growth factors. An important task for management is to create and acquire the right bundle of unique and valuable capabilities and resources. The empirical findings indicate that while the industrial sectors evolve - move up in the industry life cycle- the creation and refinement of capabilities is performed more homogenously. In his book on entrepreneurship Bhidé argued that heterogeneity naturally follows increases in the volume of a firm's business. As firms grow they add customers, employees, locations, and suppliers that are to some degree different. This study subscribes to the argument of the author that: "Longevity goes hand in hand with growth; and a firm's capacity for growth depends on the nature of its distinctive assets as well as its embedded coordination mechanisms" (Bhidé, 2000:233). Stages of exploration has to be alternated with stages of exploitation.

## 8.2 Methodological issues

In this final section, the methodological limitations of the research are presented, followed by the scientific and practical contribution of the research. The report is ended with suggestions for further research.

### *Limitations*

In this study a bold effort is made to combine the field for theory building on growth and capabilities for medium-sized firms. Central in this study is a conceptual framework based on the broad exploration of two theoretical fields and a focused choice of variables. It seems discussable whether the study has been able to find balance between

broadness and depth in combining the concepts. To come to a valid combination an effort is made to encompass the primal growth-determinants from a selection of seventeen studies on growth, in the light of the capabilities framework developed by Lado and Wilson (1994). In both the building of the framework and the empirical research, the elements of the variables are narrowly defined and not researched for their mutual influence. Despite this choice, interrelatedness of the variables is expected to occur but left out of the analysis for reasons of clarity.

In the field research the elements of the causal scheme showed to be usable and insightful aspects for growth. Based on the response of all interviewees, the topics covered the managerial and organizational processes of growth for these medium-sized firms. Furthermore there was a positive feedback on the used model by scientific experts. Nevertheless, it seems reasonable to believe that more elements could be put in the model and therefore the effort that is made in this research remains tentative. For this study the used elements are considered to be the 'most promising' for a better insight of growth processes.

A final important remark has to be made here that the outcomes of the study merely are a qualitative indication of the influence of capabilities on the growth of the ten firms. The period of analysis is rather short, and the number of firms that are studied, is comparatively small. These factors negatively influence the ability to generalise the results of this research to other cases in the two sectors.

#### *Scientific contribution*

This study has strived to contribute to the theoretical debate on the growth of firms and the role of firms' competencies in the expansion of activities.

With the theoretical analysis of literature of strategic management, organizational behaviour and the growth of the firm, an attempt is made to create a timely overview of streams that currently face an increasing interest. The theory development in this study is two-faced, on the one hand the field of theories on capabilities is examined, on the other hand an elaboration of different perspectives on growth is presented. In the conceptual framework an attempt is made to elaborate the emerging stream of dynamic capabilities and to link this notion with growth-determinants according the strategic entrepreneurship perspective.

A contribution is provided here by the discussion of this model with several researchers with specific expertise on the growth of the firm, supplemented by broader fields of expertise on entrepreneurial, innovative and strategic management. These analyses enabled substantiated proposals for making the elements of the model operational. The integrating effort enables further use of the concepts in empirical research on the relation of firm-specific capabilities and the growth of the firm.

Despite the fact that no valid predictions can be made on the relationship of capabilities and growth for other firms in the industries of ICT services or life sciences on basis of the multiple-case analysis, the results are still usable for the building of theory. In this regard is referred to Yin's (1994: 10) argument for using a multiple-case study: "Case studies, like experiments, are generalisable to their theoretical propositions and not to populations or universes ... the investors goal is to generalize theories".

#### *Practical contribution*

For the practical contribution the aim was to identify firm-specific capabilities that influence a successful growth process.

In this research ten interesting case examples are used of which six firms can be considered as best practice for fast growth in the ICT and life science industries. The other four companies have grown less strongly (or even shrink). The results of the analysis present dynamic processes for growing firms, which entrepreneurs, chief executives and members of top management teams need to be consciously and continuously aware of. Despite the idiosyncratic behaviour of organisations by using a unique combination of capabilities as strength for growth, generalisation seems possible to the strong combinations that are found. In this regard this report provides an ideal instrument for the benchmark of fast growth and capability development in the two sectors. However, this research is not a recipe for fast growth. By providing a broad description of the determinants that are required for strong growth, based on a thorough theoretical and practical investigation, merely the indication of necessary growth factors come forward here.

Furthermore, this research intended to show the relevance of specific capabilities for firm's growth processes and the usability of scientific research for medium-sized firms. In this regard the research has contributed to these firms by creating insight and hopefully awareness of the influence of particular firm capabilities on organizational growth.

### 8.3 Suggestions for further research

This study presents a broad analysis of issues on capabilities and growth, and their combinations. The tentative effort to integrate the theoretical concepts into a model for medium-sized firm growth has aimed for a better understanding of the issues, which play both in practical and theoretical field. The theoretical and practical areas of exploration seem to be in balance, however, within these areas there are still fields that need to be explored.

These suggestions for further research can generally be divided into four themes that are suggested to investigate in further research of this study.

#### I. Theories

The theoretical concepts of capabilities and growth in this study are described separately. In the discussion on these theories, no clear exploration is presented on the overlap between the perspectives (e.g. the resource based view). In this regard, in future research integrating efforts should be made on the mutual characteristics of the theoretical fields that showed to be supplementary in this research: dynamic capabilities and entrepreneurial theories.

#### II. Model

In this study choices have been made for integration. Using different or supplementary combinations of variables from the theories could result in a better fit for growth. At this point this remains unclear. The conceptual model can be further elaborated by providing theories on the direct influence of the environment of the firm's growth. Further development of the model should also incorporate the indirect relations of the variables' mutual influences.

#### III. Methodology

There is significant interest in the theories on the development of capabilities. However, in reality the topic is difficult to measure the distinctive processes within organizations. In this study an effort is made to measure processes of capabilities on basis of stories of respondents. In the future a further deepening of the methodology on process research (e.g. Pettigrew, 1992) is suggested. Complementation of secondary company information is found as very useful during the research. It enabled the usability of the single

case studies with a minimum of effort for the participating firms. For the reliability of facts in process measurement, the use of secondary information is recommended.

#### IV. Quantitative methods

After a further elaboration of the conceptual model of this study, in future research the model can be used for the investigation of growth for a larger sample of (medium-sized) firms. Contrary to the research strategy advocated in this study, the research design should entail a quantitative approach to provide stronger empirical evidence that can be generalized across (dynamic) industrial sectors, within and outside the Netherlands. After a further development and selection of the most appropriate statistics, the individual variables and relationships can be more thoroughly investigated on their influence and interrelatedness.

In sum, the themes propose that a replication and extension of the present study is appropriate. The first three themes enable the further development and validation of the conceptual model of this research. The last suggestion recommends a large-scale empirical field research.

This study aims to create better insight on the interrelatedness of growth and capabilities. Achieving a sustainable growth through firm-specific capabilities requires continuous monitoring by academics and the firms' strategic leaders, since capabilities patterns may change over time. The research themes show that the exploration in this study provides possibilities for further research. In this regard the need for a better understanding of the relationship between firm-specific capabilities and the growth of organizations remains challenging territory for researches to be explored.









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# Annex I

<b>Author(s)</b> <i>(year of publication)</i>	<b>Research</b>	<b>Dependent variable</b>	<b>External</b>	<b>Organizational</b>	<b>Determinant</b> <i>(influence on growth)<sup>1</sup></i>
Almus & Nerlinger (1999)	Empirical research on explanations and variations in growth of New Technology Based firms and non-innovative firm foundations in Germany	Growth of employees between 1989 – 1997.	Local characteristics [(+/-)] Wage and salary rates (-)	Age [(-)] Size [(-)] Liability [(-)] Networks [(+)] Diversification of products (+)	Technical and engineering skills [(+)] Individuality (-)
Beal (2000)	Study on environmental scanning and competitive strategy alignment through interviewing CEO's of 101 small manufacturing firms in the U.S.	Profitability - return on sales - return on investment - return on assets Growth - sales - profits Total amount of profits.	Environmental scanning [(+)] of: - Industry sales growth - Level of demand - Stage of development of products - Level of information diffusion - Plant capacity - Price level - Growth in distribution channels - Advertisement expenditures	Competitive strategy [(+)]: - Innovation - Market differentiation - Low Cost Leadership - Quality differentiation - Service differentiation	CEO characteristics (+)

<sup>1</sup> '+' Indicates a positive influence on the relationship.  
 '-' Indicates a negative influence on the relationship.  
 '+/-' Means that the relationship is not clear or depends on the form of the determinant (e.g. the specific sector of industry).  
 ( ) Indicates an expected relation on basis of theory.  
 [ ] Indicates a relation as a result of empirical research.

<b>Author(s)</b> <i>(year of publication)</i>	<b>Research</b>	<b>Dependent variable</b>	<b>External</b>	<b>Determinant</b> <i>Organizational</i>	<b>Managerial / Entrepreneurial</b>
Bal/jé (1998)	Study on internal growth factors of 276 (fast) growing companies in the Netherlands by using questionnaires	Growth of sales (on Birch index)	None	Competitive strategy [(+)] Innovation [(+)] Networks and cooperation (+) Organizational structure [(+/-)] Human resource management [(+)] Export (+)	Ownership of founder [(+)] Education [(+)] Team integration [(+)] Financial management [(+/-)] Knowledge management [(+)]
Baum, Locke and Smith (2001)	Empirical research on venture growth with interviews CEO's and employees of 307 U.S. companies from the Architectural woodworking industry	Growth of: - annual sales - employees - profit between 1992-1994	Environment - Dynamism [(-)] - Munificence [(+)] - Complexity (-)	Competitive strategy [(+/-)] - Focus - Low Cost - Differentiation Size (-)	Traits [(+)]: - Tenancy, - Pro-activity - Passion Individual competences [(+)] - Organizational skills - Opportunity recognition - Industry skills - Technical skills Motivation [(+)] - Vision - Growth goals - Self efficacy
Chandler and Hanks (1994)	Study on variables that influence venture performance with sample of 155 medium-sized manufacturing firms in the U.S.	Growth: - market share - cash flow - sales Business volume: - sales - earnings - net worth between 1980 and 1991.	Market attractiveness [(+)]	Resource-based capabilities [(+)] Competitive strategy (+) Fit of strategy and resources (+)	None

Author(s) (year of publication)	Research	Dependent variable	External	Determinant Organizational	Managerial / Entrepreneurial
Covin and Slevin (1997)	Study on analytical framework for Total Competitiveness of Firms, supported by data collection of 194 U.S. high growth new ventures	Growth of sales and profit between 1994-1997	None	<ul style="list-style-type: none"> <li>Strategy/direction [+]</li> <li>Human resource policies [+]</li> <li>Intra-business Unit</li> <li>Communications [+]</li> <li>Total Quality Management [+]</li> <li>Product/ service Development and Improvement [+]</li> <li>Marketing and Sales [+]</li> <li>Vendor relationships [+]</li> <li>Process improvements [+]</li> <li>Participative management [+]</li> <li>Organization structure [+]</li> <li>Business unit culture [+]</li> <li>Internal competition [+]</li> </ul>	<ul style="list-style-type: none"> <li>Complexity management [+]</li> <li>Transition sensing [+]</li> <li>Transition managing [+]</li> </ul>
Davidsson (1991)	Study on the ability, need and opportunity as determinants of the growth of small businesses (continued entrepreneurship), with empirical research on manufacturing and retail firms in Sweden.	Growth of employees and sales between 1984-1986	<ul style="list-style-type: none"> <li>Influence on opportunity:</li> <li>- Concentration in industry [(+)]</li> <li>- Market growth [(+)]</li> <li>- Rate of product innovation [(+)]</li> <li>- Favorable local characteristics [(+)]</li> <li>- Market dispersion (+)</li> <li>- Customer concentration (+)</li> </ul>	<ul style="list-style-type: none"> <li>Influence on need:</li> <li>- Size [-]</li> <li>- Age [-]</li> </ul>	<ul style="list-style-type: none"> <li>Ability</li> <li>- Education [(+)]</li> <li>- Experience [(+)]</li> <li>Need</li> <li>- Age/maturity [(-)]</li> </ul>

<b>Author(s)</b> <i>(year of publication)</i>	<b>Research</b>	<b>Dependent variable</b>	<b>External</b>	<b>Determinant Organizational</b>	<b>Managerial / Entrepreneurial</b>
<i>Lau and Busewitz (2001)</i>	Empirical research on entrepreneurial growth intentions with sample of 2878 Chinese small private business owners.	Intentions of business owners in 1991 on: - Expanding business - Remaining unchanged - Downsizing/closing - Cooperation state-owned firms - Cooperation foreign firms	Difficulty in market conditions (-) - Borrowing - Operational facilities - Competition - Policy change - Labor	Resource constraints (-) - Finance - Marketing skills - Technical skills	Commitment [(+)] Need for achievement [(+)] Demographic factors: - Age (+/-) - Education (+) - Gender (+/-) Social environment (+) Cognitive understanding of environment [(+)]
<i>Lee, Lee, Pennings (2001)</i>	Empirical study on internal capabilities, external network and performance of 137 Korean technological start-up companies	Growth of sales between 1996-1998	None	Technological capabilities [(+)] - Number of patents - Quality control Financial resources [(+)] External networks (+) - Partnerships (e.g. other firms, venture capitalists, universities) Sponsorship (commercial banks, government) None	Orientation [(+)] - Innovativeness - Risk taking - Pro-activeness
<i>Lumpkin and Dess (2001)</i>	Study on entrepreneurial orientation with factor analysis of 52 U.S. firms from different industries.	- Sales growth - Profitability - Financial strength - Overall performance	None	None	Pro-activeness [(+)] Competitive aggressiveness [(+/-)]
<i>Man, Lau and Chan (2002)</i>	Theoretical study on the competitiveness of SMEs with focus on entrepreneurial competencies	Long term competitiveness dimensions: - Potential - Performance (growth) - Process	None	Competitive scope (+) Organizational capabilities (+) Performance	Opportunity competencies (+) Relationship competencies (+) Conceptual competencies (+) Organizing competencies (+) Strategic competencies (+) Commitment competencies (+)

Author(s) (year of publication)	Research	Dependent variable		Determinant	
		External	Organizational	Managerial / Entrepreneurial	
Pelham (1999)	Research on performance indicators of 160 small manufacturing firms in the U.S.	Marketing/ Sales Effectiveness	Industry growth [(+/-)]	Market orientation [(+)]	None
	commodity and specialty segments	Growth /Share Profitability	Market concentration [(+/-)] Value added / employee [(+/-)] Market segment [(+/-)]	Customer orientation [(+)] Competitive orientation [(+)] Strategy [(+/-)]	
Rangome (1999)	A resource based view on competitive advantage and strategy analysis, supported by an empirical research based on 14 case studies of Italian SMEs in different industries.	Criticality of resources: - Competitive superiority	None	Innovation capabilities [(+)] Production capabilities [(+)] Market management capabilities [(+)]	None
		Imitability Durability Appropriability Substitutability			
Roper (1999)	Study of a group of Irish small businesses on the relation of performance with market position and ownership characteristics.	Growth - real sales - return on assets - assets to turnover between 1993 –1994	High capital requirement [+] Customer power [-] Material shortages [-]	Sales target [+] Quality certification [-] Partnership [-]	Education [+] Large firm experience [+] Ownership [-] Power sharing [-]
Uhlaler-Hendrickson and Psarouthakis (2001)	A strategic approach to dynamic management of growing firms. An academic book on organizational growth and profitability, focused on mid-sized companies supported by data analysis and multiple case studies of almost 200 U.S. firms.	Growth of sales between 1982-1987	None	Manage effectively: Market strategy [(+)] Work flow [(+)] Resource acquisition [(+)] Human relations [(+)] Resource allocation [(+)] Public relations [(+)] Technical mastery [(+)] Financial viability [(+)]	Visionary [(+)] Initiator and Manager of the eight organizational issues [(+)] Open to change [(+)]

Author(s) (year of publication)	Research	Dependent variable	External	Determinant Organizational	Determinant Managerial / Entrepreneurial
Wijewardena and Cooray (1995)	Study on determinants of growth with sample of 300 small Japanese manufacturing firms	Growth of sales (at constant prices) between 1981–1991	Type of industry (+/-) Severity of market competition (-)	Size [(+)] Age (+/-) Advertisement & sales expenditures (+) Research & development expenditures (+) Capital intensity (+) Export orientation [(+)] Skilled workers [(+)]	None
Wiklund (2000)	Longitudinal research on the role of Entrepreneurial Orientation as predictor of performance and entrepreneurial behavior of small Swedish firms in the manufacturing, service and retail industries.	- Growth of sales and employees - Sales growth compared to competitors and growth between 1996-1997. - Market value	Environment dynamism [+] Capital availability [+] Type of industry [-/+]	Firm size [+] Firm age [-]	Entrepreneurial orientation [+] - Proactiveness - Innovation - Risk taking - Autonomy - Competitive aggressiveness



