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ABSTRACT

Many firms experience abrupt or continuous changes in their business environment. Searching for opportunities to renew its operations can be critical to a firm's successful performance in such circumstances. The constructs of entrepreneurial orientation (EO) and dynamic capabilities (DC) have separately received substantial attention in scholarly work on opportunities and firm performance. There is a lack of research, however, on both EO and DC as a part of a framework that includes circumstances, actions and consequences, and how the two constructs possibly relate to one another.

The dissertation addresses these gaps by examining the role of entrepreneurial orientation and dynamic capabilities in firm performance. It especially seeks answers to what different ways exist for a renewal of a firm to improve its performance, what alternative roles EO and DC may have in firm performance and what empirical support these roles receive. The study applies two theoretical lenses: evolutionary and resource-based views of the firm. It adopts from the evolutionary view the concept of search routine and from the resource-based view the valuable, rare, inimitable and nonsubstitutable (VRIN)-qualities of resources. A cross-sectional survey was utilized as a data collection method in the empirical analysis. The data comprised 495 firms from the food industry, media sector and marine cluster in Finland. The structural equation modeling method was applied for the data analysis.

The existing research on opportunities can be categorized into four search types: optimizing, positioning, disruption and accumulation. Each search type involves specific internal and external conditions, actions and consequences and fit between these elements. The study highlights the importance of firm-controlled resources in successful firm performance. A firm arguably needs to possess either VRIN search resources or VRIN ordinary resources or both to possibly improve its performance. The study contributes to strengthening the theory base for entrepreneurial orientation and dynamic capabilities. It adds to the scholarly research by suggesting that EO and DC are closely related constructs that can be defined to be related to any of the four search types. Depending on how the property type of the construct is defined, EO and DC describe actions of search; alternatively, EO represents search preferences and DC represents search abilities. If actions and resources are considered to be intertwined, EO and DC form together a firm's search routine, which can have a positive association with firm performance. The study takes the stance that there need not be a single,

once-for-all definition for either EO or DC but this requires that a researcher be explicit about the selected conceptualization and its theoretical underpinnings, and then operationalize it accordingly.

Keywords: entrepreneurial orientation, dynamic capabilities, firm performance, search, opportunities

TIIVISTELMÄ

Monet yritykset kokevat äkillisiä tai jatkuvia muutoksia toimintaympäristössään. Uudistumismahdollisuuksien etsiminen voi olla kriittistä yrityksen menestymiselle tällaisissa olosuhteissa. Yrittäjämäisen orientaation ja dynaamisten kyvykkyyksien merkitystä yritysten suorituksessa on tutkittu erikseen jo pitkään. Tutkimuksissa ei ole kuitenkaan kiinnitetty riittävästi huomiota yrittäjämäiseen orientaatioon ja dynaamisiin kyvykkyyksiin osana liiketoiminnan uudistamisen olosuhteiden, toimien ja seurauksien kokonaisuutta. Yrittäjämäisen orientaation ja dynaamisten kyvykkyyksien mahdollisesta yhteydestä toisiinsa ei ole myöskään kattavaa tutkimustietoa.

Tämä väitöskirja käsittelee näitä puutteita tarkastelemalla yrittäjämäisen orientaation ja dynaamisten kyvykkyyksien roolia yrityksen suorituksessa. Erityisesti etsitään vastauksia siihen, millä tavoin yritykset voivat uudistaa toimintaansa parantaakseen suoritustaan, minkälaisia vaihtoehtoisia tehtäviä yrittäjämäisellä orientaatiolla ja dynaamisilla kyvykkyyksillä voi olla tässä ja millaista empiiristä tukea eri vaihtoehdot saavat. Tämä tutkimus hyödyntää evolutionaarista ja resurssiperustaista lähestymistapaa. Evolutionaarisesta näkökulmasta omaksutaan erityisesti etsintärutiinin käsite ja resurssiperustaisesta ajattelusta resurssien arvoa, harvinaisuutta, vaikeaa imitoitavuutta ja vaikeaa korvattavuutta kuvaavat niin kutsutut VRIN-ominaisuudet (valuable, rare, inimitable, nonsubstitutable). Tutkimuksessa käytettiin kyselyyn perustuvaa poikkileikkausaineistoa, joka koostui yhteensä 495 yrityksestä elintarvike- ja mediasektoreilta sekä meriteollisuudesta Suomesta. Aineisto analysoitiin rakenneyhtälömallinnuksella.

Uudistumista käsittelevästä kirjallisuudesta erottuu neljä tapaa etsiä uusia mahdollisuuksia: optimointi, asemointi, murros ja kumuloituminen. Jokaiseen etsintätapaan liittyy erityisiä sisäisiä ja ulkoisia olosuhteita, toimintoja ja seurauksia sekä niiden välisiä yhteyksiä. Tämä tutkimus korostaa yrityksen resurssien merkitystä menestymisessä. Yritys tarvitsee niin kutsuttuja VRIN-ominaisuuksia sisältäviä etsintä- tai operatiivisia resursseja tai molempia parantaakseen mahdollisesti suoritustaan. Tutkimus vahvistaa yrittäjämäisen orientaation ja dynaamisten kyvykkyyksien teoriaperustaa. Yrittäjämäinen orientaatio ja dynaamiset kyvykkyydet ovat läheisesti toisiinsa liittyviä käsitteitä, jotka voivat määrittelystä riippuen liittyä mihin tahansa neljästä etsintätyypistä. Ne voivat kuvata uusien mahdollisuuksien etsimisen toimia, tai vaihtoehtoisesti yrittäjämäinen orientaatio tarkoittaa etsinnän preferenssejä ja dynaamiset kyvykkyydet etsinnän taitoja. Jos toimien ja resurssien ajatellaan olevan toisiinsa kietoutuneita,

yrittäjämäinen orientaatio ja dynaamiset kyvykkyydet muodostavat yhdessä uusien mahdollisuuksien etsintärutiinin, jolla voi olla positiivinen yhteys yrityksen suoritukseen. Yrittäjämäiselle orientaatiolle tai dynaamisille kyvykkyyksille ei tarvita yhtä, yleistä määritelmää, kunhan tutkija tunnistaa eri määritelmien taustalla olevat teoreettiset olettamukset ja kykenee valitsemaan niistä kuhunkin tutkimustilanteeseen sopivan.

Avainsanat: yrittäjämäinen orientaatio, dynaamiset kyvykkyydet, yrityksen suoritus, etsintä, mahdollisuudet

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Turku, March 2018

Tommi Pukkinen

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1 INTRODUCTION

1.1 Understanding firm performance

Many firms experience abrupt or continuous changes in their business environment, and at varying speeds. New competitors enter the market, and technological, economic, social and political changes shape the landscape. As a result, a firm's resources, products and services may not be unique for long and may lose their significance as competitive means. Searching for opportunities to renew its operations can be critical to a firm's successful performance in such circumstances.

No single approach is available for identifying individual factors and their relationships that are associated with firm performance. The factors are generally classified into organizational and environmental characteristics, actions and consequences (Venkatraman & Camillus 1984). Each of the categories encompasses a large number of constituents. One or more of them have been examined, including intangible resources (e.g., values, capabilities and structure), tangible resources (e.g., equipment, money and location), actions (e.g., strategy content and formation) and market environment (e.g., dynamism and hostility) (Baum et al. 2001; Chrisman et al. 1998).

Three broad and overlapping lines of research can be recognized that deal with the various relationships between the factors. An intrafirm view focuses on firms' internal characteristics as well as their relative strength and weakness regarding firm performance (Hoskisson et al. 1999). One of the most influential contributions to this field has been made by resource-based approaches (Penrose 1959; Wernerfelt 1984; Barney 1991), which have been contemplating how to put together under one theoretical umbrella all the firm's resources that may or may not affect its performance. The research has concentrated in the market-based view more on what happens outside the boundaries of the firm in its environment (Hoskisson et al. 1999). This approach has been dominated by industrial organization economics. Influential streams have been the Bain/Mason paradigm, in which the external market conditions, particularly market share, are seen to dictate the conduct of the firm, and the Porterian view, according to which competitive forces affect firm behavior but room still exists for organization-level decision making (Hoskisson et al. 1999; Porter 1981). The evolutionary view represents a research tradition that has focused on the dynamic relationship between intrafirm characteristics and market conditions. This approach is critical to

the assumptions of static industry equilibrium and interprets firms and markets to be under constant change (Schumpeter 1934 & 1947; Nelson & Winter 1982a). Firms respond to changing market conditions by renewing their operations over time through purposeful or blind actions (Aldrich & Ruef 2006; Winter 2003). Firms' renewal can catalyze or even initiate market change (Schumpeter 1934 & 1947).

Research on opportunities has a strong foothold within all three approaches. The process of opportunity search has been defined as consisting of desires, abilities, environmental conditions, actions and effects (Stevenson & Jarillo 1990; Stevenson & Jarrillo-Mossi 1986). These are related to the why, how and what questions in the research on pursuit of opportunities (Shane & Venkataraman 2000). Different approaches vary in their interpretations of the actions firms can take to change their present operations, for example, whether changes are based on strict planning or whether room exists for surprises (see, e.g., Sarasvathy 2001), and whether it is the volume or the type of output that changes (see, e.g., Teece et al., 1997). Firm-controlled resources is a topic common to all the three approaches to firm performance. They have been discussed from different perspectives, either as sources of opportunities (e.g., Barney 1991) or as forces of change (e.g., Schumpeter 1934). The different views of opportunities deserve a closer examination.

The constructs of entrepreneurial orientation (EO) and dynamic capabilities (DC) have gained substantial attention in research on firm renewal and performance, especially related to opportunities. Renewal is considered as a vital and central part of entrepreneurially oriented firms' prosperity (Covin & Slevin 1989). Customer tastes, technologies, and competitive weapons often change unpredictably in dynamic environments, and entrepreneurially oriented firms try to meet and exploit these challenges (Miller 1983). Entrepreneurial orientation can be described as a firm-level phenomenon evidenced by dynamic generative processes, practices and decision-making activities (Lumpkin & Dess 1996). Entrepreneurially oriented firms can, for example, engage in product-market innovation, undertake somewhat risky ventures and be first to come up with new innovations (Miller 1983; Covin & Slevin 1989). Studies have reported significant positive effects of entrepreneurial orientation on firm performance (Rauch et al. 2009). Previous research suggests that more emphasis should be given to continued development of a more comprehensive theory of entrepreneurial orientation (Lumpkin et al. 2009). Relatedly, there is a need for richer and more fine-grained conceptualizations of the various dimensions of EO (Lumpkin & Dess 2001). More research is called also for to examine the effects of entrepreneurial orientation on organizational outcomes in various contexts (Lumpkin et al. 2009; Rauch et al. 2009).

The study of dynamic capabilities is another vivid research area on firm performance through organizational renewal. Dynamic capabilities are seen as processes and routines that help firms to respond to changing market conditions by exploring new ways of doing things (Eisenhardt & Martin 2000; Teece et al. 1997). Dynamic capabilities on the demand side include the ability to create new products to achieve congruence with rapidly changing market environments, for example (Teece & Pisano 1994). Dynamic capabilities on the resource side include firms' ability to alter their existing substantive capabilities (Helfat et al. 2007). A firm's dynamic capabilities have been suggested to comprise, for example, observation and evaluation of external environment and acquisition, reconfiguration and renewal of resources (Alsos et al. 2008). Previous research indicates that further examination of dynamic capabilities is needed as part of a framework that also includes their antecedents and consequences (Wang & Ahmed 2007). Generally, more attention should be paid to the external and internal circumstances that may foster or hinder the benefits of dynamic capabilities to firm performance (Barreto 2010). There is a call for empirical, especially quantitative, research to validate the dimensionality of the construct and of the mechanisms and the conditions of dynamic capabilities that may lead to superior performance (Wang & Ahmed 2007).

Research that focuses simultaneously on entrepreneurial orientation and dynamic capabilities has been rather scarce, although they have been extensively studied separately. It also gives a scattered picture of the two constructs' possible relationship, suggesting at least three interpretations. Entrepreneurial orientation and dynamic capabilities could independently affect firms' performance (Jantunen et al. 2005). Conversely, entrepreneurial orientation could be an organizational mindset that influences the development of a firm's dynamic capabilities (Jiao et al 2010; Weerawardena et al. 2007). Another line of investigation considers dynamic capabilities as a prerequisite for a firm's entrepreneurially oriented strategy (Wiklund et al. 2009). These various interpretations suggest that the two constructs are potentially closely related, but further research is warranted to clarify their relationship. Research on entrepreneurial orientation is criticized for having a normative assumption of value and an automatic connection with better firm performance, as well as for neglecting the firm's external and internal conditions (Lumpkin & Dess 1996; Covin & Slevin 1991). Similarly, dynamic capabilities can potentially improve firm performance (Teece et al., 1994; 1997), but their influence depends on how well dynamic capabilities are aligned with a firm's internal and external environments (Winter 2003; Helfat et al., 2007; Barreto 2010). It is, therefore, of the utmost importance to analyze further the connection between entrepreneurial orientation and dynamic capabilities and their impact of firm performance.

The underlying pre-assumption behind both entrepreneurial orientation and dynamic capabilities is that firms need to renew themselves to be successful in changing markets. Entrepreneurial orientation (Lumpkin & Dess 1996; Covin & Slevin 1989; Miller 1983) and dynamic capabilities (Teece et al. 1997; Helfat et al. 2007) are both related to changing market environments, emergence of business opportunities, changes in firms and firm performance. These shared underpinnings open up insights into a common theory base for the two constructs and to examination of their relationship, which is the target of this study.

1.2 Research objective

This study's objective is to examine the role of entrepreneurial orientation (EO) and dynamic capabilities (DC) in firm performance. For this the following three research questions are set:

- What different ways are there for a purposeful renewal of a firm to improve its performance?
- What alternative roles may entrepreneurial orientation and dynamic capabilities have in firm performance from the perspective of firm renewal?
- What empirical support do the possible alternative roles of entrepreneurial orientation and dynamic capabilities in firm performance receive?

Scholarly research on entrepreneurial orientation and dynamic capabilities represents two traditions that have been developing largely independently. This study aims to contribute to the field of joined research on entrepreneurial orientation and dynamic capabilities by furthering the development of a common theoretical basis for them and by conducting related empirical analysis. Specifically, the study aims at making three contributions to the research. First, it takes stock of various theoretical views on purposeful firm renewal utilizing the concept of opportunity search. Second, it positions entrepreneurial orientation and dynamic capabilities relative to the different views on opportunity search. Third, it provides empirical evidence of the relationship between entrepreneurial orientation and dynamic capabilities in firm performance.

1.3 Outline of the study

The study proceeds as follows. The first chapter has already introduced the study's topic and objective. The second chapter draws on the scholarly research

on opportunity search to address the research question about various ways for a firm to try to improve its performance through purposeful renewal of its operations. The third chapter investigates different conceptual definitions of entrepreneurial orientation and dynamic capabilities in research literature and then positions the constructs to the framework of different ways of search that were identified in the previous chapter. The chapter ends with a conceptual specification of competing models of fit between entrepreneurial orientation, dynamic capabilities, market environment and performance of a firm. The chapter aims by this to answer the research question about possible alternative roles of entrepreneurial orientation and dynamic capabilities in firm performance. The fourth chapter presents the methods for testing empirically the competing models of fit, including operationalization of constructs, study design and sampling, data description and assessment, as well as the chosen analytical tools. The fifth chapter goes through the analysis and its findings to answer the research question about what empirical support alternative roles of entrepreneurial orientation and dynamic capabilities in firm performance receive. The sixth chapter concludes the study by answering the research questions, discussing the study's theoretical contributions and by providing suggestions for future research.

2 FIRM PERFORMANCE

2.1 Examination of firm performance

The study examines firm performance as organizational renewal, defined here to mean any forward-looking change a firm makes to its present operations. The focus is on organizational renewal through opportunity search, which is a firm's purposeful attempt to form alternatives to its present operations for making a profit. Thus, opportunity search is a means of organizational renewal. Concurrent terms of opportunity search in this study are also organizational search and, simply, search. Next, each of the key pieces of the definition of opportunity search is discussed separately.

A *firm* in this study is equivalent to an organization, which is defined as a coalition of individuals (see Cyert & March 1963) working together to combine resources profitably (see Penrose 1959). A firm is the unit of analysis, which means that the focus is on its characteristics and actions in the market, not on the interests and behaviors of various individuals or subunits and bargaining between them inside the firm[1]. The term firm is used interchangeably in both singular and plural forms in the study. Opportunity search is *purposeful* when firms actively try to generate new alternatives. Purposeful search is opposite to blind variation and, in practice, firm renewal is often a combination of the two (Aldrich & Ruef 2006; Nelson & Winter 1982a). Various degrees of purposefulness are present in planned and emergent forms of search, as will be discussed later on. An attempt suggests that search involves actions that may or may not result in alternative operations and, furthermore, that the consequences of alternative operations may or may not be profitable. *Forming* of alternatives captures two schools of thought: the one according to which objectively existing alternatives are discovered and the other that sees that opportunities are subjective and created by the firm (see e.g., Alvarez & Barney 2007).

[1] Many of the theories (e.g., Schumpeter 1934, Kirzner 1973, Casson 1982, Shane 2003) referred to in this study examine opportunity search primarily as an individual-level phenomenon. This study follows Stevenson and Jarillo's (1990) view, according to which opportunity search as a behavior can as well be examined at both the individual and firm levels, since firms are viewed as collections of individuals. Consequently, it is assumed that the aforementioned theories are applicable to both the individual and firm levels. Furthermore, firms are described in this study as singular subjects and are referred to with such words as "it" or "they", although it is recognized that it is the individuals and the groups inside the firm that eventually take the actions (see Stevenson & Jarillo 1990; Shane & Venkataraman 2000).

Present operations of a firm refer to the current combinations of resources, that is, the existing ends-means framework. Specifically, they consist of the current goods (products or services), production (including administration and delivery), volume (amount of output) and market (customers, suppliers and location) of the firm (see Winter 2003). *Alternatives* refer to different ways of doing things from the current ones. Alternatives are closely related to opportunities. Oxford English Dictionary defines an opportunity as "A time, juncture, or condition of things favorable to an end or purpose, or admitting of something being done or effected" (Sarasvathy et al., 2003, 142). Following this, an opportunity refers in the context of a firm to some possibly profitable exchange in the future (Kirzner 1973; Casson 1982; Stevenson & Jarillo 1990). Depending on the theoretical approach, an alternative becomes an opportunity when a firm calculates (Hey 1981; see also Simon 1959), notices or discovers (Kirzner 1973), estimates (Knight 1921; Schumpeter 1934), judges (Penrose 1959) or imagines (Sarasvathy 2001; see also Schumpeter 1934) a beneficial exchange for profit in it.

The use of the concept of opportunity has recently been criticized. It has been pointed out that an opportunity has been defined in a vast number of ways or has not been defined at all. It is also considered to fit poorly to the discussion of discovering objective or creating subjective opportunities and is arguably directing attention away from action. (Kitching & Rouse 2017; Davidsson 2016.) An opportunity is also considered problematic in theory building and testing due to its inevitable connotation of favorability (Davidsson 2016). A theory should capture inaction and failure, but opportunity as a favorable situation cannot contribute to negative performance. Consequently, it has even been suggested that the concept of opportunity could be excluded from the vocabulary and instead discuss, for example, about identification of new venture ideas (Davidsson 2016), imagining new business ideas, creating new ventures or combining resources to create new goods and services (Kitching & Rouse 2017). This study takes note of the debate and defines an opportunity as an alternative to the present operations of a firm to try to make profit. Opportunities and alternatives are applied in the text interchangeably.

Profit is defined as an economic profit, which is the difference between a firm's revenues, accounting costs and opportunity costs (Baumol & Blinder 2007). A firm earns normal profit when the economic profit is zero[2], supranormal profit when it is positive and economic loss when it is negative. A firm may have various goals, for example an increase in market share, but profit can be seen as a generalized end goal (see Penrose 1959; Casson 1982; Sarasvathy 2001). How

[2] In the case of zero economic profit, a firm earns accounting profit, when the revenues exceed the accounting costs.

much profit a firm aims to gain is not determined, but it is left open for discussion from various theoretical perspectives in the study.

2.2 Theoretical underpinnings

Research on firm performance from the perspective of firm renewal, specifically opportunity search, is found in the fields of entrepreneurship, strategic management, organizational behavior and economics. This study views and discusses various perspectives to gain a diverse understanding of the phenomenon.

2.2.1 Various search behaviors

Research on opportunity search contains two separate directions. One stems from economic and entrepreneurship theoretic perspectives and derives its logic from the movements of markets (see e.g., Schumpeter 1934; Kirzner 1973). The other direction of search follows organizational and strategic management perspectives; its logic is based on the development of firms (see e.g., Cyert & March 1963). The present study integrates the two areas of research and identifies four types of opportunity search: optimizing, positioning, disruption and accumulation.

Optimizing search describes firms as neoclassical allocators of resources in (near) perfect equilibrium. This search has many names, including optimum or optimal search (Stigler 1961; Rothschild 1974; Weitzman 1979; Hey 1982), rational search (March 1991), cost-conscious search (Kirzner 1973), or allocative process (Sarasvathy et al., 2003; Buchanan & Vanberg 1991). It is identified as optimizing search from here on. Positioning search identifies firms as constrainers of output or pickers of resources in imperfect equilibrium. Positioning is rooted in the industry- and resource-based tradition, which emphasizes static external conditions (see Zajac et al., 2000). Market positioning (Teece et al., 1997), that is, monopolizing, includes several theoretical approaches, such as Bain-type industrial organization (Conner 1991), industry analysis of competitive forces (Porter 1980), strategic conflict (Shapiro 1989), rent-seeking behavior (Tullock 1967; Tollison 1982; Posner 1975) and, with some controversy[3], the output restraining (market power) aspect of the resource-based view (Peteraf 1993; Barney 1991; Grant 1991). Resource positioning, that is, asset positioning (Dierickx & Cool

[3] Some authors consider both market-positioning and resource-positioning to be rooted on resource-based view (e.g. Peteraf 1993; Barney 1991; Grant 1991), while others see them to represent different paradigms (e.g. Teece et al. 1997).

1989) or resource picking (Makadok 2001), is based on the Ricardian aspect of the resource-based view (Peteraf 1993; Wernerfelt 1984; Barney 1991; Amit & Schoemaker 1993).

Disruptive search as a behavior depicts firms as introducers of untried combinations of resources in disequilibrating markets. The origins of disruptive search are found in Schumpeter's (1934 & 1942) work.[4] This form of search has been identified in the literature with many names, including entrepreneurial activity or function (Schumpeter 1934), creative destruction (Schumpeter 1942), creative response (Schumpeter 1947), revolutionary change (Tushman & O'Reilly 1996), discontinuous change (Romanelli & Tushman 1994), radical change (Abernathy & Clark 1985; Benner & Tushman 2003). Similarly, it has been identified as research (Nelson & Winter 1978), science-based search (Nelson & Winter 1982b), innovation (Schumpeter 1947), innovation search (Levinthal & March 1981), disruptive innovation (Kirzner 1999), destructive innovation (Abernathy & Clark 1985), exploratory innovation (Jansen et al., 2006) and exploration[5] as an innovation strategy (Fauchart & Keilbach 2009). It has also been recognized as distant search and slack innovation (Cyert & March 1963) or strong form of search (Venkataraman 1997). This study identifies this type of behavior of firms as disruptive search.

Accumulative search portrays firms as introducers of unnoticed resource combinations in equilibrating markets. Accumulative search is grounded on the work of Kirzner (1973)[6], who builds his theory on the ideas of Hayek (1945) and especially those of von Mises (1952). Accumulative search has been identified in the literature with such names as entrepreneurial alertness, entrepreneurial discovery and arbitrage (Kirzner 1973; see also Hayek 1945), imitative activity (Kirzner 1973), imitation (Nelson & Winter 1982b), imitative innovation (Huang et al., 2010) and coordinative innovation (Kirzner 1999). It has also been investigated as passive search (Ardichvili et al., 2003), local search (Cyert & March 1963), cumulative search (Nelson & Winter 1982b), creative accumulation (Malerba & Orsenigo 1996), weak form of search (Venkataraman 1997) and evolutionary change (Tushman & O'Reilly 1996). Similarly, this type of opportunity search

[4] Schumpeter's research is interpreted here in such a way that disruptive search is not imitative (see Kirzner 1973) and does not include the discovery of new sources of given market-controlled resources (see Shane 2000; Eckhard & Shane 2003). If it is believed that Schumpeter's original work actually includes also some of these behaviors, then disruptive search as presented here describes a specific part of Schumpeter's theory.

[5] March (1991) described exploration and exploitation essentially as a trade-off between collecting more information and utilizing current information. A special case of this is a trade-off between minor and major innovations.

[6] The focus of this study is on the part of Kirzner's theorizing in which he broadens the Schumpeterian view. Kirzner makes an effort to explicitly differentiate his approach from that of Schumpeter in his 1973 work. Overall, his work (1973, 1999) is integrative in nature: He extends Schumpeter's theory and eventually describes how his own view also absorbs the Schumpeterian view.

has been identified as refinement search (Levinthal & March 1981), refinement and imitation (Levinthal & March 1993), incrementalism (Levitt & March 1988), incremental innovation (Abernathy & Clark 1985; Benner & Tushman 2003), regular or conservative innovation (Abernathy & Clark 1985), routine innovation (Knight 1967), exploitative innovation (Jansen et al., 2006) and exploitation as an innovation strategy (Fauchart & Keilbach 2009). This type of firm behavior is identified as accumulative search from here on.

Organizational development-based approaches focus on the forms (i.e., logics, methods, approaches, sequences, modes) of search. They open up a firm's "black-box" and attention is focused on how search is conducted (see Cyert & March 1963, 17). Two dominant approaches have been recognized with different labels, depending on the scholarly field. These include such categorizations as causation and effectuation (Sarasvathy 2001), discovery and creation (Alvarez & Barney 2007; Nelson & Winter 1982a), as well as discovery and entrepreneurial bricolage (Baker & Nelson 2005), planning and improvisation (Moorman & Miner 1998; Weick 1998), problemistic search and slack search (Cyert & March 1963), anticipating and probing (Brown & Eisenhardt 1997), planned and emergent change (Burnes 1996; Bamford & Forrester 2003; Grieves 2010), deliberate and emergent change (Mintzberg & Waters 1985; Hax & Majluf 1988), and deliberate and situated change (Orlikowski 1996). The two approaches are identified from here on as planned and emergent[7] forms of search[8].

The planned approach follows a sequence of intentions and implementations (Weick 1998). It makes a sharp distinction between choosing and doing, that is, between making and implementing choices (Nelson & Winter 1982a; Bullock & Batten 1985; Cyert & March 1963). A plan is first composed and then executed (Moorman & Miner 1998). Numerous phase models of planned change (for a review, see for example Bullock & Batten 1985) have been identified. Often cited is the Lewinian 3-step model, which proceeds from unfreezing to moving to refreezing (Burnes 2004; Weick & Quinn 1999). Planned change is ordered, rational and linear (Burnes 2004). Firms set goals, estimate expected returns and scan and choose among alternative behaviors to achieve their goals (Cyert & March 1963). A firm may eventually commit to searching randomly (Knight 1967) if the planned search is unsuccessful, which is, in a way, an extreme form

[7] Researchers do not necessarily consider, for example, bricolage and improvisation as identical concepts, but they interpret them to be closely related (Miner et al., 2001). Similarly, research on effectuation and entrepreneurial bricolage has highlighted some fundamental similarities and common behavioral dimensions between the two approaches (Fisher 2012), suggesting that they are essentially two views of the same organizational behavior.

[8] Some researchers have suggested that the term "search" has little or no meaning in this kind of exploration of ways to produce new products or services, because firms are not trying to discover opportunities that readily exist (objectively) in the environment (Alvarez & Barney 2007). However, "search" is used in this study in a broader sense, referring to firms' all purposeful efforts to change their operations.

of planned search, when a firm intentionally takes indiscriminate actions to renew its operations.

Consequently, in planned search a firm first identifies a problem, generates and chooses new solutions based on expected consequences (unfreezing), implements a solution and gathers feedback (moving) and finally adapts its fixed criteria (refreezing) (Cyert & March 1963; Sarasvathy 2001; Levinthal & March 1993; Teece et al., 1997; Bullock & Batten 1985; March 1981). The core mechanism in planned approach is imprinting, wherein the historical and social contexts affect what can be perceived and delimit the alternatives available to the actors (Suddaby et al., 2015). Firms follow a top-down approach, wherein the external context predetermines the firms' actions (Welter 2011). They select first the specific end and then acquire the required means from any possible sources also outside the firm to implement the change (Sarasvathy 2001). The top-down approach also refers to an organizational hierarchy in which management designs and implements the plans (Burnes 1996). Search is based on fixed rules that change over time as firms learn from their experiences (Cyert & March 1963). Firms try to anticipate the future conditions in the market in the long-run, including the effects of their own actions (Knight 1921).

Emergent search describes organizational experimenting (Moorman & Miner 1998). It does not follow the linear logic of planned search but is not irrational (Sarasvathy 2001), accidental (Miner et al., 2001) or random, either (Weick 1993). Rather, it takes a holistic (Burnes 2004) and reciprocal (Orlikowski 1996) view of change, where search is both deliberate and spontaneous (Weick 1998). Design and execution converge in emergent search so that the time between composing and executing is nonexistent (Moorman & Miner 1998; Baker et al., 2003). Search follows a sequence of freezing, rebalancing and unfreezing, and change is a mixture of reactive and proactive activities (Weick & Quinn 1999). The logic of intention is replaced in emergent search with the logic of attention so that firms are alert to daily contingencies (Weick 1993; Weick & Quinn 1999). Firms rely on endogenous goal creation and control instead of planning and predicting or estimating (Sarasvathy 2001).

Search follows a bottom-up approach, where firms may influence the external context (Welter 2011) by starting with the existing set of means they readily control and by keeping the specific ends open to be created during the search process (Sarasvathy 2001; Weick 1993). The selection between various alternatives is made on the basis of affordable loss (Sarasvathy 2001). The bottom-up approach also means that search is conducted through limited structures autonomously at all organizational levels, not only by the top-management (Burnes 1996; Brown & Eisenhardt 1997). Firms are proactive, not in the sense that they would try to foresee before others the uncontrollable exogenous events in the environment that might occur in the future but in the sense that they try to change it them-

selves, rather than wait for the environment to change (Weick 1993; Alvarez & Barney 2007). The central mechanism in the emergent approach is reflexivity, when actors generate alternative social and economic arrangements by being aware of the ongoing interactions with key stakeholders and of the broader context within which they are embedded (Suddaby et al., 2015). Search is an iterative process that starts from a strong vision; opportunity is developed further by combining knowledge and incorporating feedback and by communicating the opportunity to various stakeholders (Puhakka & Stewart 2015). Successful interaction then creates shared interests that make an opportunity collective (Mainela et al., 2014).

Planned and emergent forms are integrated in this study to the four general types of search so that each of them can potentially follow either of the two sequences.

2.2.2 Approaches on examining search behaviors

This study examines organizational search from the evolutionary and resource-based perspectives, and the two are seen to have close linkages. The evolutionary approach explains how particular organizational phenomena come to exist in specific kinds of environmental conditions. It includes actions of variation, selection, retention and struggle over scarce resources. (Aldrich & Ruef 2006.) A key concept in evolution is search routine. Nelson and Winter (1982a) have suggested that firms' activities can be divided into ordinary and search, of which ordinary describes the current ways of providing a fixed amount of existing goods in the market and search routine describes an effort to change the ordinary activities. Evolution can be purposeful or blind (Aldrich & Ruef 2006), but in this study a teleological perspective is adopted that narrows the evolutionary approach to actions towards a desired goal or an end state of improved performance. There are no assumptions about the paths, but there are many ways to achieve it, although the general end goal is predetermined by the firm (Van de Ven 1992). These different ways are related in this study to planned and emergent forms of search, depending on whether the starting point of search is the changes a firm wants to make (ends) or the resources at hand (means) (see e.g., Sarasvathy 2001; Alvarez & Barney 2007; Ardichvili et al., 2003). This study considers organizational search to be purposeful, and purposefulness is seen to contain both planned and emergent forms of search.

Several different approaches for describing organizational evolution have been proposed (for a review, see e.g., Tushman & Romanelli 1985; Van de Ven 1992). The primary division is made between organizational ecology and organizational adaptation perspectives (Hannan & Freeman 1977; Barnett & Carroll 1995). Ac-

cording to the ecological approach, there is a strong inertia in a firm to avoid changing its operations. A firm holds on to the ways of doing things established already at the founding in a strict ecological interpretation, rather than trying to search for new ones. A firm may search new alternatives in a slightly less stringent view, but it cannot change easily. Inertia prevents firms from adapting to the environment at all or in time and, therefore, firms with unfavorable features in a given environment fail, and different new firms appear. The adaptation perspective assumes that firms learn about opportunities and threats in the environment and formulate strategic responses. Two subfields exist within the adaptation view that are sometimes considered as two independent approaches; one focuses on slow and incremental changes, the other on fast and radical changes (Tushman & Romanelli 1985; see also Van de Ven 1992). Efforts have been made to overcome the theoretical differences between the organizational ecology and organizational adaptation approaches (Barnett & Carroll 1995). One such example is punctuated equilibrium, which aims to integrate ecologic as well as incremental and radical adaptation views (Tushman & Romanelli 1985). This study adopts an evolutionary approach according to which a firm may be highly adaptive or boundedly adaptive due to some degree of inertia, as will be explained in a moment. Some firms may never change no matter what the situation is, but such a strong inertia, which results in a permanent status quo of ordinary operations of the firm, is beyond the scope of this study.

The resource-based view (RBV) of the firm is utilized to examine resource scarcity. It describes the conditions (ex-ante and ex-post) of search. The resource-based view is understood to contain static (equilibrium) and dynamic (non-equilibrium) schools of thought (Priem & Butler 2001; Barney 2001). Following this treatment, in the examination of optimizing and positioning, a static logic of RBV is applied whereas the investigation of disruptive search and accumulative search is based on a dynamic logic. Firms are seen as collections of resources (see Penrose 1959). Resources may differ in heterogeneity, that is, value and rarity, or immobility, that is, inimitability and nonsubstitutability (VRIN-qualities). Valuable resources are those that potentially increase the efficiency and effectiveness of the firm. Market environment determines which of the firm's resources, if any, are valuable at a given time (Barney 1991 & 2001; Priem & Butler 2001). Resources are rare when only a small number of all firms possess (or have access to) them. Resources may also differ in how easily they can be imitated or substituted. (Barney 1991; Dierickx & Cool 1989; Peteraf 1993.) The VRIN-qualities of resources are closely linked to firms' competitiveness. Resources that are utilized but have no VRIN-qualities are a source of competitive disadvantage (Barney 2001). Resources that are only valuable can provide competitive parity; if they are also rare, they are a potential source of immediate competitive advantage and, in addition, if the resources are also diffi-

cult to imitate and substitute, a firm may gain sustained competitive advantage (Barney 1991; Barney 1986). Ultimately, this study is an analysis of the VRIN-qualities of firms' search resources in their attempt to form ordinary resources and resource combinations that meet some or all of the VRIN-qualities to earn profit.

This study adopts an approach according to which there can be either a loose or a tight fit between search behavior and the context. Search behavior is a function of external and internal factors. Firms are boundedly adaptive to external or internal circumstances in the case of a loose fit, while they are seen to be highly adaptive in the alternate perspective of a tight fit. Search in a tight fit scenario is similar across firms affected merely by a few external factors, whereas in a loose fit scenario, search is firm-specific and attributable to organizational characteristics (see Cyert & March 1963) that may differ either significantly or very little between firms (Alvarez & Barney 2007). Loose fit, or boundedly adaptive, search behavior, is based on organizational ecology and static resource-based views, according to which internal and external conditions are taken as givens by firms before the search occurs. Firms are assumed to possess fixed levels of search resources, and the focus is on their usage. Firms have a tendency to repeat their past practices in a loose fit, including those related to search (Miller & Friesen 1980a; Aldrich & Ruef 2006; Nelson & Winter 1982a; Davidsson 2016)[9]. Therefore, firms are assumed to stick with any one or possibly a combination of some of the various search activities presented in this study, at least in the short-run. The conditional effects of the context on search behavior and the consequences of search are of specific interest. Firms respond swiftly to changes in conditions in the case of a tight fit. This highly adaptive search rests on organizational adaptation and dynamic, resource-based views. When search is highly adaptive, search resources and search behaviors can change quickly. The focus is on their development or choice within firms.

Another aspect of search behavior is the level of conscious thought put into it. The neoclassical approach interprets search as consideration, and it makes a sharp distinction between the different organizational elements of search. This traditional view separates not only search resources from search behavior but also the preferences and abilities of search from one another (see Nelson & Winter 1982a). The starting point is that a firm has a set of preferences that it uses to consciously choose between different abilities and behaviors. The evolutionary perspective, in turn, understands search as routine. It recognizes that sometimes a firm makes considered choices among various options, but it states that, typically, selections are made automatically, which blurs the boundaries between choice

[9] This is not to say that organizations do not learn but, rather, that adaptation takes time and is based on experiences about how well the established procedures are working (Cyert & March 1963).

set and choosing. Firms are boundedly rational, for which reason they cannot go through all the possible options but instead rely on routines. (Nelson & Winter 1982a.) The concept of a routine encapsulates preferences, abilities and behavior. Nelson & Winter (1982a) identify a routine as a regular and predictable exercise of automatically selected abilities. They further explicate that abilities are, in fact, behavioral options, that to behave is to make automatic choices over a narrow pool of abilities. Abilities are a set of alternative behavior options, whereas preferences are the choice of what abilities to use in a given situation (Nelson & Winter 1982a). Sometimes, when the firm attempts to modify a routine or it is not working properly, it may be justifiable to distinguish between preferences and abilities in the evolutionary approach or to define routine through only one of the concepts but, ultimately, they are seen to be intertwined (Nelson & Winter 1982a). Preferences and abilities of search are not interacting antecedents of search behavior from the evolutionary perspective, then, but are embedded in the search routine. Moreover, a routine may involve interaction with external and internal contexts. The choices within the routine can interact with the context, but they are made automatically, without deliberation (Nelson & Winter 1982a).

Conscious thought or automatic action cannot be related straightforwardly to only planned or emergent forms of search. A simple interpretation could be that planning is conscious, and emergent behavior is spontaneous; however, Nelson and Winter (1982a) describe planning as often routinized. Moreover, emergent behavior can be interpreted to be both deliberate and spontaneous (Miner et al., 2001; Weick 1998). According to Winter (2003), emergent search is not routine in itself when routine is understood as a highly patterned and repetitious behavior. Patterns may exist at a higher level of abstraction, however, even in improvisation; in that sense, emergent search can be akin to a routine (Winter 2003). Eisenhardt and Martin (2000), in turn, explain that there is more than one type of routine, so that in the case of an emergent search routine with only a little structure, it is simple, experiential and iterative and relies on situation-specific, newly created knowledge (Eisenhardt & Martin 2000).

2.2.3 Elements of opportunity search

There is a long tradition in research to segregate actors from their context and emphasize one or the other (see e.g., Porter 1981; Hoskisson et al., 1999; Brockhaus 1980; Gartner 1988). According to critics, however, human activity does not occur in a vacuum. Opportunity search consists of a joint role of the actors, the context and the actions in this agent–non-agent nexus (Davidsson 2016; Venkataraman 1997; Shane 2003; Sarasvathy 2008; Welter 2011). Firms may have different qualities, they may operate in dissimilar and constantly changing envi-

ronments that provide both possibilities and constraints to firms' search behavior, and the search activity may take different forms. Furthermore, opportunity search is temporal. The context in which search occurs may change over time, and people also learn from their past behaviors (Welter & Smallbone 2011). Opportunity search is interpreted in this study to comprise three main elements: search behavior, search conditions and search consequences (see Figure 1).

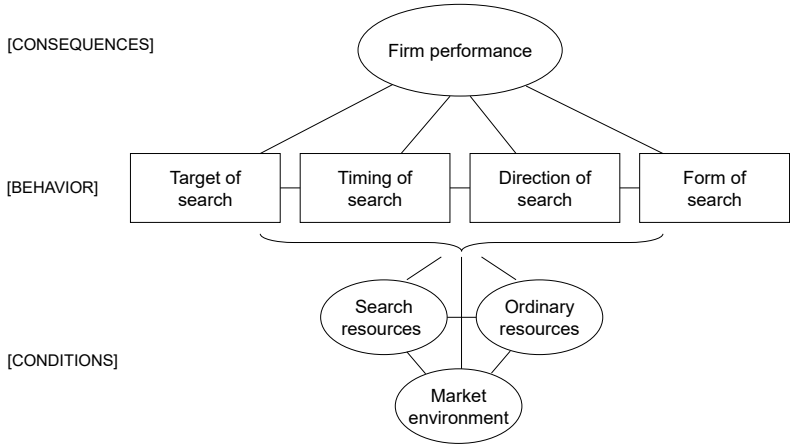

Figure 1 Elements of opportunity search in the study

A firm's behavior is classified into two categories, ordinary and search, or, worded differently, static and dynamic behavior. Firms have their ordinary operations of producing current goods in current ways and also search operations of trying to form new, ordinary operations (Nelson & Winter 1982a). This division is also parallel with a categorization of firm characteristics into basic and developmental. (Collis 1994; Amit & Schoemaker 1993) The centerpiece of the framework is the search behavior that may take various forms, depending on the theoretical approach. It describes what, when, where and how firms search for alternative operations. Specifically, the elements of search include the search target (type and novelty of alternatives), the search timing (frequency, amount and speed), the search direction (internal, external) and the search form (planned, emergent). Moreover, search behavior has a hierarchical structure (Nelson & Winter 1982a). Firms search opportunities to change their everyday (zero-level) operations at the first level, but the search may also involve second or higher level changes in the search process itself. This happens when a firm searches alternative ways to search for possible changes into its ordinary operations. This study primarily focuses on the first level search; thus, search resources (preferences and abilities), search activities and search consequences concerning higher level(s) of search are discussed only briefly.

The context is presented as external and internal conditions to the search. Conditions within the firm are sources of both benefits and limitations in search, while market circumstances are sources of possibilities and threats (Penrose 1959; Wernerfelt 1984; Barney 1991). These influence what, when, where and how a firm searches for new alternatives. External conditions comprise demand, supply and competitive situations and any changes in them in the firms' environment. According to the resource-based view market, conditions determine the value of firm-controlled resources (Barney 1991; Barney 2001; Priem & Butler 2001), providing both possibilities and constraints to firms' search behavior (Penrose 1959; Welter 2011). External circumstances are divided into three categories, including munificence, dynamism and complexity (Dess & Beard 1984). Munificence (capacity) refers to the rate (frequency and degree) of changes in the availability (richness) of demand and market-controlled resources and to the intensity (hostility) of competition. Dynamism (variability, volatility, turbulence) reflects the level of uncertainty (irregularity, unpredictability, unmeasurable risk) in the rate of change in demand, market-controlled resources and competition. Complexity indicates the heterogeneity (differentiation, diversity) and concentration (distribution, location, mobility) of demand, competition and market-controlled resources. (Dess & Beard 1984; Child 1972; Aldrich 2008.)

Internal conditions of the firm refer to the resources it controls. This study conceptually distinguishes the behavior of firms from their resources. Resources indicate a capacity to do something, whereas behavior refers to what a firm actually does at a given time. Resources are defined here to include anything[10] the firm readily controls or that is controlled by the resource owners in the market, an interpretation in accordance with Penrose (1959). It expands, for example, the definition by Amit and Schoemaker (1993) to include external factors. This interpretation is also different from Barney (1991), in that it includes external resources and also those internal resources that may not be sources of competitive advantage. This definition also involves both single resources and teams of resources, which is a different route than what Grant (1991) takes, for example. Each resource can potentially be used in many different ways (can render a multitude of services) and, therefore, is a possible contribution to a firm's actions (Penrose 1959). Firms can try to increase their profits by creating more value for customers and suppliers or by capturing a larger share of the existing value (Brandenburger & Harbone 1996). Following this, resources are either generative or restrictive. Generative resources are used to create value, whereas restrictive

[10] There are many categorizations of resources (see e.g., Penrose 1959; Wernerfelt 1984; Barney 1991). Grant (1991) utilizes Hofer and Schendel (1978) when he specifies a wide range of resources that can be used to exemplify the "anything" of this study. These resources may include financial, physical, human, technological and organizational resources, as well as reputation.

resources are utilized in an effort to capture value by eliminating free competition in the market.

This study divides resources into two categories, ordinary and search, or labeled differently, operative and change resources, or static and dynamic resources. Ordinary resources are anything a firm uses or could use as an input to current or future combinations of resources. At minimum, every firm possesses some managerial ordinary resources that provide services for the supervision of established operations (cf. Penrose 1959), since an exchange economy with specialized roles of resource owners and producer firms would not otherwise exist in the first place. Firms use search resources to form alternative ways of combining ordinary resources to make profit. This study further divides search resources into preferences (i.e., rules, criteria, mindset, attitudes, beliefs, priorities, interests, will, desire, aspiration) and abilities (i.e., techniques, skills, capacity). Preferences describe what a firm is willing to do, abilities are the firm's capacity to do something. This division is in accordance with that of Nelson and Winter (1982a), who distinguish between decision rules (or policies) and techniques (or skills) of search. Techniques are a set of alternative behavior options, while rules determine the choice of what techniques to use in a given situation (Nelson & Winter 1982a). Search resources come also logically close to what Penrose (1959) describes as a firm's entrepreneurial resources.

This study categorizes search preferences into challenge, uncertainty, initiative, curiosity, opportunism and deliberation. Challenge refers to a firm's willingness to accept the possibility that unsuccessful search may threaten its survival, uncertainty to acceptance of unmeasurable risks, curiosity to desire to know more about the circumstances, initiative to taking action before others, opportunism to self-interest at the expense of others and deliberation to careful consideration (as opposed to experimentation). It is notable that a willingness to grow the firm is not interpreted as a search preference. The rationale is that every firm would welcome improved performance if it was donated to it unconditionally. However, in real life higher profits are assumed to be influenced by the choices the firm makes, and preferences describe the firms' criteria for making these choices. That is to say, firms may have different levels of performance aspiration; this is not considered here as a specific preference, but it is reflected in the search preferences described above. Search abilities are categorized into ideation, assessment and introduction. Ideation refers to the ability to examine present conditions and to generate ideas about alternative combinations of resources, assessment to the ability to examine future conditions and to choose among alternatives and introduction to the ability to apply the new alternative on a full scale.

Based on Van de Ven's (1992) classification of different types of process models of change, the study follows the approach that identifies a process as a category of concepts and, accordingly, focuses first on distinguishing the con-

cepts of search and then discussing their relationships. Each of the four types of organizational search is next discussed through the previously described framework. Search activities, internal conditions (search resources and ordinary resources) and market environment (munificence, dynamism and complexity) are first examined separately. Then the relationships between the elements are investigated from the perspective of loose and tight fit so that search can be either a conscious or a routinized action. Each type of search is presented initially as a stand-alone activity and then examined together.

2.3 Optimizing search

Optimizing search is a process through which a firm tries to find the best way to utilize its known resources. Optimizing is examined next in detail regarding external and internal conditions, search behavior and the fit between the elements.

2.3.1 Activities of optimizing search

Target of search

An optimizing firm makes decisions about the volume of output. It adapts the quantity of goods or switches from producing one given good to producing another given good following the autonomous shifts in the market (Lipczynski et al., 2005; Kirzner 1973; Schumpeter 1934 & 1947). This applies, for example, to a situation of a population increase, when firms would simply buy more of the same means and sell more of the same ends. The changes the firm makes are only new to itself. If consumers' tastes change autonomously to wanting a different good than before, a firm adapts simply by searching for a proper amount of this new good to match the changed demand.

Timing of search

An optimizing firm searches alternatives passively and adjusts to autonomously changing external conditions (Kirzner 1973; Rothschild 1947). Search starts when the level of demand for the good(s) changes. A firm cannot continue operating in the same way as previously but needs to respond out of objective necessity (Schumpeter 1934). If a firm chooses not to adjust, it takes a loss and ceases to exist, eventually. A firm invests only a minimum sum to search without threat-

ening its survival at any point. Search is exhaustive. It ends only when a firm finds the optimal level of output, that is, the one with the largest known or expected pay-off (Cyert & March 1963; Simon 1955; Weitzman 1979). The search is simultaneous in all optimizing firms, so no one completes it before others (see Knight 1921).

Direction of search

Search is directed primarily at external conditions but also at internal conditions in the case of the emergent approach to search. Firms operate with a framework of given means and ends (Kirzner 1973). They make decisions with given demand situations as sellers of goods and with given supply situations as buyers of resources. In order to determine the optimal level of output, the firm searches information about autonomous price changes of goods and resources that have already occurred and about a priori risks attached to possible future changes (see Simon 1955 & 1959).

Form of search

Optimizing is described typically as planned action. The search follows a sequence of forming expectations and making choices (Simon 1959; Stigler 1961). A firm soon finds out everything that affects to its operations and then conducts a cost-benefit analysis in which it weighs the known or expected costs incurred against the known or expected returns (Cyert & March 1963; Rothschild 1974; Baumol & Blinder 2007). A firm calculates the point in which marginal revenue equals marginal cost to find an optimal solution (Lipczynski et al., 2005).

It is also possible to consider optimizing search as emergent behavior. A common assumption under perfect market conditions is that there is no time cycle of operations (Knight 1921). The formation of expectations, choice making and adaption happens instantaneously, which implies a possibility of an emergent approach in which the core premise is that the time between composing and executing is non-existent (see Moorman & Miner 1998; Baker et al,. 2003). Moreover, emergent search could occur if it is accepted that firms are equally incompetent in calculating the optimal amount of output in advance. Search could then start, for example, when a customer or two asks for the good although the firm has already run out of it or when there are a few unsold goods left at the end of the day. The firm then begins to probe with small changes in volume to afford the chance of unsold items or empty-handed customers until it finds a new balance between the two.

2.3.2 External circumstances and optimizing search

Nature of markets

Optimizing search is most effective when the market is close to equilibrium.[11] Intercommunication among resource owners, consumers and firms is perfect, and everyone knows immediately everything there is to know about the situation (Knight 1921; Hayek 1945; Sarasvathy et al., 2003). There is then only one price for a good, and it conveys all of the relevant information to allocate resources (Knight 1921; Stigler 1957; Eckhard & Shane 2003). Changes in prices reflect autonomous changes in the amount, quality and type of given demand and resources (Kirzner 1973). Firms are price takers, which do not have the power to change the markets (Rothschild 1947; Baumol & Blinder 2007). The environment is munificent when demand for the given goods is on the rise and lean when it is down. Although neither of the circumstances provides possibilities for economic profit, in a rich environment a firm has a chance to increase its accounting profit. Search occurs in circumstances of perfect competition. There is an indefinite number of small and homogeneous firms, none of which has the possibility to gain advantage over the others (see Stigler 1957; Baumol & Blinder 2007).

Low market dynamism is favorable to optimizing search. Any changes in the environment happen according to known, unchanging laws without uncertainty about the future (Knight 1921). Sudden events may occur in the environment, such as natural catastrophes, wars, diseases, public regulations or scientific breakthroughs, which affect demand or resources, but everyone knows about them instantly and responds in expected ways (see Schumpeter 1934; Knight 1921).

A low level of environmental complexity supports optimizing search. Demand and market-controlled resources are then homogeneous (Stigler 1957; Knight 1921; Sarasvathy et al., 2003). Consumers and resource owners are rational maximizers who have no habits or preferences. All consumers are willing to pay the same price for a good, and all resource owners want to receive the same payment for their supply (see Knight 1921). Resources are either of equal quality or the superiority of any resource is fully reflected in its price. Demand and resources are evenly distributed over the market, because there is free mobility in all activities (Knight 1921; Casson 1982; Sarasvathy et al., 2003). All market participants act entirely independent of all others, so no constraints are set by other individu-

[11] Assumptions about a perfectly competitive market environment can be loosened as long as the conditions are symmetrical for all firms. For example, government regulation (monopoly rights, licenses) may exist if the costs and benefits of the interventions treat every firm equally, and all firms are fully aware of this, making rent seeking perfectly competitive (Tollison 1982; Posner 1975; Baumol & Blinder 2007).

als or society for acting according to one's rational motivations. Firms can enter and exit freely, and resources are accessible to every firm. (Knight 1921.)

Market-level consequences of optimizing search

Firms as a group have a fundamental role in the market, although none of them can alone affect supply and demand through search. Search results in most efficient (Pareto-optimal) allocation of scarce, productive resources in the economy (Arrow & Debreu 1954). Search contributes to wealth in society, with the exception of symmetrically imperfect conditions when, for example, in perfectly competitive rent seeking, firms waste money in competition for the regulated resources through search but the revenues just cover the overall search costs of all the firms, resulting in a net loss for the society (Baumol & Blinder 2007; Posner 1975). The ultimate consequence of search, then, is the existence of a specialized exchange economy. If all firms would cease to search, they would stop transferring resources into goods through production, and the market structure, with separate consumer, resource owner and producer firm roles, would disappear. For example, if transaction costs are assumed to exist and firms would not incur them into their calculations, the trade would break down (see Casson 1982).

2.3.3 Internal circumstances and optimizing search

Nature of firms

Search resources that favor optimizing search can be derived from the principles of rational maximization. An optimizing firm is typically described as having no habits, preferences or aversions in its operations (Knight 1921). Accordingly, it has a low preference for challenge, uncertainty, initiative, curiosity, opportunism or experimentation. However, low preference for something can be rephrased as a preference for something else. Therefore, an optimizing firm is described here as having a set of search rules according to which they prefer survival, known risks, passive response to competition, indifference, common interest, and deliberation. A high preference for opportunism[12] is also possible on the assumption that competition is not entirely free, but government regulation exists (perfectly

[12] In this case creating additional value and capturing larger share of the existing value are not considered as mutually exclusive interests. A somewhat rational firm is supposed to be interested not only in capturing more value but also in creating additional value.

competitive rent seeking; see Tollison 1982; Baumol 1990). If perfect conditions are loosened further so that knowledge is symmetrically imperfect among firms and surprising events can occur (see Sarasvathy 2001), a firm could have a preference for experimentation.

Search does not require complex abilities. Ideation is simple, as a firm needs to know about the changes in the price of each good and resource.[13] Prices contain (near) perfect information about the present alternatives, and firms know either with certainty or with definite probabilities future consequences of choosing among them (Simon 1955 & 1959; Knight 1921; Casson 1982). Assessment requires computation skills that enable the firm to calculate the best solution among the alternative courses of action (Simon 1955). Alternatively, a firm needs to be able to calculate how much loss it can afford (see Sarasvathy 2001). Furthermore, a firm needs only a limited set of abilities to be able to introduce the change in the market. An ability to replicate or to reduce productive operations is required, depending on whether the new amount of the given resource combination is above or below the current scale of production (see Nelson & Winter 1982a). The theory assumes that every firm engaging in optimizing search possesses these abilities (Simon 1955 & 1959) or that the abilities are symmetrically imperfect so that no firm is systematically better than others in acquiring information, making choices and pursuing actions (Sarasvathy et al., 2003).

Yet another supportive internal condition for efficient optimizing search is that firms are homogeneous in their ordinary resources. Firms have equally valuable managerial services for the supervision of the given operations (cf. Penrose 1959). Resources are perfectly mobile at (near) market equilibrium. Firms do not readily possess any unique, ordinary resources and cannot acquire them from the market, either. Instead, all ordinary resources, including, for example, capital, labor and management, are equally available to every firm virtually instantly and without exchanges costs (Knight 1921; Penrose 1959).

Firm-level consequences of search

Successful optimizing search results in a maximum amount of profit from operating with the given ends and means. This does not necessarily mean a better performance, however. When demand increases, the price and the quantity go up and a firm will gain more, whereas a decrease in demand causes a fall in the price

[13] There is only one price for every good and resource. In a plain situation, there is only one good (A) that firms know how to produce and only one known combination of resources (C+D) to produce it. In a more sophisticated situation, a firm knows how to produce at least two different goods (A and B) and/or there are two or more given ways to combine the related resources (C+D or E+F). However, in both instances the needed ability to gather price information is essentially the same.

and in the quantity, leading to optimal, although, shrinking returns. Profit is a compensation for performing a specialized function in the economy as a coordinator of given, freely accessible, ordinary resources (Knight 1921).

2.3.4 Fit between the elements of search

Loose fit identifies routinized search as moderation. The preferences, abilities and actions of search are inseparably intertwined, and their influence on firm performance is conditioned on a stable and simple market environment. Conscious search, in turn, can be described as mediated moderation. Nelson and Winter (1982a) express this by saying that decision rules determine a firm's behavior and performance as a function of internal and external conditions. The overall effect of search preferences on firm performance is dependent on search abilities and market environment as two moderators, and the interaction effects are produced through search behavior as a mediator. First, optimizing preferences lead into the best possible performance if a firm has a capacity to conduct search. A firm needs a set of simple abilities of gathering price information, making computations and replicating or reducing output. A firm needs to have simultaneously optimizing preferences and a favorable market environment in the other interaction effect, when the demand for the given goods changes but there is no uncertainty about the future and no ignorance about the present. Firm-controlled ordinary resources are not moderating between search preferences and firm performance, since search is directed only to external conditions and also because the resources are presumably equal across firms.

The overall moderated effect is produced through optimizing behavior. Search preferences are antecedents to actions that in turn affect firm performance. A preference for known risks and common interests leads to searching for a new level of output for the given good without trying to limit competition, with the possible exception of perfectly competitive rent seeking. A preference for survival leads to investing only a little to search. A preference for indifference and passivity dictates that a firm searches occasionally when there is a change in the demand for the given good, and it does not try search before competitors. A preference for deliberation suggests that a firm first assesses all the alternatives before adapting its operations but, with very limited search abilities, a firm might end up in emergent form of search.

Tight fit describes routinized search as mediation. The influence of market environment on firm performance is channeled through optimizing search routine. Search is an adaptive response when there is an external stimulus and an internal response. Conscious search can be presented as a model of serial mediation. It is a three-mediator model, in which the influence of the market environment on

firm performance is channeled through search preferences, search abilities and search behavior. Changes in the market result in development or choice of optimizing preferences, which in turn leads into swift formation or selection of such abilities that are needed in search. Whether the firm develops or chooses the search resources depends on the extent of its resource pool. The firm does not readily possess the preferences or abilities in the former situation, whereas in the latter, the omniscient firm has a perfect array of various resources of which it chooses the ones it needs for this type of search. Abilities, for example, can be understood as a pool of alternative search techniques, and search preferences specify which of the alternatives the firm decides to choose (see Nelson & Winter 1982a). Once the firm has developed or selected the required search abilities, they are put into use by searching for an optimal amount of output, which then results in maximal firm performance. The mediation is complete. Market environment has no direct influence on performance, since a firm is assumed to learn to know changes in external conditions immediately as they occur, so there is no possibility of producing and selling suboptimal quantities of goods.

2.4 Positioning search

A firm uses positioning search to search for superior, but scarce, ordinary resources among the ones it readily controls. Positioning search is explored next in terms of search behavior, external and internal conditions and the fit between the elements.

2.4.1 Activities of positioning search

Target of search

Positioning search comprises two alternative ways by which a firm may possibly gain profits. A firm tries to produce the given goods more efficiently in resource positioning (Teece et al., 1997; Peteraf 1993; Wernerfelt 1984). The potential outcome is a reallocation of the given ordinary resources[14]. A firm searches lower cost with the same quality or higher quality with the same cost alternatives than what the firm itself and its competitors are currently utilizing. A firm tries to

[14] It is assumed here that the best way to utilize the resources is always through goods, not through trading them in the factor-market (cf. Teece et al., 1997).

deliberately restrict the amount of given output in the market in market-positioning (Peteraf 1993; Teece et al., 1997 Wernerfelt 1984). The potential outcome is achieved or maintained control over the amount of the given output. A firm is striving to form alternatives that restrict free competition between rivals or limit new entrants' access to the market (Salop & Scheffman 1983; Schmalensee 1985; Rumelt 1991). A firm engages in a strategic game in which it tries to outsmart competitors by searching among known ways to either raise rivals' expenditures or lower their revenues. Lowering competitors' earnings or building entry barriers occurs when a (dominant) firm turns into a pricing war, when it reduces or threatens to reduce the price of a good in the short-run to eliminate competition and to gain more of a monopoly position and higher earnings in the long-run (Joskow & Klevorick 1979; Baumol & Blinder 2007; Porter 1980). Cost-raising opportunities, in turn, may include, for example, an effort to establish mandatory, industry-wide standards, legal obstacles or exclusive dealing arrangements with suppliers or customers (Salop & Scheffman 1983). Firms may also seek to take actions and counter-actions through litigation or aggressive advertising (Baumol & Blinder 2007). They may also aim at hostile elimination of competitors in the market by such means as takeovers and mergers[15] (Baumol 1990; Eckhard & Shane 2003; Penrose 1959). An alternative way to limit competition among rivals is to try to involve them in collusive arrangements (Baumol & Blinder 2007; Posner 1975).

Timing of search

Search for alternative operations is occasional. Any position of a firm is temporary in the product or the resource market and is only sustained until another firm competes it away or market conditions change autonomously (Porter 1985; Barney 1991). A firm responds to these changes through search for better alternatives. Search is a fierce action-reaction game among competitors (Baumol & Blinder 2007; Shapiro 1989). A firm invests in search by sacrificing some its short-term profits (see Salop & Scheffmann 1983).

[15] Firms may also be acquired for other reasons than monopolizing and, therefore, not all takeovers need to be unproductive (Williamson 1981; Baumol 1990; Eckhard & Shane 2003). Similarly, not all takeovers aimed at monopolizing are a result of positioning search but can also be outcomes of disruptive or accumulative search if they use innovative ways of acting in the market.

Direction of search

A firm directs its search to understand the specific characteristics of its ordinary resources and its relative competitive position in the industry (see Porter 1985; Amit & Schoemaker 1993; Teece et al., 1997). Firms readily know all the customers, goods and ways of productions and delivery. What a firm does not know is whether each of the ordinary resources it controls is used to its best potential within this framework. A firm can search for resources that could be utilized more efficiently in another given use from the current one. For example, a firm may discover that its location has, by chance, become superior to that of competitors for another given purpose than the one for which it was originally chosen for (see Barney 1991). Alternatively, a firm can search among resources that render multiple services for situations in which a unique service that was originally considered secondary has become valuable in changed external conditions. An example is highly specialized skills and values of individuals (see Dierickx & Cool 1989; Barney 1991). A firm could also search for a unique resource that it could, perhaps, develop a little bit further or exploit to accumulate other resources. Organizational culture (Barney 1991; Amit & Schoemaker 1993), for example, could perhaps be nurtured more or utilized in recruiting highly qualified employees.

Firms readily know all the possible monopolizing actions in market positioning. A firm needs to search information about its relative resource position in the market and about the probabilities attached to rivals' and new entrants' actions to determine which of them to utilize. A firm directs its search to examine the size differences, since the largest firm(s) in the market probably have superior financial resources and may out-survive competitors or possible new entrants in aggressive price competition (Salop & Scheffman 1983), or they may wear out others with expensive lawsuits, for example. A firm directs its search also to identify whether it is already a first mover in some ways in the market and how to possibly reinforce that position through increasing the costs of incumbent rivals or new entrants. A firm could find out that it is already a first mover through a new product or scale economies[16], for example, or that it differs in the capital- or labor-intensive production processes or in reputation. Then it would continue to search ways to combine this unique initial position to sustain its supranormal profits with, for example, enforceable rights, such as patents, licenses, ownership rights or standards, entry barriers such as discriminating dealing arrangements or buyer switching costs, or customer loyalty programs and advertising (see Lipp-

[16] A new product and scale economies are examples of a first-mover advantage resulting from disruptive search (see Schumpeter 1934). Market positioning is, then, a way to try to maintain that initial advantage. For example, Lieberman and Montgomery (1988) discuss innovation and R&D expenditures as first-mover advantages and patenting as a means to maintain the initial position.

man & Rumelt 1982; Rumelt 1987; Lieberman & Montgomery 1988; Salop & Scheffman 1983).

Form of search

Position-pursuing search is typically described as a causal logic of expectation–action, wherein a firm first gathers information and makes assessments and then executes changes in its operations. This planning approach applies to both resource and market positioning, but the steps are slightly different. When using resource positioning, a firm first identifies its unique resources, next selects an appropriate market to maximize profits and, finally, utilizes the resources differently (Teece et al., 1997; see also Barney 1991). Search is often described in the form of strategic games in market positioning (Shapiro 1989; Baumol & Blinder 2007). Firms try to calculate the optimal choice in this game-theoretic perspective from a set of alternative actions based on a matrix of expected payoffs that lets them analyze the earnings of each alternative against the competitors' possible actions (Baumol & Blinder 2007). Specifically, a firm first analyzes the market, next picks a strategy based on perceptions about rivals' strategies and, finally, acquires resources (e.g., patents) to compete in the market (see Teece et al., 1997; Makadok 2001).

It is also possible to characterize positioning as an emergent process. A firm with limited scanning and calculation abilities of search could perform just enough analyses to start experimenting with the resources and the conditions without fixing the final outcome in advance. For example, an initial observation might be that two persons who were hired by the firm for their engineering skills seem also to be rather competent in managerial issues and are, therefore, assigned tentatively to a new position in the organization. Later, some contingent encounters with customers might reveal, for example, that one of the two employees is even more qualified in customer service and is eventually re-repositioned to sales and marketing. The end result would a more efficient use of the given ordinary resources within the firm.

2.4.2 External circumstances and positioning search

Nature of markets

A lean equilibrium environment favors positioning. Generally, consumers and resource owners have perfect knowledge of the current conditions in equilibrium

conditions, and they behave rationally, for which reason the prices and the resource combinations available in the market are given to firms. The market environment offers no other ways for a firm to improve performance except by passively adapting to increased demand. However, in a lean environment with a low level of demand, even this alternative is unavailable, indicating that a firm may benefit from more closely scrutinizing the resources it already controls. A firm may try to increase its efficiency during scarce external conditions by improving operating practices or by competing more aggressively (see Aldrich 2008). Regarding the competition, resource positioning may be useful when there are a large number of small firms in the market (Lippman & Rumelt 1982; Rumelt 1987). Each firm has so few resources that it is unlikely for anyone to gain control over the market, narrowing a firm's possibilities to improve its productive efficiency. Market positioning typically assumes a concentrated market with relatively few, possibly unevenly-sized firms (Schmalensee 1985; Rumelt 1991; Shapiro 1989). These firms have larger resource pools that may open up possibilities for competing intensively to become a price-maker in the market in the future.

A moderately low level of environmental dynamism rewards positioning. Little uncertainty about the future exists in equilibrium conditions, because there is either no progress or fluctuation in consumers' demand and in resource-owners' supply, or the changes are predictable. However, firms have imperfect information about rivals' future actions. Firms operate with a given set of alternatives, but they are uncertain which ones the others may choose and what the consequences will be (Shapiro 1989; Lippman & Rumelt 1982; Caves & Porter 1977). When environmental dynamism is somewhat low, a firm may be able to form statistical probabilities about the future course of actions.

Moderately low complexity in the environment promotes positioning search. Market-controlled resources are then homogeneous and immobile. Markets are not fragmented, and firms have comprehensive information about the current demand and resource supply. However, firms do not know exactly the quality of the ordinary resources the others firms currently control. Also, resource owners in the market cannot imitate or substitute the more efficient resources controlled by some firms. It follows from this that if some firms are lacking a superior resource possessed by another firm, they cannot purchase it from the factor market (Dierickx & Cool 1989). Similarly, demand is homogeneous and immobile (Priem & Butler 2001; Lippman & Rumelt 1982; Peteraf 1993). It is not possible for firms to identify new product markets, since consumers want the same things and have perfect knowledge of the alternatives.

Market-level consequences of search

Resource positioning is neutral in its effects on customer value. The superior ordinary resources of some firms provide lower than average costs only to them. However, these resources are limited in supply, so firms cannot expand their production and force rivals out of the market (Peteraf 1993; Rumelt 1987). Successful market positioning is harmful to the market. Firm capture a larger share of the wealth without creating any new value to customers. It reduces competitors' revenues or increases their costs and can cause rivals to exit the market and others to forgo entry (Salop & Scheffman 1983; Teece et al., 1997). Ultimately, a firm or a group may exclude all the competitors and gain or maintain a monopoly or a cartel position. It can then limit the supply and set the price above the production costs, thus reducing consumer wealth (Salop & Scheffman 1983; Baumol & Blinder 2007). Unsuccessful search benefits customers when the competition reduces prices, but rivals or new entrants are not excluded from the market.

2.4.3 Internal circumstances and positioning

Nature of firms

Organizational characteristics support positioning when search resources are homogeneous across firms. Positioning firms are often assumed to be rational maximizers (Wernerfelt 1984; Peteraf 1993; Shapiro 1989; Conner 1991), and the search resources largely reflect that. A positioning firm[17] has some preference for challenge but is unwilling to endanger its existence. It is willing to take measurable risks by figuring out a probability distribution of currently unknown returns (see March 1991). A positioning firm also has a low preference for curiosity but is willing to take some initiative in competition. A firm has an opportunistic preference[18] that is reflected in its willingness to try to eliminate competition in the market (see Baumol & Blinder 2007; Salop & Scheffmann 1983; Aldrich 2008). Moreover, a positioning firm has a preference for deliberation; however, with limited search abilities it could have an interest in experimenting. If all firms had scarce financial resources or analytical search skills, for example, they

[17] Preferences are the same for resource positioning and market positioning. A rational firm will engage initially in both search behaviors, and if they turn out to be conflicting, opt for the one with higher expected long-term returns (Carstensen 2001). This means that the firm does not prioritize one over the other but searches among its ordinary resources for opportunities to lower the unit costs or control the amount of output (or both).

[18] In this case, a somewhat rational firm is assumed to be equally interested in capturing more value and creating additional value.

might follow the emergent rather than the planning approach (see Sarasvathy 2001).

A firm needs somewhat simple skills of ideation, assessment and introduction, when it wants to operate with resource combinations that are already known in the market. For ideation a firm needs an ability to collect data about possibly unnoticed ways of using its resources to produce the given goods (Peteraf 1993; Wernerfelt 1984; Barney 1986; 1991), and about resources and probabilities of given competitive moves of its rivals (Teece et al., 1997; Baumol & Blinder 2007). A firm needs a calculation skill to assess the consequences of various alternatives based on the collected data, or alternatively, an ability to calculate how much it can afford to lose. A firm also needs an ability to reallocate some of its resources if it finds out that some of them are not yet in the best possible use.[19] Since the required search abilities are relative simple, they are assumed to be homogeneous across firms. Specifically, the abilities needed in search may not themselves be rare, difficult to imitate or imperfectly substitutable (Barney 1991). No one gains advantage over others by examining the market environment, for example. Every firm will form the same expectations of the future by using the methods and skills for collecting and analyzing the data that are all in the public domain (Barney 1986).

Heterogeneity and imperfect mobility of firm-controlled ordinary resources are elementary in positioning search. Successful resource positioning requires that some of the resources differ in their efficiency level for producing the given goods, and they are distributed unevenly among firms (Barney 1991; Peteraf 1993; Dierickx & Cool 1989). Initial differences in the distribution of market power are a necessity for market positioning to be successful (Barney 1991; Grant 1991). The heterogeneity exists in resource positioning typically at the firm level and often between groups of firms, such as incumbent firms and potential entrants, in market positioning (Peteraf 1993; Caves & Porter 1977). The uneven accumulation of superior ordinary resources over time across firms is due to systematic actions[20], like organizational policies and investments, or random events or both (Lieberman & Montgomery 1988; Dierickx & Cool 1989; Lippman & Rumelt 1982).

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[19] For example, if a two-product firm has acquired in the past a resource X for its services in producing a given good A, a firm may discover through search that this resource X is more efficient in producing a given good B than is resource Y, which is currently performing the task. The firm then needs an ability to reallocate the resources so that resource X is assigned to good B and the resource Y is either switched to producing good A (if roughly as efficient as resource X was) or abandoned and another resource Z is acquired from the market to fix the resource deficit in producing good A.

[20] Systematic accumulation cannot involve any search behavior in the case of resource positioning, because that would make it tautological (a firm cannot search for something that it has already searched). The situation is a little bit different in market positioning, since a firm may already enjoy a first-mover position as a result of luck or systematic search (e.g., innovation) and is now in search for ways to sustain the initially beneficial position through predation.

Imperfect mobility of firm-controlled ordinary resources is another important condition in positioning search. Firms operate with given resources. Even the firm itself cannot (easily) replicate the limited superior resources. The lucky firms have so little of the superior resources in the case of resource positioning that they cannot satisfy the entire demand, for which reason less efficient resources are also brought into production (Peteraf 1993; Rumelt 1987). Conversely, the fortunate firms may have so many of the superior resources in market positioning that they can eventually control the amount of the given output in the market. Rivals cannot (easily) imitate or substitute imperfectly mobile resources by buying or building them (Dierickx & Cool 1989; Barney 1991). Imperfect mobility is a result of specific properties of the resource accumulation process within the firm, including time-consuming historical conditions, causal ambiguity or social complexity (Barney 1991; Dierickx & Cool 1989; Lippman & Rumelt 1982; Nelson & Winter 1982a).

Firm-level consequences of search

A firm earns short-lived Ricardian (Marshallian) rents in successful resource positioning, because it owns more efficient and scarce productive resources to produce the given output than some other firms in the market (Rumelt 1987; Peteraf 1993; Mahoney & Pandian 1992). If the firm also succeeds in eliminating the competition by identifying imperfectly mobile resources, the profits last a prolonged period of time until external market conditions change autonomously and shift the balance in the market (cf. Barney 1991). A firm takes a loss if it fails in search, as the search costs are unrecoverable (see Rumelt 1987). The failure occurs if nothing has changed after search or if the calculated risks about competitors' actions are realized. Successful market positioning results in monopoly rents (Peteraf 1993; Teece et al., 1997). A firm creates or maintains an imperfectly competitive market structure by capitalizing on its first-mover advantage or other sources of market power. If a firm fails to achieve or maintain an exclusive position or firms as a group fail to limit new entries to the market, the firm is unable to raise profits, suffering a loss, instead. A firm pays something during the search process in an effort to try to build barriers to competition in the form of negotiating costs to increase competitors' expenditures or lost revenues in predatory pricing, for example, but these investments are nonrefundable (Salop & Scheffman 1983; Caves & Porter 1977).

2.4.4 Fit between the elements of search

Loose fit presents routinized positioning as moderation. Search preferences, abilities and actions are embedded into a search routine, and their effect on firm performance depends on a lean, somewhat stable and somewhat simple market environment. Conscious positioning can be modeled as mediated moderation. The overall effect of search preferences on performance depends on search abilities, ordinary resources and the market environment. Specifically, the influence of preferences on performance is dependent on the possession of somewhat simple abilities of ideation, assessment and introduction of changes. The impact is also contingent on heterogeneous and imperfectly mobile ordinary resources. Search preferences also improve performance if the market environment has supportive properties of low munificence, somewhat low dynamism and somewhat low complexity.

Search preferences determine the performance of a firm through search behavior as a mediator. Specifically, search preferences affect outcomes, timing, direction and ways in which a firm searches. A willingness to take measurable risks dictates that a firm search for more efficiency among the given resources. A preference for opportunism results in searching not only for lower costs but also for ways to monopolize the market. Some preference for challenge results in sacrificing short-term profits without threatening a firm's long-term survival. A low preference for curiosity dictates that search is occasional and starts when the price of the given good or the given resources change in the market. A firm with a preference for some level of initiative joins into a strategic game, where it makes moves and countermoves to react to rivals' actions. A high preference for deliberation results in a planned approach to search, unless the lack of computational search abilities favors the emergent form of search.[21]

Tight fit presents routinized positioning as mediated moderation. A firm adapts to a lean, somewhat stable and somewhat simple market environment by engaging in positioning and receives performance benefits on condition that it happens to have some heterogeneous and possibly imperfectly mobile ordinary resources. Conscious positioning is otherwise similar, but mediation is modeled with three intermediary mechanisms. A firm responds to external changes by building or choosing the search resources needed for a complete fit. It first adapts its preferences for the circumstances and then develops or chooses from a large array of search abilities those that are useful in the situation at hand. Now, having the required search resources, it successfully controls the amount of output or

[21] This kind of conditional choice between emergent and planned search would be modeled as moderation, but this alternative will not be discussed in detail here.

produces the given goods more efficiently, which eventually results in improved performance.

2.5 Disruptive search

A firm attempts to introduce untried resource combinations profitably in the market in disruptive search. First, search behavior and the external and internal search contexts are studied separately; after that, their relationships are reviewed.

2.5.1 Activities of disruptive search

Target of search

A firm engaging in disruptive search tries to form an untried combination of resources. A new combination can occur in the output or input domain (Abernathy & Clark 1985). Schumpeter (1934) identifies five such combinations: an entirely new good or quality of a good, a new market, a new method of production or delivery, a new source of supply and a new way of organizing the industry. A new form of organizing has probably been the most cumbersome for other researchers to get a hold on, as Schumpeter (1934) scantily discusses it. Williamson (1981), who offered one approach to interpreting new ways of organizing, identifies new governance structures of the firm in the form of backward and forward vertical integration and horizontal integration or divisionalization of activities. Common to all the aforementioned combinations is that they can create benefits at the same time for both customers and firms.

However, this does not need to be the case. Already Schumpeter (1947) explicated how entrepreneurial action should not contain any value judgment so that successful search may as well benefit as injure the society. Echoing this, Baumol (1990) identifies monopoly seeking as an unproductive[22] form of entrepreneurship and suggests that Schumpeter's (1934) listing should be enlarged to cover new ways of monopolizing so that a firm may discover, for example, a new, unused legal gambit that may benefit the one who exploits it first. Similarly, Tollison (2012) considers monopoly seeking to be negative entrepreneurship, and

[22] There are two forms of unproductive entrepreneurship, legal and illegal (Baumol 1990), of which the illegal is not examined here except for firms' sometimes unauthorized efforts to establish a cartel within the industry.

Penrose (1959) relates this type of entrepreneurial behavior to empire building or financial speculation.

A firm is in search of a radically new resource combination that refers to scale, irreversibility and isolation. When the change is radical, the new differs from the old to a large degree (Knight 1967; Dewar & Dutton 1986). The new situation cannot be reached from the earlier one through small and continuous steps (Schumpeter 1934 & 1947). This happens when a high degree of new knowledge is embedded in the combination (Dewar & Dutton 1986). A radical resource combination is outside the well-established alternatives in the industry. It is new not only to the firm itself but also to the relevant environment (Schumpeter 1934; Knight 1967). Such a resource combination is untested, untried and unfamiliar to the public (Schumpeter 1934 & 1942); then, either demand or supply or both are unknown before the search (Sarasvathy et al., 2003; Ardichvili et al., 2003).

A radical combination is irreversible, and when it is superior to existing alternatives, it replaces them permanently (Schumpeter 1934 & 1947). For example, a new or improved good takes the place of the inferior good, which eventually disappears from the market. Additionally, a radical change has typically been understood as an isolated, one-time event (Schumpeter 1934; Levinthal & March 1993; Abernathy & Clark 1985; Knight 1967; Shane 2003). Search tends to result in such dramatic changes when it is driven by inertia and performance crisis caused by some external forces (Tushman & Romanelli 1985; Romanelli & Tushman 1994). This represents a planned form of search and has been challenged by the emergent approach, according to which it is not a matter of single, abrupt changes but recurrent, reciprocal, numerous and rapid modifications[23] that may result in a fundamental change over time (Orlikowski 1996; Weick & Quinn 1999; Brown & Eisenhardt 1997; Sarasvathy 2001).

Timing of search

The timing of search is related to possibilities or crisis. Advocates of the crisis approach include, for example, “problemistic search” (Cyert & March 1963) and “punctuated equilibrium” (see Romanelli & Tushman 1985). Search is then externally driven and episodic. Inert firms start to search new alternatives when they face considerable pressure after sustained failure to maintain their performance level. Search lasts a relatively brief period of time until the firm identifies

[23] Brown and Eisenhardt (1997), for example, describe these changes to be somewhere between incremental and radical. For them, radical refers to new breakthrough goods or techniques, such as DNA cloning. They further describe a new resource combination to be somewhere between this kind of radical and the next generation innovation, which seems to position the change actually quite close to what Scumpeter (1934) identifies as improved goods.

a first alternative that solves the problem. A firm attempts to be a leader rather than a follower in the competition. Firms invest considerable sums in searching for new alternatives.

The possibilities approach gains support from the "continuous change" perspective, for example (see Brown & Eisenhardt 1997; Weick & Quinn 1999). Search is internally driven and proactive. It is believed that knowledge is never complete, new alternatives can always be formed and search is a way to be ahead of the competition (Penrose 1959; Brown & Eisenhardt 1997). A firm may be able to create the future through such search behavior by setting the tempo in the market instead of merely responding to poor performance (Brown & Eisenhardt 1997). The changes in a firm's operations are not forced or triggered by the environment but are initiated willingly by the firm itself before competitors change their operations (Schumpeter 1934; Venkatraman 1989). Such a search tends to be constant, so there is no beginning or end point in it (Weick & Quinn 1999; Orlikowski 1996; Brown & Eisenhardt 1997; Penrose 1959). Most importantly, firms try to exploit surprises. They cannot anticipate or plan situations, since they occur often as a result of chance encounters and conversations with stakeholders, such as customers and suppliers (Miner et al., 2001; Sarasvathy 2001; Dew 2009; Moorman & Miner 1998).

Direction of search

Disruptive search may be directed to external or internal conditions or both. Inventions are one form of new knowledge in the external environment; those are any irregular changes in science and technology (Schumpeter 1934; Penrose 1959; Drucker 1985; Shane 2003). For example, a firm may direct search on advances in basic research in universities (Nelson & Winter 1982b; Levinthal & March 1981). Another direction of search is socio-demographic changes in the number, composition and preferences of the population (Shane 2003; Penrose 1959). A third group includes changes in formal institutions, especially in public policy and regulations, which alter the rules of the game (Welter 2011; Shane 2003; see also Penrose 1959).[24] Last, sometimes the source of new alternatives is not a recent change in conditions but rather an enduring, perhaps even commonly known, situation in the market (Schumpeter 1934). Examples include unused resources (Schumpeter 1934), such as waste, or unmet demand, or a lack of a cure for a disease (Sarasvathy et al., 2003). Another direction of search is the ordinary resources a firm currently controls. In Penrose's (1959) view, each firm is

[24] Schumpeter (1934) puts only little emphasis on some of these sources, especially changes in policies or consumers' tastes, because in his view they are either rare or markets tend to adapt to them automatically.

a collection of unique resources that may be used in a number of different ways. All the possible ways to use the resources to yield productive services are not known automatically by every firm, but some entrepreneurial firms are fully aware of their own ignorance. If a firm can identify and utilize these unused or under-used services more effectively, that may provide it a competitive advantage.

External or internal conditions can be discussed separately, but they are, in practice, complementary and intertwined search directions. External circumstances change over time, which may alter the significance of the firm-controlled resources and open up new ways to use them profitably (Penrose 1959). A firm may respond to external variation by systematically researching into unknown characteristics of its resources to discover something new about them (Penrose 1959). Alternatively, a firm may begin its search with the means at hand but keep the final outcomes open to any contingencies that it may discover and exploit along the way (Sarasvathy 2001; Weick 1993; Baker & Nelson 2005). A firm does not search for pre-existing, yet unknown, knowledge in this case, but imagines and experiments with various alternatives utilizing external and internal surprises that arise over time (Sarasvathy 2001 & 2008; Dew 2009; Miner et al., 2001). Search is directed especially towards working with human agencies rather than limiting efforts to exploiting exogenous factors, such as new technologies or socio-economic changes (Sarasvathy 2008).

Form of search

Disruptive search can be planned or emergent, and both forms can be problem driven or possibility driven. Planned search consists of discovery, evaluation and exploitation of new alternatives (Shane & Venkataraman 2000; Eckhard & Shane 2003). During the process the firm discovers an alternative behavior, assesses it and decides whether or not to try to exploit it, finally obtain resources and design organization modes and strategies to exploit the opportunity (Shane 2003). In planned search an inert firm first identifies a problem and then starts to search[25] a new resource combination to solve it (Cyert & March 1963; Venkatraman 1989; Romanelli & Tushman 1985; Levinthal 1997). Possibility-driven planned search

[25] The search may proceed in steps, so that if a solution is not found through local search, the firm proceeds to use more complex, distant search beyond the present line of operations to find more radical solutions. Eventually, if a successful solution is not found through (distant) search and the pressure to achieve the goal is high, the firm may engage, under considerable distress, in random search on whatever direction. (Cyert & March 1963; Knight 1967.) The relationships between various types of search are discussed further at the end of Chapter 2.

is continuous and involves discovery and implementation of some pre-existing, untried alternatives (see Shane 2003; Alvarez & Barney 2007).

A firm engaging in emergent search does not discover or preselect alternatives, but keeps them open and constructs them by exploiting contingencies (Sarasvathy 2001 & 2008; Alvarez & Barney 2007). That means, for example, creating a new product while simultaneously adapting to changes in technologies and markets (Brown & Eisenhardt 1997). Search consists of ideation based on the resources at hand, testing and shaping the idea through interaction with various stakeholders, and assessing, which results in a decision to pivot and pursue some other alternatives or to commit to the tested and shaped alternative (Sarasvathy 2001 & 2008). Firms can try to probe and control the future through experimental products and strategic partnerships with stakeholders, for example (Brown & Eisenhardt 1997). They work in ongoing interaction with, for instance, their current customers to generate new product features (Miner et al., 2001). Consequently, firms do not (only) recognize and discover readily existing opportunities in the environment but actively fabricate opportunities through their own actions (Sarasvathy 2008; Alvarez & Barney 2007).

2.5.2 External circumstances and disruptive search

Nature of markets

Environmental munificence has a dual role in advancing disruptive search. Rapid changes in the market environment provide possibilities or pose threats to firms. Conditions are favorable when there is new, untried information flowing constantly to the market (Schumpeter 1934; Penrose 1959). Technological advancements, new raw materials and untapped markets for goods all provide new possibilities (Schumpeter 1934). Disruptive search, however, may also be effective in a lean environment. Increases in prices of market-controlled resources or decreases in the prices of goods are external sources of disturbance (Nelson & Winter 1982a; Cyert & March 1963). The changes may have been autonomous but, perhaps even more importantly, caused by major alterations in competitive conditions (Tushman & Romanelli 1985), signaling to firms a need to search new alternatives elsewhere.

A high level of market dynamism supports disruptive search. Firms cannot predict or control in uncertain conditions exactly what will happen in the market in the future without the search or during or after the search. They are ignorant about what the situation in the market would be in the future without their interference; even more importantly, they do not perceive with any accuracy how

their own actions would possibly change the market (Knight 1921). The main uncertainty concerns the future sale price of the goods. Firms buy resources at present prices and convert them into finished goods, whose prices will prevail only after they have been introduced in the market (Knight 1921; Schumpeter 1934; Kirzner 1973). Irregular, progressive changes are the source of uncertainty (Knight 1921). It may be very difficult to foresee changes in consumer tastes, technology, factor markets, competition or legal, social and political events (Lipczynski et al., 2005; Romanelli & Tushman 1985). Uncertainty exists especially about consumers' willingness to adopt new buying habits and also about the actions competitors may take before or after the firm introduces new resource combinations (Knight 1921; Schumpeter 1934 & 1942). Uncertainty also exists about future technological developments that could replace the technology in which the firm has just invested. Additionally, production uncertainty exists regarding the amount and quality of resource combinations that will result from the search. Firms do not know for certain if they are able to execute their actions as precisely as they have imagined and willed (Knight 1921). For example, a firm is uncertain whether it will be able to secure the necessary cooperation, such as financing, to do something new (Schumpeter 1934 & 1942). Firms are also ignorant about possible externalities and their consequences. Some third parties might suffer from negative effects, such as pollution, which could result in governmental regulations.

A high level of environmental complexity favors disruptive search. Firms are ignorant about the present in a complex market, because they do not perceive the prevailing conditions both as they are and in their totality; therefore, they do not necessarily know all the alternative behaviors available to them (Knight 1921; Mises 1952; Simon 1959; Schumpeter 1934). Complex markets are heterogeneous and imperfectly mobile. Consumers differ in their preferences in heterogeneous conditions, and market-controlled resources have different qualities. Similarly, competing firms are heterogeneous in their characteristics. Moreover, firms have incomplete access not only to demand, market-controlled resources but also to those resources controlled by other firms. For example, there may be legal restrictions on the use of some resources, high entry costs to some areas or difficulties of obtaining materials or financing, for example (Penrose 1959; Schumpeter 1934 & 1942).

Market-level consequences of search

Successful disruptive search can either increase or decrease consumer wealth. A firm creates more value when it provides a better solution to buyers' underlying needs than other alternatives. This happens if a firm creates supply, demand or

both (Sarasvathy et al., 2003; Ardichvili et al., 2003). Buyers gain less value if they have to pay more for an equal or poorer solution than before. This occurs if a firm succeeds in creating new ways to control the amount of the given output.

Successful search alters the competitive situation in the market by interrupting the tendency towards market equilibrium with uniform prices; the markets start, instead, to disequilibrate towards multiple prices (Schumpeter 1934 & 1942; Kirzner 1973). A complete reorganization of the industry occurs when the price difference is successfully created: A competitive struggle begins, the possible dismissal of workers follows, and obsolete businesses are superseded by others (Schumpeter 1934). Successful search may eventually result in a temporary monopoly position, which is either a consequence of successful value creation to buyers or successful elimination of competitors. If the firm is unsuccessful in disruptive search, the potential buyers are unwilling to change their buying behavior in favor of a new resource combination or the attempts to restrict free competition fail, and the market remains close to equilibrium.

2.5.3 Internal circumstances and disruptive search

Nature of firms

Internal characteristics support disruptive search on the assumption that firms are heterogeneous in their search resources. Organizational **preferences towards search** boil down to bounded rationality. Firms are viewed as satisficers that search for alternatives that meet their individual needs (Simon 1955 & 1959; Cyert & March 1963). Firms are willing to accept uncertainty. This willingness to take unmeasurable risks is commonly associated with entrepreneurial behavior (Knight 1921; Penrose 1959; March 1991; Shane 2003). Schumpeter (1934) disagrees, but mainly because he focuses on financial risk and firms' coincidental role as capital owners. Then again, Schumpeter (1934) agrees with Knight (1921) that decision makers are uncertain about the future course of events. Penrose (1959) raises another aspect by stating that a firm may not accept unlimited uncertainty but at some point prefers to search for ways either to reduce uncertainty or invest and grow without increasing it. Sarasvathy (2001 & 2008) contributes to the discussion by explaining that firms do not try to avoid uncertainty but see unexpected events as a possibility to exercise control over the future situations. Sarasvathy (2008) further explains how firms try not to avoid failure but recognize it as an integral part of performing well. Firms manage failures by keeping them small and killing them early through their willingness to fail (Sarasvathy 2008; see also Brown & Eisenhardt 1997; Baker and Nelson 2005).

Firms may have a high or low preference for opportunism in disruptive search. Firms are primarily interested in adding their own wealth and may, or may not, be concerned whether an activity contributing to this goal is adding customer value through reduced prices or better quality of goods (Schumpeter 1947). Penrose (1959) identifies these two types as product-minded and empire-builder ambitions, and Baumol (1990) them as productive and unproductive forms of entrepreneurship. A low or high preference for opportunism cannot be argued to be superior to one another, if one accepts Penrose's (1959) treatment of them as two alternative interests. However, if creating additional value and capturing a larger share of the existing value are not considered as mutually exclusive interests, then the firm that prioritizes both has, arguably, more options open to itself in the future. Firms also have a high preference for challenging themselves (Schumpeter 1934), sometimes so much that they are willing to endanger their existence.

Firms have a high preference for taking initiative in competition. Disruptive search is pioneering activity in which firms seek new alternatives before competitors seek them (Schumpeter 1934; see also Venkatraman 1989). Firms may have a low or high preference for curiosity. The population ecology perspective assumes that a strong structural inertia prevents most firms from easily changing their everyday operations (Hannan & Freeman 1977; Barnett & Carroll 1995). The premise in this view is that firms change reluctantly, and structural inertia is present in both punctuated equilibrium (Tushman & Romanelli 1985; Romanelli & Tushman 1994) and distant problemistic search (Cyert & March 1963). Conversely, according to the adaptation perspective, firms are eager to alter their behavior (see Hannan & Freeman 1977; Barnett & Carroll 1995). This view can be found in Schumpeter's (1942 & 1947) later work[26] on creative destruction as well as in the continuous change approach developed by Brown and Eisenhardt (1997). Such curiosity may have been built into the organizational culture and become routine in firms. Penrose (1959) similarly states that some firms prefer to search new alternatives in all circumstances. Search is driven by an inability to remain stable, in a sense (Weick & Quinn 1999). A high preference for curiosity is likely to be more efficient than a low preference when the external and internal environments are more complex, indicating that there are many unknown (services of) resources that could potentially be combined in new ways (see Penrose 1959).

Furthermore, firms may have a low or a high preference for deliberation. Knight (1921) explains that uncertainty can possibly be reduced either through increasing their knowledge of or their control over the future. Consequently,

[26] Schumpeter's (1934) earlier work shows that established firms do not have the will to search for new resource combinations and, moreover, new firms have it only at the time of market entry; after that, they also fall into the state of inertia.

some firms may prefer deliberation and estimation of future conditions, while others believe that the future cannot, and need not, be estimated in any degree (Sarasvathy 2001 & 2008). More profoundly, it is a matter of having either an objectivist or a subjectivist ontological belief among the firms about the nature of reality. The rule of deliberation builds on the assumption that opportunities pre-exist to be recognized or discovered, whereas the premise in preference for experimentation (i.e., low preference for deliberation) is that opportunities can be created and constructed by exploiting contingencies (Sarasvathy 2001 & 2008; Sarasvathy et al., 2003; Alvarez & Barney 2007). There is also a middle ground interpretation, according to which objective external events may help get things started, but opportunities must be developed further through a firm's creative actions (Ardichvili et al., 2003). A preference for experimentation arguably works better than a preference for deliberation in conditions of extreme dynamism and complexity (see Sarasvathy 2001; Eisenhardt & Martin 2000).

Complex **search abilities** support disruptive behavior. Essential to search is a firm's ability to form new ideas about alternative operations; this can be categorized as two cognitive properties, an ability to observe the surroundings and an ability to combine information. Firms do not know everything about the current context in which they operate; therefore, knowledge accumulation may lead to continuous availability of alternatives for new, productive services (Penrose 1959). Firms with a preference for deliberation need an ability to systematically collect pre-existing knowledge (Cyert & March 1963; Bullock & Batten 1985; Shane 2003; Penrose 1959). Creativity is also needed to form new ideas about resource combinations in response to the acquired knowledge (Penrose 1959; Shane 2003). Organizational creativity is supported by an ability to build hierarchical structures and cultures. Such centralized structures are based on top-down command and supervision (Burnes 2004; see also Sarasvathy 2001). A supportive culture similarly encourages improvisation and initiative among the firm's employees (Miner et al., 2001; Burnes 2004; Sarasvathy 2001). A supportive culture include not only management's passive toleration of unauthorized special projects of employees (Cyert & March 1963; Levinthal & March 1981; Miner et al., 2001) but also designation, approval and encouragement of individuals' and teams' searches for new alternatives (Miner et al., 2001).

An ability to pay attention to the present and make sense of the past is relevant to firms with a preference for experimentation (Brown & Eisenhardt 1997). A firm especially needs receptivity, that is, an ability to discover and use unexpected daily contingencies (Sarasvathy 2001; Weick & Quinn 1999). For example, a firm may try to raise awareness of external and internal surprises through careful observing and listening to people when interacting with them (Moorman & Miner 1998). Creativity is important for imagining various ends from the means at hand and utilizing surprises that arise over time (Sarasvathy 2001 &

2008; Baker et al., 2005). An ability to build empowering and participatory structures enhances creativity when responsibilities and priorities are clearly articulated and accompanied with extensive communication (centralized structure) but also when the actual creative processes are freely structured (decentralized), allowing employees to be autonomous (Brown & Eisenhardt 1997; Burnes 2004).

An ability to examine the future is another essential feature in disruptive search. A firm with a preference for deliberation needs an ability to form expectations about uncertain future courses of events. It benefits from an ability to collect and analyze data, not about new alternatives this time but, rather, about the consequences of choosing between them (see Sarasvathy 2001; Casson 1982; Alvarez & Barney 2007). However, planning is necessarily open to many errors due to limited information. Firms may overcome this deficiency with an ability to make judgmental decisions, which is a combination of estimation based on past experiences, intuition and imagination (Schumpeter 1934; Knight 1921; Penrose 1959; Casson 1982; Shane 2003). Firms with a preference for experimentation are dependent not so much on their ability to anticipate the future but rather on their ability to control it. These firms, therefore, first need to be able to predetermine a level of loss they can afford (Sarasvathy 2001). Then, they benefit from having an ability to create probes into the future, such as experimental products and strategic partnerships with various stakeholders, especially with potential customers, to co-create value (Brown & Eisenhardt 1997; Sarasvathy 2001 & 2008; Miner et al., 2001). This requires social and network skills (Baker & Nelson 2005). For example, a firm may orchestrate active interactions between a product development team and other internal and external parties, such as customers, who work together on a new product (Miner et al., 2001). A firm also needs an ability to choose options that create more options in the future (Sarasvathy 2001). For example, if a firm has the ability to create low-cost means of experimentation, it can afford to have more of them (Brown & Eisenhardt 1997). An ability to create a variety of probes with low costs enhances learning and reduces the financial risks of failure. Firms then learn more about possible futures and, if the experiments fail, the losses are small enough (Brown & Eisenhardt 1997).

Disruptive search also requires a specific set of abilities to introduce new resource combinations. A firm needs to be able to acquire or to develop the missing resources or to replicate those resources it already possesses, which is related to a preference for deliberation. For example, if a firm decides to introduce its good to an entirely new market where competitors are not yet operating, it needs to be able to repeat its operations there. A firm needs to overcome many potential difficulties in practice when carrying out new combinations, including the difficulty of gaining access to financing, of acquiring command over means of production, of the challenge of winning over customers, and of the resistance competitors

create (Schumpeter 1934). This requires an ability to negotiate, build trust and convince financiers, resource owners, consumers and potential employees about the firm and its goods (Penrose 1959). A firm may also need production and technical know-how to develop the idea into a (partly) tangible good. After probing the future, an ability to choreograph the transition from existing operations to new ones rather than leaving the switch to chance is essential to the firm with a preference for experimentation. Choreographing is based on roughly predefined schedules and clear responsibilities, which eventually make the transition a familiar routine at the firm. (Brown & Eisenhardt 1997.)

The heterogeneity and immobility of firm-controlled **ordinary resources** supports disruptive search. This asymmetry is not necessary, since market conditions have a central role in search, either through pre-existing knowledge or contingencies. However, asymmetry may offer an alternative route to successful search if external conditions are not favorable in the way previously described, such as new, untried information is not flooding to the market. Heterogeneity means, on the one hand, that each firm is a collection of unique resources and, on the other hand, that any resource can be used in a number of different ways (Penrose 1959). The uniqueness of resources between firms refers to differences in kind (effectiveness) rather than in degree (efficiency); that is to say, resources may provide different services rather than the same service with different levels of efficiency. Heterogeneity of firm-controlled resources makes the internal search environment more complex. All the various ways of using resources are probably not known automatically and, therefore, some untried productive services inherent in resources are likely to be continuously available in every firm (Penrose 1959). Moreover, the pool of ordinary resources is in constant change as firms systematically acquire new resources from the market (Penrose 1959) and random everyday variations occur, through employee turnover and accidents (Aldrich & Ruef 2006), for example.

Firm-level consequences of search

There is no automatic mechanism of success inherent in disruptive search, which can, but need not, lead to performance improvements (Schumpeter 1934; Tushman & Romanelli 1994). An immediate result of disruptive search is that a firm adapts a new way of action by combining resources differently. This may improve firms' environmental fitness, but a firm may equally well have selected an inappropriate alternative (Aldrich & Ruef 2006) or has been unable to act upon it in practice (Penrose 1959). Successful search generates entrepreneurial profit, the surplus over costs of providing more value to customers than other firms (Schumpeter 1934) or controlling the amount of output (Baumol 1990). Howev-

er, the returns are uncertain, realized over a long period of time and are negative in many instances (March 1991).

2.5.4 Fit between the elements of search

Loose and tight fit between search behavior, internal and external context and firm performance can be modeled differently, depending on whether search is seen as a neoclassical consideration or an evolutionary routine. The influence of a search routine on firm performance can be modeled as moderation in the case of loose fit. Search as a routine encapsulates preferences and abilities. Its impact on performance depends on the complex abilities of ideation, assessment and introduction, as well as on a highly volatile and complex environment that is lean or rich with untried resources.

The interpretation of search as conscious action within a loose fit approach is visible in research on the individual–opportunity nexus (see Venkataraman 1997; Shane & Venkataraman 2000; Shane 2003) or, more generally, the agent–non-agent nexus (see Davidsson 2016). This approach starts from the premise that the fit between actors' characteristics and situations explains the search actions that, in turn, determine the consequences at the individual, firm, industry and society levels (Shane 2003; Shane & Venkataraman 2000; Davidsson 2016). Entrepreneurship studies have typically interpreted these situations to occur outside the firm in the market environment (Shane 2003). The reason for this is probably a desire to clearly distinguish between the agent and the entity they act upon (see Davidsson 2016). However, the research on the emergent approach to organizational change through the concepts of effectuation (Sarasvathy 2001) and entrepreneurial bricolage (Baker & Nelson 2005), for example, has also expanded attention to the resources a firm already controls. The fit in the nexus approach is equivalent to the interactive effects of the actor and the situation on the actions. The entire nexus approach can be identified as a mediated moderation model in which the direct and the interactive effects of the actor and the situation on the consequences are mediated by their actions (Davidsson 2016).

When the nexus approach is applied here, the overall influence of search preferences on firm performance depends on search abilities, firm-controlled ordinary resources and the market environment, and the impact happens through the search behavior as a mediating mechanism. The effect of search preferences on firm performance is a function of complex abilities of ideation (scanning, attention, creativity), assessment (judgment, probing) and introduction (acquisition, development, replication, orchestration) of new resource combinations. Search may be directed inside the firm to the ordinary resources it controls. The consequences of search, then, depend on the nature of these resources, which ought to

at least be valuable and unique, possibly also difficult to imitate and replace, if they are to enhance firm performance. The given search preferences enhance performance if the market environment has the specific properties of low or high munificence, high dynamism and high complexity. The association between search preferences and firm performance is likely to be highest when all the three conditions are met simultaneously.

Search behavior is the mediator responsible for the effects of search preferences on firm performance. A high preference for unmeasurable risks indicates that a firm searches fundamentally new, untried, ways of doing things. Firms with an opportunistic search rule seek monopolizing combinations, while others search alternatives that also create value to customers. A high preference for challenges dictates that a firm invests considerable sums on search. A strong desire for initiative determines that a firm is a leader that searches combinations of resources that are new to the entire market. A firm with a high preference for curiosity is in continuous search, whereas a firm with low curiosity starts to search when conditions change to the worse for the firm. A preference for deliberation results in a planned form, and a preference for experimentation results in an emergent form of search.

A tight fit between the elements of disruptive search can be modeled as mediated moderation. Market circumstances influence the firm's performance, and the overall effect is dependent on the value and rarity, inimitability and nonsubstitutability (VRIN) qualities of the ordinary resources the firm controls. However, the moderating effect of ordinary resources may not be that strong, because firms could direct the search primarily to external conditions. Furthermore, variations in internal conditions may also cause the firm to start adapting through search. According to the traditional view of search as conscious action, the effects of the market and of internal circumstances are produced through a series of three mediators. The firm first develops or chooses the search preferences that match the conditions. Next, it adopts the search abilities required to act in accordance with the preferences. Finally, the firm forms a radically new resource combination that results in increased performance. Search resources are embedded into the search routine in the evolutionary approach, and the firm adapts its search routine to external and internal conditions with a single step, thereby achieving better performance.

2.6 Accumulative search

Firms engaging in accumulative search try to introduce unnoticed combinations of resources profitably to the market. This chapter initially studies accumulative

search as a behavior and both external and internal circumstances separately; then it takes their mutual fit into closer examination.

2.6.1 Activities of accumulative search

Target of search

Accumulative search is targeted at introducing a new, previously unnoticed resource combination. Such a combination may exist readily in the market, but firms have so far been largely ignorant about it (Kirzner 1973). A successful firm then matches an existent demand with an existent solution (Ardichvili et al., 2003; Sarasvathy et al., 2003). In practice, the firm may introduce an unnoticed good, market, resource or method of production, delivery or organizing. In the simplest situation the firm becomes an arbitrateur that buys and sells a good at profit in different parts of the market (Hayek 1945). It can be the same good or resource at a lower price, a higher quality good or resource at the same price, or both (Kirzner 1973; Hayek 1945). A firm may also try to imitate a pioneer's actions in the market, for example, to introduce a similar kind of new good (Kirzner 1973).

A new combination of resources may be a way to try to create added value for customers but it may equally well be a monopolizing attempt (see Penrose 1959). For example, a firm could discover a largely unnoticed, cheaper legal service in the neighboring submarket to sue competitors to raise the barrier for competition and gain additional profits thereafter. An unnoticed resource combination is incrementally new and a little different from the current alternatives known in the market (Kirzner 1973; Knight 1967; Cyert & March 1963; Tushman & O'Reilly 1996; Dewar & Dutton 1986; Abernathy & Clark 1985). It contains a low degree of new knowledge, for example, new technology. An incrementally new combination may contribute to irreversible change in the market (progress) but the change may equally well be ephemeral (fluctuation).

Timing of search

Timing of search depends on whether a firm's behavior is alert or inert. Alert search is continuous. There is no particular point in time or a situation or a problem as a result of which an alert firm engages in accumulative search; rather, it is spontaneously scanning the environment at all times (Kirzner 1973 & 1997). For such a firm search is a regular, ongoing process (Knight 1967; Abernathy &

Clark 1985). Problemistic search is temporary (Cyert & March 1963). An inert firm maintains its current operations as long as possible and moves from one crisis to another. It follows a feedback-react procedure in which the emphasis is on a short-run reaction to a short-run feedback. A firm starts to search for solutions for the problem when external conditions change and threaten its performance. Sometimes the feedback from the market may result in frequent searching for solutions (Tushman & O'Reilly 1996). A firm invests significant sums to search for new alternatives, but it will ultimately be content with a lower level of performance if incremental changes do not produce results (see Cyert & March 1963).

Direction of search

Accumulative search can be directed at external or internal conditions. Search is local. It is directed in the near neighborhood of the present activities (Cyert & March 1963; Levinthal & March 1981; Nelson & Winter 1982a). The general source of new alternatives is ignorance among market participants about present features of the context (Kirzner 1973; Hayek 1945). Some researchers see that the present maladjustments of factor markets and product markets are idiosyncratic in nature, which makes it difficult to categorize the sources of opportunities in any meaningful way (see e.g., Shane 2003). However, it may be possible to identify at least some broad directions for search. Market participants do not know automatically about all the changes that have taken place in the various parts of the market. One such change is local irregular fluctuations. Consumers' tastes may be fluctuating unexpectedly or there may happen a sudden redistribution of resource-owners' supply (Knight 1921; Hayek 1945; Mises 1952; Kirzner 1973 & 1999). Abrupt changes in natural or human conditions, say a natural disaster, a war or an epidemic, may alter consumers' preferences or may destroy some of the resources in that submarket and affect the prices as a result. Another external source of new alternatives is progressive changes, especially innovations, which have been introduced as a result of disruptive search by some pioneering firms but are still unknown to most market participants. Innovations create price gaps in the market, and other firms may try to locate these situations and imitate them (Kirzner 1973; Nelson & Winter 1982b; Nelson & Winter 1978).

Firms may also search among the ordinary resources they control. Penrose (1959) does not limit her view on disruptive search, when she explains that firms can search for new alternatives also in the absence of any changes in external circumstances. Search is directed at identifying unnoticed inefficiencies in allocating resources among known uses. For example, a firm may notice that their

employees or machinery are more efficient in producing the given higher priced good than the current good and switch to producing it and benefit from the efficiency difference. Firms also build on established technical and production competencies (Abernathy & Clark 1985; Benner & Tushman 2003). They search opportunities to fine tune, make improvements and reinforce the existing techniques (Nelson & Winter 1982b; Levinthal & March 1981 & 1993; March 1991; Shane 2003).

Form of search

Accumulative search may follow a planned or emergent sequence of activities. Planning differentiates between discovery, assessment and exploitation of new alternatives (see Shane and Venkataraman 2000; Shane 2003). This is highlighted in problemistic approach to search, where firms first identify and assess alternatives and then choose and implement them (Cyert & March 1963; March 1981). Specifically, firms become aware of a problem, identify, assess and choose alternatives, then implement them and finally evaluate and modificate its search procedures (Cyert & March 1963). Alert approach to search, in turn, captures the emergent sequence. Alertness is in a midway between deliberately produced information and pure chance (Kirzner (1997). In alert search it is "probably dubious" (Kirzner 1973, 38) to differentiate discovery and exploitation from another. Firms are spontaneously scanning the context and are ready to be surprised which approach is somewhat different from systematic and cost-conscious search for information which they know that is missing and know how to probably find (Kirzner 1973 & 1997).

2.6.2 External circumstances and accumulative search

Nature of markets

Environmental munificence may advance accumulative search in two different ways. Constant autonomous changes, whether fluctuations or progress, are a source of possibilities and threats to firms (Kirzner 1973; Hayek 1945; Mises 1952). An environment rich with unnoticed resources or goods is a source of new alternatives for firms. Accumulative search may also be effective in a lean environment, where there is lack of demand or resources or intensified predation by competitors. External disturbances cause problems to firms, and accumulative search may be a way to solve them (see Cyert & March 1963). There are no strict

assumptions about beneficial market structure. Either a large number of small firms or only a few, unevenly-sized firms may operate in the market, and some of them may have a potential to become a price-maker.

A moderate level of environmental dynamism is useful in accumulative search. The focus of search is in present conditions (single-period market), in which case uncertainty about the future has a smaller role than in the examination of long-term markets (Kirzner 1973 & 1999; March 1991; Tushman & O'Reilly 1996). One source of uncertainty concerns the shift from one time period to another. Existing markets change at some point and may destroy short-term opportunities on the assumption that there is a time lag between production and consumption[27]. The firm loses its momentum if there is an autonomous shift in consumers' preferences, availability of resources or technologies; as a result, existing prices change before the firm gets its offering to the market (see Kirzner 1973). Relatedly, firms do not know what competitors are planning to do, since they don't know what new means and ends others might know and what decisions they might make that affect the prices of resources and goods before the firm gets its offering to the market (see Kirzner 1973). Third, uncertainty exists about technological failure similar to disruptive search but to a smaller degree. For example, an imitating firm may fail in its effort to produce a good similar to a pioneering competitor's (see Nelson & Winter 1982a). Fourth, some level of commercial uncertainty is also present although not to the same extent as in disruptive search. For example, some early consumers may already have adopted a new buying habit as a result of the introduction of a new good by a pioneering firm engaging in disruptive search. However, some uncertainty may remain about other consumers' willingness to follow suit, about the quality of the utilized new technologies or about potential negative externalities, for example health or environmental issues and related government interventions, which may slow down or even stop the already started process of market change. Fifth, uncertainty still exists even within a single time period about whether a searching firm will ever come across any unnoticed alternatives to buy and to sell.

A rather complex market environment favors accumulative search. Differences in local conditions mean that some of the existing, market-controlled ordinary resources or goods are heterogeneous in their price or quality (Hayek 1945; Kirzner 1973). The lack of automatic and complete transfer of knowledge also means that market participants (consumers, resource-owners, firms) are unaware of all the possible alternatives currently available to them (Kirzner 1973 & 1999; Knight 1921; Hayek 1945; Mises 1952; Simon 1959). Market-controlled re-

[27] This type of uncertainty is largely eliminated if the firm buys and sells a product without any time-consuming processes of production (Kirzner 1999). An example of this is a can of milk that is bought and sold unprocessed (Kirzner 1973).

sources are somewhat mobile. Once a firm introduces a new resource combination, it is often easy for others to follow suit (see Kirzner 1973).

Market-level consequences of search

Accumulative search unifies the market's prevailing allocation patterns. The market is initially out of balance in the sense that there are multiple prices or qualities for the same goods or resources. A successful search starts an equilibrating process that is fundamentally a price competition. The market moves from imperfect knowledge towards more perfect knowledge. (Kirzner 1973 & 1997 & 1999) The role of the firm engaging in accumulative search is to provide new information to the market by buying and selling at different prices than others. New price information reduces the level of ignorance until the market approaches a point of equilibrium, when there is no ignorance and, therefore, no opportunities exist for economic profit (Kirzner 1973). If accumulative search is unsuccessful, the market remains in disequilibrium such that resources are allocated inefficiently.

Customers may not necessarily benefit from a successful accumulative search. The overall welfare may diminish if a firm manages to restrict free competition. Similarly, it may be problematic in the long-run if all firms engage solely in accumulative search, even if that does not result in monopolizing. Firms performing accumulative search often exploit innovations that have been created through disruptive search, so if all firms only wait for others' to provide such new combinations, eventually no one is providing them. The market moves to a downward spiral of refining existing goods up to a point where they are fully exhausted and nothing remains to refine anymore; consequently, the market is trapped into a suboptimal, stable equilibrium (Levinthal & March 1993; March 1991).

2.6.3 Internal circumstances and accumulative search

Nature of firms

Heterogeneous search resources across firms advance successful accumulative search. This asymmetry is captured in the rules of search. Firms accept moderate levels of uncertainty. Firms are often uncertainty and risk avoiders (Cyert & March 1963), but some level of uncertainty bearing is required in search (Kirzner 1973). Firms have a moderately high preference for initiative in competition that is reflected in their eagerness to follow the market's pioneering firms (see Kir-

zner 1973). Attitudes towards curiosity may vary across firms. Inert firms have a preference for maintaining the status quo as long as possible. This approach is present in models of local problemistic search (Cyert & March 1963; Nelson & Winter 1982a) and punctuated equilibrium (Romanelli & Tushman 1985). Alternatively, firms may have a high preference for curiosity. This view can be found in the entrepreneurial alertness approach, according to which some firms possess a routine-resisting and responsive attitude and have a propensity and drive to identify new alternatives and pursue goals efficiently (Kirzner 1973 & 1997). The higher the complexity of the external and internal environment, the more a high preference for curiosity is likely to be superior to a low curiosity preference. There are more unnoticed resources that could possibly be utilized differently as the complexity increases (see Penrose 1959).

Firms prefer to take challenges as long as those challenges do not jeopardize their survival (see Cyert & March 1963). Firms engaging in accumulative search may have either a low or high preference towards opportunism. A high preference for opportunism is arguably superior to low preference on the assumption that it means a firm is interested not only in capturing more value but also in creating additional value (cf. Penrose 1959). More alternatives are likely to open up for such a firm than for one that only prefers a common interest. Firms may also have a high or low preference for deliberation. Firm engaging in problemistic search are willing to estimate (Cyert & March 1963). Without knowing what to look for, alert firms, in turn, are ready to be surprised by their own ignorance (Kirzner 1997).

Asymmetric search abilities among firms foster effective accumulative search. Firms need abilities in the problemistic approach to systematically scan information about alternative ideas, to estimate their expected consequences and to exploit the chosen alternative, especially to negotiate agreements with various stakeholders (see Cyert & March 1963). The alertness approach, in turn, emphasizes the ability to notice new alternatives without systematic search. Kirzner (1973, 68) defines such an ability broadly as "knowing where to look for knowledge" and, in this sense, being the "highest order of knowledge." A more concrete effort specifies alertness to capture an ability to scan and search for a wide range of new information from various different places without any specific agenda about what to look for (see Tang et al. 2012)[28]. Furthermore, if a firm becomes aware of a pioneering competitor's recently launched new resource combination, it needs imitative abilities, such as reverse engineering or negotiat-

[28] Tang and others (2012) conceptualize alertness as having three dimensions: scanning and search, association and connection, as well as evaluation and judgement. Only the first of these dimensions is considered here, since it is related to the part of Kirzner's work that extends Schumpeter's view of entrepreneurship as a disequilibrating force to an equilibrating force and which is, therefore, in the focal point in this chapter.

ing skills to acquire some of the core resources from the competitor (see Nelson & Winter 1982a). A firm may also need an ability to replicate the ordinary resources it already possesses and wishes to include in a new combination[29] (see Nelson & Winter 1982a).

Heterogeneity of ordinary resources across firms is not a prerequisite for effective accumulative search. Kirzner (1973), for example, states that alertness is an alternative to an idea that some firms would automatically and readily possess some unique knowledge others do not have. It is not the possession of substantive knowledge of market data but alertness to new information that accounts in this view. However, asymmetric ordinary resources may be another path to successful search (see Penrose 1959) if the market environment is unsupportive in the way described previously. Relevant are the possible differences in degree rather than in kind so that some of the ordinary resources may have the potential to serve the given good more efficiently instead of serving an entirely new good. Ordinary resources change constantly when firms purchase new resources (Penrose 1959) and face unexpected variations in the existing ones (Aldrich & Ruef 2006).

Firm-level consequences of search

Accumulative search may possibly improve firms' performance. A firm successful in exploiting existing but largely unnoticed differences in prices or qualities gains supranormal profit but, probably, only temporarily. The action of one firm in the market makes other firms aware of a new alternative and triggers a competition, pushing prices gradually towards a point of normal profits (Kirzner 1973). A firm that is unsuccessful in search takes a loss. It may then either continue its search for new alternative operations or accept the decreased performance (Cyert & March 1963; Simon 1955).

2.6.4 Fit between the elements of search

Loose fit describes moderation, in which the effect of search on firm performance depends on the internal and external contexts. According to an evolutionary view, search preferences, abilities and actions cannot be separated from one another but together form a firm's search routine. This routine has a direct impact

[29] For example, if a domestic service firm learns that the same service is demanded in the neighboring country for a higher price and decides to provide its services there, it needs to be able to replicate the resources to also operate successfully in the new market.

on the firm's performance, and the relationship is moderated by the firm's ordinary resources and market environment. The accumulative search routine may be more effective than other search behaviors when a firm is ignorant about some of the readily available ways of using its ordinary resources or the market environment is lean or rich, involves moderate level of unmeasurable risks and is somewhat complex.

Studies on alertness have brought up the need to concomitantly consider both abilities and willingness in the search process (McMullen & Shepherd 2006; Mitchell et al., 2007). More generally, a traditional approach to loose fit can be modeled as mediated moderation when the overall influence of the search preferences on firm performance is a function of the search abilities, the ordinary resources and the market environment, and the effect occurs through the search behavior as a mediator. Search preferences are more likely to improve performance when they are accompanied with somewhat complex abilities of ideation (scanning, attention), assessment (judgement) and introduction (acquisition, replication, imitation) of new resource combinations. A firm with unnoticed ways of using its ordinary resources also has a potential performance advantage over others. Furthermore, accumulative search is effective in market conditions of low or high munificence, moderate dynamism and somewhat high level of complexity.

Search behavior is a mediating mechanism between search preferences and firm performance in the traditional perspective on fit. A moderate preference for uncertainty determines that a firm searches incrementally new ways of doing things. Depending on the preference for opportunism, search may be targeted at forming productive or unproductive combinations of resources. A preference for somewhat high initiative drives a firm to speedily introduce minor changes and imitate the leading firms' radical changes. A high preference for curiosity defines that a firm is in continuous search, whereas a firm that has a low preference for curiosity engages in search periodically when the performance level is threatened. A preference for experimentation leads towards the emergent search form, whereas a preference for deliberation results in the planned approach to search.

Tight fit represents mediated moderation, wherein a firm aligns with the context through search. External or internal circumstances act as a trigger to search. The characteristics of ordinary resources moderate the association between market circumstances and firm performance, but the interaction effect may not very strong, since firms can direct the search to external conditions. The search routine acts as a single mediator between external and internal context and firm performance in the evolutionary approach. The traditional view assumes that the search proceeds through serial mediation with three intervening mechanisms. The firm first adopts the search preferences described earlier that then guide the

development or selection of the needed search abilities, after which the firm introduces[30] a largely unnoticed resource combination in the market.

2.7 Framework of search

This study portrays optimizing, positioning, disruptive and accumulative search as different approaches to firm renewal. It focuses especially on how purposeful search generates variation when firms compete over scarce resources. Firms try to introduce valuable, rare, inimitable and nonsubstitutable (VRIN) resource combinations to the market. A firm needs to possess either VRIN search resources or VRIN ordinary resources or both to form VRIN resource combinations. The search behaviors provide partly differing perspectives on these issues. This study identifies the four types of search as viable and descriptively valid alternatives that could exist in any population of firms, at least temporarily, depending on how far or close to equilibrium the market is and whether the fit between search and market conditions is considered loose or tight.

External conditions

Optimizing search and positioning search are both efficient means of firm renewal in rather static external conditions (see Table 1). Demand and availability of resources are subject to autonomous changes, and there is little uncertainty about the future or ignorance about the present. Optimizing search can be beneficial, especially in a rich environment where demand is steadily increasing, risks are known and market-controlled resources are homogeneous and mobile. Positioning search, in turn, is favored by a lean situation in which demand is decreasing or unchanging, risks are measurable and market-controlled resources are homogeneous and resource owners cannot (easily) imitate or substitute the resources that are controlled by some firms and are currently missing from the market. Disruptive search and accumulative search are supported by a relatively dynamic market environment in which changes are faster, the future is more uncertain, and the present circumstances are more complex.

The higher the dynamism, the more a firm benefits disruptive search, especially when there are many new, untried resources flowing into the market. An environment full of new knowledge provides a rich source of possibilities and in-

[30] Any single search event may or may not result in a new resource combination, depending on the VRIN-qualities of the context, but complex external and internal environments are favorable for forming new combinations on the average.

creases the chances of forming new combinations. Firms are well aware of the available resource combinations in a lean environment, so a firm may direct its search to the resources it readily controls. When environmental dynamism is high, a firm cannot calculate the future and is, therefore, favorable to firms that accept and even praise unmeasurable risks. This is a high risk/high reward scenario in which no one knows with certainty how competitors and buyers will respond to a firm's actions. Doing something fundamentally new may pay off well or end in significant performance loss. From a slightly different perspective, there is a possibility in uncertain conditions for pioneering firms and pioneering customers to find or encounter each other. Furthermore, in a highly complex environment where there are many heterogeneous and locally distributed resources, firms with disruptive preference have more chances of coming up with new alternatives.

The market environment may support accumulative search in multiple ways. A firm benefits in a lean environment from a willingness to pay attention to other submarkets or to the resources it readily controls in order to identify new alternatives. Firms with some preference for unmeasurable risks are likely to prosper in somewhat uncertain conditions, in which they have good chances of coming up with alternatives that are incrementally different from the present ones. Accumulative search benefits especially from fragmented markets, which are a potential source of unnoticed alternatives. Heterogeneous and locally distributed demand and resources provide more possibilities for willing firms to form new alternatives by being alert to pioneering competitors' new initiatives and to conditions across various submarkets.

Table 1 Framework of opportunity search

	Optimizing search	*Positioning search*	*Disruptive search*	*Accumulative search*
External conditions (ex-ante)	High munificence Low dynamism Low complexity	Low munificence Fairly low dynam. Fairly low compl.	Low or high munific. High dynamism High complexity	Low or high munific. Fairly high dynam. Fairly high compl.
External conditions (ex-post)	Perfect equilibrium	Imperfect equilibrium	Disequilibr. towards imperfect equilibrium	Equilibrating towards perfect equilibrium
Ordinary resources	Homogeneous Mobile	Heterogeneous Immobile	Possibly heterogen. Possibly immobile	Possibly heterogen. Possibly immobile
Search resources	Homogeneous, Mobile	Homogeneous, Mobile	Heterogeneous, Immobile	Heterogeneous, Immobile
Search preferences	Low uncertainty Low curiosity Low challenge Low initiative High opportunism High deliberation	Fairly low uncert. Low curiosity Fairly low challenge Fairly high initiative High opportunism High deliberation	High uncertainty High (or low) curios. High challenge High initiative High (or low) opport. Low (or high) delib.	Fairly high uncert. High (or low) curios. Fairly high challenge Fairly high initiative High (or low) opport. Low or high delib.
Search abilities	Very simple -Introduction: replication and contraction -Assessment: computation -Ideation: observation of demand and price changes	Somewhat simple - Introduction: reallocation - Assessment: calculation - Ideation: analysis	Very complex - Introduction: acquisition, development replication choreographing - Assessment: judgement, affordable loss, probing, interaction - Ideation: scanning, attention, creativity, structures	Somewhat complex - Introduction: acquisition, imitation, replication - Assessment: judgement, affordable loss - Ideation: scanning, attention
Outcomes of search	Resource allocation: change in volume	Resource picking: reallocated resources	Resource manipulat.: untried combinations	Resource manipulat.: unnoticed combinat.
Timing of search	Episodic Passive Small sums	Episodic, Reactive Fairly large sums	Contin. (or episodic) Proactive Large sums	Contin. (or episodic) Proactive or reactive Fairly large sums
Form of search	Planned (or emerg.)	Planned (or emerg.)	Emergent (or plann.)	Planned or emergent
Direction of search	Primarily external conditions	Internal and external conditions	External and internal conditions	External and internal conditions
Firm performance	Zero economic profit or economic loss	Richardian or monopoly profit or loss	Schumpeterian profit or loss	Kirznerian profit or loss
Fit	Conscious or routine Loose or tight	Conscious or routine Loose or tight	Conscious or routine Loose or tight	Conscious or routine Loose or tight

Internal conditions

This study takes rationality as a point of reference that has helped to determine the search preferences and abilities for all four search behaviors. The very idea of having preferences is, in fact, counter to the neoclassical view (see Knight 1921), which makes all the search behaviors intently rational.

Homogeneous and mobile search resources support optimizing and positioning. The search resources must be valuable but need not to meet the other VRIN-qualities. This means, basically, that every firm in the market has the same search preferences and abilities. Optimizing firms have a preference for survival, known risks, low curiosity, low initiative, opportunism and deliberation. Search requires the simple abilities of ideation, assessment and introduction. Positioning firms differ from optimizing firms in that they accept measurable risks and have a higher preference for challenges and for initiative. Search requires somewhat simple abilities for ideation, assessment and introduction of new operations. Firms need abilities to gather information about more efficient ways to produce the given combinations and about the probabilities of rivals' competitive moves to calculate the consequences of various alternatives or affordable loss and to reallocate resources between given uses.

The premise in successful disruptive and accumulative search is that firms have heterogeneous and imperfectly mobile search resources. Essentially this means that there are firms in the market that are engaging in some of the other types of search or that there are some differences among firms within disruptive and accumulative search. Disruptive search indicates a preference for unmeasurable risks, a high preference for challenge and initiative, a low (or high) interest in deliberation, as well as a high (or low) preference for curiosity and opportunism. Search requires complex abilities of scanning or attention and creativity for ideation, judgmental or probing abilities for assessing new alternatives as well as abilities of acquisition, development, replication and orchestration to introduce new resource combinations. Accumulative search differs from disruptive search with slightly lower levels of preference regarding uncertainty, challenge and initiative. A firm also needs slightly less complex search abilities in comparison to disruptive search. Ideation is easier, as the new alternatives differ to a smaller degree from the existing ones; for the same reason, the assessment and the introduction of a new resource combination is also slightly less demanding.

Internal conditions support optimizing search on the assumption that firms' ordinary resources are of the same kind. They are valuable but do not fulfill any of the other VRIN-qualities. Successful positioning search requires that firm-controlled ordinary resources are at least heterogeneous and, possibly, also imperfectly mobile. Positioning may yield results even if all firms in the market had equal search resources, because firms are assumed to direct the search to identi-

fying unnoticed efficiency differences among the ordinary resources in their possession. Disruptive search and accumulative search, in turn, can be fruitful irrespective of whether firms are homogeneous or heterogeneous in the initial endowment of ordinary resources, because the search can also be directed to the external conditions.

Target of search

The target of search is a resource combination with attempted VRIN-qualities. It is an effort to increase either the efficiency or the effectiveness of the ordinary resources the firm readily controls or acquires from the market. Optimizing and positioning result in a potentially more efficient way of allocating (picking) the resources within the fixed framework of means and ends. The outcome of optimizing search is a change in the amount of the given output with given prices and given costs. Positioning search leads to a reallocation of firm-controlled ordinary resources so that a given service is provided by another given resource than before. The outcome of disruptive search and accumulative search is a different, potentially more effective way to combine (manipulate) resources. Disruptive search results in a previously untested, radically new combination of resources that may create a price gap between means and ends in the market. The firm introduces a previously unnoticed, incrementally new resource combination in accumulative search that, if successful, essentially closes a price gap in the market.

Common to all described search activities is that the attempted outcome is an improvement in a firm's operations, but this may well come with a net loss in customer welfare. Search for profits is implicitly assumed to be beneficial to both firms and the society (see Eckhard & Shane 2003). However, when firms engage in any of the four searches, they may try to form alternatives that create value to customers or, alternatively, destroy it in order to gain profit. Optimizing firms may engage in perfectly competitive rent seeking when they waste money in competition for the regulated resources, while positioning firms may try to search for pre-existing resources of market power to eliminate free competition. Firms in disruptive search may try to form some new, unproductive ways of competition, whereas firms engaging in accumulative search may try to identify some previously unnoticed alternatives for monopolizing the market. Although efficiency and monopoly are two distinct outcomes of search, they need not be mutually exclusive (Williamson 1991). The firm can try to gain the best outcome by searching for a single mean that would simultaneously bring efficiency and monopoly (Carstensen 2001) or that would advance in the short-run one and in the long-run the other of the two outcomes (Williamson 1991). However, this may be difficult to achieve in practice, and a firm may need to choose between the

two. For example, a rational firm might engage initially in pursuing both outcomes and, if they turn out to be conflicting, opt for the one with the higher expected long term returns (Carstensen 2001).

Timing of search

Both optimizing and positioning search occur in firms as a response to external changes in the price of the given goods and resources. Search is episodic and lasts until the firm has identified the most efficient way to utilize its resource pool to form the given combinations of resources. Search is also simultaneous in firms, and they react to each others' actions, especially in market positioning. Optimizing firms invest small, and positioning firms invest fairly large sums in search. Both disruptive and accumulative search can be either continuous or episodic. Episodic search is a response to adverse conditions that threaten firms' performance, whereas continuous search is driven by curiosity. Firms try to be proactive in disruptive search and to lead the competition, irrespective of whether they engage to search episodically or continuously. Accumulative search firms, in contrast, are either fast followers of radical pioneers or are leaders in introducing incremental changes. Firms invest large or fairly large sums in search.

Direction of search

An optimizing firm directs search primarily to the ordinary resources it readily controls and tries to identify the most valuable way to allocate them between the known resource combinations. The premise in positioning search is that firms may possess resources superior to their competitors, but they are currently unaware of this. Firms seek new information about unique and, possibly, also imperfectly imitable resources that only it has an access to in order to leverage their distinctive situation in the market of forming the given combinations of resources. Both disruptive and accumulative search are directed either to the ordinary resources available at the factor market or to those the firm currently has in its possession, and often the search is a mixture of both directions. Firms with a preference for disruptive search seek untried, potentially valuable (ways of using) resources, whereas firms use accumulative search to find resources that are obviously undervalued. The resources are preferably also rare, inimitable and non-substitutable but, in principle, the ordinary resources and their combinations need to turn out to be only valuable, since it is the heterogeneous and imperfectly mobile search resources that are the source of advantage in competition and make it possible for a firm to stay a step ahead of all, or at least most, rivals.

Form of search

Planned and emergent forms are interpreted in this study as two alternative ways to conduct any of the four core search activities. Planning is a standard approach to all the search activities. Scholars have associated planning with optimizing (Sarasvathy 2001) and positioning (Teece et al., 1997) as well as with disruptive and accumulative search (Shane 2003; Shane & Venkataraman 2000; see also Baker et al., 2003). These interpretations are rooted on the assumption of some pre-existing alternatives and calculated or judgmental choices between them. It has also been argued that, for example, Schumpeter (1934) says very little about how search for recombinations of resources actually occurs; consequently, there is also research on an emergent form of disruptive search (see Baker & Nelson 2005; Alvarez & Barney 2007). Kirzner's (1973) work on entrepreneurial alertness has also been interpreted as a contribution to the emergent approach to search (Baker & Nelson 2005). Sarasvathy (2001), in turn, says that it could be argued that accumulative search contains processes of planning, and disruptive search would be dominated by improvisation.

This study takes note of these considerations and utilizes them. Planned and emergent forms of search are interpreted to describe alternatives for how the four core search behaviors may be conducted. Planning firms go through all the alternatives before making choices when using optimizing search and adjusting the volume. Emergent search starts, however, on the assumption of equally imperfect calculation abilities among firms, from an occasional observation of unserved customers or excess goods, after which the firm begins to probe with small, affordable changes in quantity and continues to adjust further based on customer interactions. Planning firms exhaustively analyze the market conditions and the characteristics of the resources they control in positioning search, identify the best possible given alternative and then implement their choice. Improvising firms, with symmetrically imperfect calculation abilities, perform just enough analysis, perhaps recalling a random event in the near past, to get started with experimenting whether the resource acquired or built for a given use (A) would, in fact, be more efficient in another given use (B) or, maybe after further contingent events, in some other fixed usage (C), without any predetermined idea of the final outcome of the search.

A firm can apply a planning approach when using disruptive search and seek for untried, objective knowledge, either outside or inside the firm, about alternatives that are distant to the existing ones and make estimates about their potential. A firm can optionally prefer to direct disruptive search to resources at hand and imagine radically new ways of using them and invite customers to join the social construction of opportunities already at early stages without needing to estimate the future. When using a planned approach to accumulative search, a firm can

search for unnoticed, objective knowledge about external markets or inside the firm in the neighborhood of, for example, already existing goods and methods of production, and judge the future potential of some new ideas and then exploit them if satisfied with the estimates. Alternatively, a firm can choose to follow the emergent logic in which it starts with the resources at hand and imagines incrementally new ways of using them and collaborates with customers from the very beginning.

Planned and emergent forms of search are analytically distinguishable from each other. A firm may prefer one form of search over the other, or it may be more qualified in only one of them. Conversely, a firm may sometimes have to switch between planned and emergent search to cope with different kinds of situations and challenges it faces over time (Winter 2003). The two forms can also occur simultaneously, overlapping and intertwining (Sarasvathy 2001). Firms may follow planned behavior through highly formalized procedures of developing new products while simultaneously also improvising new ways of doing things (Miner et al., 2001). Similarly, some individual actions, for example, contacting a supplier to check the availability of some part, may be planned within product development, although the overall project is improvised (Miner et al., 2001). Balancing between highly structured planned search and less structured emergent search is, in practice, a challenging task for firms (Eisenhardt & Bhatia 2000 in Eisenhardt & Martin 2000).

Firm performance

There are no guarantees that search is profitable. A firm makes a normal profit (revenues equal accounting costs and opportunity cost[31]) when the resource combination is valuable, a temporary, supernormal profit (revenues exceed accounting costs and opportunity cost) when it is also rare, and persistent, supernormal profits when the combination is not only valuable and rare but also difficult to imitate and substitute. Loss occurs when none of the VRIN-qualities is met. A firm needs to possess either VRIN search resources or VRIN ordinary resources or both to form a VRIN resource combination. All the four search behaviors can result in any type of profit or loss, depending on the situation in the market and within the firm.

Profit has been recognized in scholarly research to contain contractual and entrepreneurial elements (Knight 1921; Rumelt 1987). Contractual profit is a fixed earning in a situation where the probabilities of various future conditions in the

[31] Opportunity cost is defined in this study as a difference between the return for the unchosen resources minus the return for the chosen resources.

market are known (Knight 1921). It is compensation for producing known resource combinations with scarce, possibly unique, resources (Kirzner 1997; Knight 1921; Rumelt 1987; Peteraf 1993). Contractual income can be identified as zero economic rent in conditions of perfect competition (Schoemaker 1990) and, in the case of imperfectly competitive market equilibrium, either as Ricardian rent or monopoly rent, depending on whether it is compensation for scarce productive resources or for market power (Peteraf 1993; Grant 1991; Mahoney & Pandian 1992). Entrepreneurial profit is compensation for discovering new resource combinations in uncertain conditions (Rumelt 1987). It is a residual, or surplus, that is earned when the price of a good is higher than the costs of the production factors (Knight 1921; Schumpeter 1934; Rumelt 1987). Entrepreneurial profit is compensation for a scarce ability to make judgments, willingness to take action and good luck (Knight 1921). Entrepreneurial profit can be further categorized as Schumpeterian and Kirznerian (Teece 2007). From this study's perspective, contractual profit could be interpreted as compensation for controlling and using heterogeneous and possibly imperfectly mobile, ordinary resources, and entrepreneurial profit as a return for controlling and using heterogeneous and possibly imperfectly mobile, search resources.

However, this interpretation is not entirely satisfying, because it suggests that search does not contribute to profits in the case of optimizing and positioning search. It also does not recognize the possibility that there may be ordinary resources with VRIN-features in disruptive and accumulative search. Therefore, contractual profit and entrepreneurial profit are redefined as ordinary profit and search profit. The former is compensation for controlling and using at least valuable, possibly also rare, imperfectly imitable and imperfectly mobile, ordinary resources. The latter is compensation for valuable, possibly also rare and imperfectly mobile search resources. Every firm possesses search and ordinary resources at all times. Profit or loss always contains some portion of both ordinary profit and search profit[32]. The value of search and ordinary resources depends on the market environment. Zero economic profit is compensation, in the case of optimizing search, for a firm for possessing and using valuable search resources and valuable ordinary resources. A positioning firm earns Richardian or monopoly profit for valuable search resources and for ordinary resources that are at least heterogeneous, possibly also imperfectly mobile. For firms engaging in disruptive or accumulative search, Schumpeterian and Kirznerian profits, respectively, flow from possessing heterogeneous and possibly imperfectly mobile search resources. Additionally, the ordinary resources need to be valuable but can also be rare and imperfectly imitable and substitutable.

[32] This applies even to a firm that does not search at all. It has a preference not to search, which may be a valuable feature under some circumstances.

Fit between the elements of search

The first aspect of fit is the relationship between preferences, abilities and actions of search. Search can be a conscious or a routinized action. The traditional view suggests that search preferences, abilities and behavior are distinct from one another. Firms have a set of search preferences they utilize to make deliberate choices over the pool of available search abilities to change their operations. The evolutionary approach assumes that search resources and behavior cannot be separated but are embedded in the search routine. Both the orthodox and the evolutionary view can be related to all the four search activities, as has been already presented.

An important question is whether or not firms can learn and change their search behavior by switching between the four types of search or perhaps making some alterations within one type. The second aspect of fit concerns the relations between search, external and internal conditions, and firm performance. The evolutionary approach recognizes firms to be either adaptive or inert to change. Tight fit is based on the organizational adaptation approach and assumes that firms change their search behavior swiftly in response to external or internal changes. Tight fit has been modeled in this study as mediation. The external or internal environment dictates a firm's performance through conscious or routinized search as an adaptive mechanism. Its influence depends on the characteristics of firm-controlled, ordinary resources except for optimizing search. The market environment's effect on firm performance cannot be positive in the case of positioning, unless the firm has some unexploited, ordinary resources with VRIN-qualities; this is not a requirement in disruptive and accumulative search, although it increases the likelihood of improved performance.

A dictionary definition of "inertia" contains two alternative meanings: a state of rest or a uniform motion (Merriam-Webster 2016). A strict ecological perspective assumes a strong, structural inertia that prevents firms from changing their everyday activities. (Hannan & Freeman 1977; Barnett & Carroll 1995.) Loose fit in this study is based on the definition of inertia as a uniform motion that is interpreted to mean that firms perform search, but they do not alter (easily) their search behavior. Inertia as a uniform motion of search is present, for example, in Cyert and March's (1963) work when they suggest that firms tend to search in the same way now as in the past. The same argument of repetitive behavior is made by Nelson and Winter (1982a) when they discuss the continuity of routinized action. Inertia as repetition is also present in Miller and Friesen's work (1980a) on momentum in organizational adaptation when they explain that reversals in the direction of change are relatively rare, as well as in Levitt and March's (1988) discussion of competency traps as persistence in inferior procedures. Similarly, Aldrich and Ruef (2006) bring forth the persistence of past selection crite-

ria that were once helpful for the firm but are irrelevant or harmful in the current market situation.

Loose fit has been presented in this study basically as moderation, when conscious or routinized search affects firm performance, but the association depends on the market environment. The market environment sets the selection criteria that favor some forms of search at the expense of others. It acts as a selective force when firms operate in the same market but engage in different search behaviors for one reason or another. The relation between search and performance also depends on the VRIN-qualities of firm-controlled, ordinary resources except for optimizing search, which only changes the volume of the given output. Furthermore, depending on whether search is understood as conscious or routinized action, the effect also depends on the quality of the firm's search abilities.

Besides loose and tight fit, another possibility is that search resources and market environment each directly influence search behavior. When organizational characteristics, in general, are examined in isolation from one another and from environmental conditions, an implicit assumption is that it is possible to find a "best practice" or characteristic suitable for all situations (see Hofer 1975; Huselid 1995). Alternatively, if there is no such superior characteristic, it is believed that a universally poor one exists that should be avoided in almost all circumstances (see Porter 1980; Baum et al., 2001; Miles et al., 1978). Accordingly, search and market environments would independently affect firm performance.

The relationship between various search behaviors

The four search behaviors have been studied so far in this chapter mainly as separate ways of creating organizational change. It was previously discussed how firms may possibly engage in different search activities over time. Furthermore, research has recognized a need to balance between various search behaviors. This balancing effort has been suggested as happening either sequentially or simultaneously. For example, a firm may try to combine disruptive search with monopolizing positioning search to gain longer lasting benefits. Schumpeter (1942) argues that some monopolizing (market positioning) activities, like patents, temporary secrecy and long-period contracts, are needed to complement disruptive search to safeguard the profitability of investing in that search (see also Rumelt 1987; Boldrin & Levine 2004). Similarly, Shane and Venkataraman (2000) recognize the possibility of using positioning search, especially monopolizing, as a means to increase the duration of a profit-generating opportunity in the case of both disruptive and accumulative search (see also Shane 2003; Casson 1982). Similarly, some portion of a firm's behavior may be based on optimization and another portion on innovation activities (Nelson & Winter 1982a).

It has been recognized that firms need to balance between various searches to be successful at all times, especially regarding disruptive search and accumulative search. Cyert and March (1963), for example, suggested a sequential relationship between local (accumulative) and distant (disruptive) search, so that a firm first starts with incremental changes and, if that does not solve the problem, it moves to search for more radical alterations. Furthermore, Tushman and Romanelli (1985) base their model of punctuated equilibrium on local and distant search. Firms evolve through relatively long periods of incremental change but, at some point, minor changes are insufficient for a firm to achieve its performance goals, so it needs fundamental changes to avoid failure (Tushman & Romanelli 1985). Several academics have also paid attention to the need for a firm to tackle disruptive and accumulative search simultaneously. It is not enough for a firm to sequentially switch between local and distant search to maintain high performance in varying conditions; rather, it needs to simultaneously engage in both searches, which is identified as (simultaneous) ambidexterity (Tushman & O'Reilly 1996; He & Wong 2004; Jansen et al., 2006; Raisch & Birkinsaw 2008) or balance between exploitation and exploration (March 1991; Levinthal & March 1993).

Others have suggested, however, that in high-velocity settings (short product cycles and intense competition), firms need to change continuously through a process that is somewhere between radical (disruptive) and incremental (accumulative) (Brown & Eisenhardt 1997). McMullen and Shepherd (2006), in turn, have proposed that accumulative and disruptive search are, in fact, not two separate behaviors but parts of the same process, in which accumulative search is the first stage of paying attention to new alternatives (third-person opportunities), while disruptive search represents the second stage during which firms evaluate the feasibility and desirability of the alternatives (first-person opportunities) and either act on them or cast them aside.

Finally, purposeful and blind variation have so far been treated in this study as different mechanisms, although they are, in fact, linked to one another and may even be inseparable in practice (see Nelson & Winter 1982a; Aldrich & Ruef 2006). At least three aspects are relevant here. Blind variations in firm-controlled, ordinary resources could cause purposeful search for new alternatives. For example, several key persons could suddenly leave the firm, which would initiate a search for solutions to the unexpected situation. Moreover, an idea of a new alternative, for example a new product, could arise by chance; a firm would then assess and either discard or execute it based on its search preferences and abilities. Some degree of blind variation is also inherently present in the emergent form of search. Firms attempt to leverage surprises instead of being averse to them.

3 ENTREPRENEURIAL ORIENTATION AND DYNAMIC CAPABILITIES

The second research question of the study addresses the possible roles of entrepreneurial orientation (EO) and dynamic capabilities (DC) in firm performance from the perspective of firm renewal. This study examines how the two concepts are discussed in the theoretical and empirical literature to answer this. Entrepreneurial orientation and dynamic capabilities are each identified here as a construct, something that does not exist as a directly observable object but one that researchers create (see Nunnally & Bernstein 1994). The task is to review the existing conceptual definitions of the constructs and to shed further light on them by utilizing the theoretical discussion about opportunity search. First, the entrepreneurial orientation and dynamic capabilities are studied separately; then, they are positioned relative to the framework of opportunity search presented in the previous chapter.

3.1 Conceptualization of entrepreneurial orientation

Defining the construct consists of identifying its domain and theme (MacKenzie et al., 2011; see also Nunnally & Bernstein 1994). These issues are discussed next regarding entrepreneurial orientation.

3.1.1 Domain of entrepreneurial orientation

Domain establishes what the construct is seen to conceptually capture and how it differs from other related constructs (MacKenzie et al., 2011). The entrepreneurial orientation domain is examined in terms of its purpose and property type, what the entity EO applies to and the constructs that are conceptually close to EO.

Definitions of EO

A plethora of different labels has been given to the phenomenon that the entrepreneurial orientation concept tries to capture. Zahra and colleagues' (1999) article provides an illustrative overview by showing how, over time, it has been

called by such names as entrepreneurship, corporate entrepreneurship, intrapreneurship, entrepreneurial posture and entrepreneurial orientation. The first written mention of entrepreneurial orientation as a construct can be traced at least to 1975 and to Anderson and Paine's (1975) work when they examined strategy formulation in different environmental settings (see Table 2). They use EO as a synonym for Mintzberg's (1973) entrepreneurial mode of strategy formulation and define (p. 818) the concept as "characterized by a pro-active search for new opportunities in a yielding environment, centralized power, bold actions in changing strategic properties of the organization, and growth as a dominant goal." For some reason, the other pioneering studies on the concept do not refer to their work.

Table 2 Selected definitions of entrepreneurial orientation

Author(s)	*Definition*	*Objective*	*Dimensions*	*Parallel terms*
Anderson & Paine (1975)	"Characterized by a proactive search for new opportunities in a yielding environment, centralized power, bold actions in changing strategic properties of the organization, and growth as a dominant goal" (p. 818)	Improved economies of operation (optimization, planned change); or, satisficing, survival (effective problem solving)	Proactiveness, centralized structure, boldness, growth	Entrepreneurial mode
Miller (1983)[33]	"A process by which organizations renew themselves and their markets by pioneering, innovation and risk-taking" (p. 770)	Competitive advantage	Innovation, risk-taking, proactiveness	Entrepreneurship, entrepreneurial activity, entrepreneurial firm
Covin & Slevin (1989)	"The extent to which the top managers are inclined to take business-related risks, to favor change and innovation in order to obtain a competitive advantage for their firm, and to compete aggressively with other firms" (p. 77)	Competitive advantage	Innovation, risk taking, proactiveness	Entrepreneurial-conservative orientation, entrepreneurial posture, entrepreneurial strategic posture, entrepreneurial firm, prospector firm, entrepreneurial organization, entrepreneurial behavior
Smart & Conant (1994)	"… a dynamic goal-oriented process whereby an individual combines creative thinking to identify market place needs and new opportunities with the ability to manage, secure resources and adapt to the environment to achieve desired results while assuming some portion of risk for the venture" (p. 2)	Favorable organizational performance	Innovation, risk taking, strategic planning, identification of customer needs, perseverance and identification of new opportunities	Entrepreneurship
Lumpkin & Dess (1996)	"Key entrepreneurial processes, practices and decision-making activities that lead to new entry" (p. 136)	New entry	Innovativeness, risk taking, proactiveness, autonomy, competitive aggressiveness	-
Wiklund (1998)	"The CEO's strategic orientation reflecting the willingness of a firm to engage in entrepreneurial behavior." (p. 65)	Better performance	Risk taking, innovation and proactiveness	-

Miller (1983) used the term "entrepreneurship," which is accepted here as a definition of EO, since Covin & Slevin (1989), Lumpkin and Dess (1996),

[33] Miller (1983) did not use the term "entrepreneurial orientation" but "entrepreneurship," which is accepted here as a definition of EO because of its integral role in the later works listed in the table.

Wiklund (1998) and other early works (e.g., Morris & Paul 1987) on the explicit concept of entrepreneurial orientation use it as a central reference. Accordingly, Miller (1983, 770) defines entrepreneurial activity as a "process by which organizations renew themselves and their markets by pioneering, innovation and risk-taking." He further describes (p. 771) an entrepreneurial firm as "one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch." Entrepreneurship is essentially about the Schumpeterian introduction of new resources combinations for Miller (1983). A non-entrepreneurial firm, in turn, innovates very little, avoids risks and imitates the actions taken by competitors instead of leading the way (Miller 1983).

Covin and Slevin (1989, 77) define entrepreneurial orientation based on Miller (1983) as "the extent to which the top managers are inclined to take business-related risks, to favor change and innovation in order to obtain a competitive advantage for their firm, and to compete aggressively with other firms." Covin and Slevin (1989) parallel entrepreneurial orientation to the strategic orientations of Miles and Snow's (1978) prospector firms and Mintzberg's (1973) entrepreneurial organizations. They further define conservative orientation as an alternative, opposing strategic posture for entrepreneurial orientation. The top management style of firms with conservative orientation is decidedly risk-averse, non-innovative and reactive (Covin & Slevin 1989).

Smart and Conant (1994, 2) specify EO based on entrepreneurship as "a dynamic goal-oriented process whereby an individual combines creative thinking to identify market place needs and new opportunities with the ability to manage, secure resources and adapt to the environment to achieve desired results while assuming some portion of risk for the venture." They see EO as an owner-manager centric process that contains both traits and skills.

Lumpkin and Dess (1996, 136) describe entrepreneurial orientation as "key entrepreneurial processes, practices and decision-making activities that lead to new entry." This new entry may be achieved by entering new or established markets with new or existing goods or services. Entrepreneurial orientation involves the intentions and actions of key players in a process aimed at new entry through new venture creation. It reflects the organizational processes, methods, practices and decision-making styles that firms use to act entrepreneurially (Lumpkin & Dess 1996). The authors believe there is a fundamental set of strategy-making process dimensions that underlies entrepreneurial orientation. They characterize entrepreneurial orientation with five dimensions: a propensity to act autonomously, a willingness to innovate and take risks, proactiveness to marketplace opportunities and a tendency to aggressive competitive behavior.

Wiklund (1998, 65), in turn, defines entrepreneurial orientation as "the CEO's strategic orientation reflecting the willingness of a firm to engage in entrepre-

neurial behavior." He continues further (p. 65), stating that EO is used to "characterize the entrepreneurial dimensions of a firm's strategy." The objective of entrepreneurial orientation is the firm's improved performance. He follows Miller (1983) in including risk taking, innovation and proactiveness as dimensions of the construct.

Property type of EO

A type of a construct's property may refer, in general, to a thought (e.g., value or intention), a feeling (e.g., attitude), a perception, an action (e.g., behavior or activity), an outcome (e.g., performance), or an intrinsic characteristic (e.g., ability or structure) (MacKenzie et al., 2011). We must understand to which property the "orientation" part of the construct refers, in the case of entrepreneurial orientation. According to Oxford Dictionaries (2011), orientation means "the determination of the relative position of something or someone." It may refer to physical position or direction, familiarization with or introduction of something, or the direction of attitude or interest (Oxford Dictionaries 2011). There has been little consensus over the years as to what type of construct EO is (Wiklund 1998). It has been seen as a dubious mix of preferences, (past) behaviors and beliefs (Wiklund 1998; Davidsson 2016). Consequently, at least three different interpretations of the property type of EO can be found in the research literature.

Entrepreneurial orientation can be interpreted as action, attitudinal construct, or a mixture of two or more property types, including goals, willingness, abilities structure, decisions and actions. Miller (1983) shifted the attention from characteristics of entrepreneurial actors to entrepreneurial behavior by arguing that organizations can act entrepreneurially. Miller and Friesen (1982) had previously referred to various innovative actions of entrepreneurial firms. Overall, interpretation of EO as an action gained a strong foothold in early works on the concept (see Covin & Slevin 1991).

According to another viewpoint, entrepreneurial orientation is interpreted primarily as an attitudinal measure. According to Zahra (1991), entrepreneurial orientation gauges a firm's disposition rather than actual engagement in entrepreneurial action. Some researchers have understood EO to describe a willingness to engage in particular actions in this case: to innovate, to take business-related risks and to be proactive when competing with other firms (Wiklund 1998; Wiklund & Shepherd 2003; see also Naman & Slevin 1993; Merz et al., 1994). Moreno and Casillas (2008) present entrepreneurial orientation as a specific style of management and describe it as a cultural dimension of the firm. Jiao and others (2010) have interpreted entrepreneurial orientation as a mindset and an atmosphere within an organization. For others the construct addresses the philoso-

phy of business behavior that guides the firm (Merz et al., 1994) and determines the nature and scope of its activities and plans (Miles et al., 1993). Zahra and others (1999) have pointed out that orientation does not necessarily gauge actions. They conclude that more research is required to distinguish between orientation and actions.

Entrepreneurial orientation as a mixture of property types has been a third common interpretation of the concept. Anderson and Paine (1975) described EO in terms of goals, structure and actions. Lumpkin and Dess (1996) suggest that entrepreneurial orientation involves both intentions and actions taken in strategy-making processes. According to Covin and Slevin (1989), EO is a top manager's management style comprising management philosophy, decisions, and behaviors. Smart and Conant (1994) shifted the focus of their work to yet another property type by suggesting that entrepreneurial orientation is a mixture of propensities and various abilities. Kropp and colleagues (2006) also investigated EO as an ability-related concept, anchoring it partly to the self-efficacy theory.

The debate about the property type of EO seems analogous to the discussions about the nature of the concept of a firm's strategy. A large number of different interpretations of a strategy concept are present in the literature (see e.g., Hax & Majluf 1988). Depending on the definition, a strategy includes one or more of the following property types: goals, resource allocation priorities, decisions (based on deliberation, rules or unintentionality) and actions (Minzberg 1978; Mintzberg & Waters 1985; Child 1972; Hax & Majluf 1988; Venkatraman 1989; MacCrimmon 1993). The advantage of choosing only one property type versus a mixture of types is that it becomes possible to examine the relationships between antecedents (e.g., goals) and mechanisms (e.g., actions) in different contexts (Venkatraman 1989; Mintzberg & Waters 1985).

The definitional disagreement on the EO's property type is relevant from yet another viewpoint, in that it is essentially a matter of focusing on the characteristics of actors, or their behavior or the consequences of that behavior. The research has identified three major aspects of entrepreneurship: why some (people or organizations) act entrepreneurially, how they act and what happens when they act (Stevenson & Jarillo 1990; Venkataraman 1997; Shane & Venkataraman 2000). The property type determines to which of these aspects of entrepreneurship EO is positioned and to which one(s) it contributes. "Why" is about actions' antecedents, "how" is about actions' mechanisms, and "what" is about actions' consequences. "Why" is related to actors' values, motivations and goals, whereas "how" is about entrepreneurial management and different modes of action to achieve the set goals (Stevenson & Jarillo 1990; Shane & Venkataraman 2000). Consequently, if EO is interpreted as an attitudinal concept ("why"), it is related to antecedents of entrepreneurial action; if it is seen as a behavioral construct, it is connected to the mechanisms of entrepreneurial action ("how"). Furthermore,

if EO is understood as a mixture of attitudes, behaviors and goals, then it contributes simultaneously to the antecedents, actions and consequences of entrepreneurship.

Entity of EO

Entity refers to the object to which the construct's property applies. For example, an entity may generally be an individual, a group, a network, an organization, or a task, a process or a culture (MacKenzie et al., 2011). There is no reason why a construct could not have varying entities; however, it is essential to specify properly the level to which a construct applies in each research setting (MacKenzie et al., 2011).

There is widespread agreement in the literature that entrepreneurial orientation is an organization-level phenomenon reflected in the actions and attitudes of individuals and groups within an organization. Many authors have identified EO as a firm-level process (Miller 1983; Smart & Conant 1994; Lumpkin & Dess 1996). Covin and Slevin (1991) hold the view that entrepreneurship as a process ought to be also related to organizations, not only to individuals. Similarly, Miller (1983) states that there has been a strong tendency to identify entrepreneurship with an independent-minded owner-manager who makes the firm's strategic decisions. Miller (1983), in turn, examines entrepreneurship as the entrepreneurial activity of the firm when the efforts at the firm level extend beyond one key manager. Entrepreneurial efforts may be performed by traditional owner-managers, the head-office management department or in any other level of organizational hierarchy, such as R & D, engineering, marketing, or production (Miller 1983). Covin and Slevin (1989) and Wiklund (1998) express the same thing but focus on one specific group of people when they state that EO is a managerial orientation reflecting the entire firm. More recently, some initiatives have applied the concept of entrepreneurial orientation directly to individuals (e.g., Langkamp-Bolton & Lane 2012). To conclude, the construct of entrepreneurial orientation was originally created to shift the focus from the individual level to the firm level but other attempts have subsequently been made to utilize the concept to describe entrepreneurial individuals.

EO and related constructs

It is important to identify what a construct is supposed to conceptually represent; it is equally essential to discuss what is unique in it, that is, how it differs from other, closely related constructs (MacKenzie et al., 2011). It is challenging at best

to try to position entrepreneurial orientation both terminologically and content-wise with respect to other commonly used concepts in the entrepreneurship and strategic management literature. The terminological challenge dates back to the first writings on entrepreneurial orientation in which the authors used many parallel expressions to describe the construct. Covin and Slevin (1989) discuss entrepreneurial strategic posture, entrepreneurial posture and entrepreneurial behavior, as well as (1991) corporate entrepreneurship, entrepreneurial process and entrepreneurial organization as coterminous to entrepreneurial orientation. Miller (1983), in turn, uses entrepreneurship, entrepreneurial behavior, entrepreneurial efforts, entrepreneurial activity and organizational renewal as substitutes for each other while laying the grounds for the entrepreneurial orientation construct. Usage of many parallel wordings to describe the same phenomenon may become more understandable if we look at the main arguments these researchers were trying to make. Next, EO is discussed in regard to some of these closely related concepts.

EO and entrepreneurship. The literature identifies three different interpretations of the relationship between entrepreneurial orientation and entrepreneurship. Miller (1983) and Covin and Slevin (1989; 1991) suggested that the domain of entrepreneurship research should be refocused from individuals to organizations and from actors to actions. Accordingly, they conceptually outline entrepreneurship as an organization-level behavior through which organizations renew themselves. Morris and Paul (1987) were among the first to explicitly associate the EO concept with firm-level entrepreneurship. Following this line of work, EO can be interpreted to be coterminous with entrepreneurship when entrepreneurship is understood as a firm-level entrepreneurial phenomenon. Lumpkin and Dess (1996), in turn, distinguish EO from entrepreneurship. They define entrepreneurship as a desired goal of launching a new venture, while entrepreneurial orientation refers to the means of achieving this new entry through various processes (methods, practices, decision-making styles). This distinction is comparable to the one Venkatraman (1989) makes about means and ends in strategic management. He notes that if only actions are treated as a strategy, it is possible to examine the relationships between actions and goals in different contexts. Wiklund's (1998) work provides yet another view of the relationship between entrepreneurial orientation and entrepreneurship, irrespective of whether entrepreneurship is interpreted as actions or consequences. Based on the works of Brown (1996) and Merz (1994), Wiklund (1998) considers entrepreneurial orientation to reflect a firm's willingness to engage in entrepreneurial behavior. Entrepreneurial orientation should be able to predict subsequent entrepreneurial behavior in this logic (Wiklund 1998).

EO and entrepreneurial process(es). Entrepreneurial processes are inherently included in the concept of entrepreneurship, and the literature presents at least

two views on it. Miller (1983) describes entrepreneurship from the process perspective, including the three subprocesses of innovativeness, risk taking and proactiveness. Elaborating on this, Lumpkin and Dess (1996) and Morris and Paul (1987) before them argue that entrepreneurial processes constitute the concept of entrepreneurial orientation. The second well-established description of entrepreneurial processes originated with Venkataraman (1997) and Shane and Venkataraman (2000), who identified three processes in particular: discovery, evaluation and exploitation of opportunities. During these processes actor(s) discover an opportunity generated by environmental changes, assess it and decide whether or not to try to exploit it and, finally, obtain resources, design organization modes and strategies to exploit the opportunity (Shane 2003). These two process approaches could be viewed as two separate answers to the "how" question of entrepreneurship research, that is, as mechanisms that result in a new entry or possibly some other consequences. However, arguably these two could also be interpreted to be connected. Innovativeness as a dimension of EO might indicate a firm's commitment to discovering new opportunities, risk taking to the assessment stage and being proactive in taking the initiative to exploit the opportunities.

EO and corporate entrepreneurship. The literature provides two alternative perspectives on the relationship between EO and corporate entrepreneurship. They may be seen as equivalents (Zahra & Covin 1995; Covin & Slevin 1991; Morris & Paul 1987) or partly overlapping (Covin & Miles 1999). According to Covin and Miles (1999), corporate entrepreneurship is often viewed through three distinct organizational phenomena, which include situations where an established organization enters a new business (corporate venturing), an individual or a team promotes new product ideas within the organization (intrapreneurship), or an entrepreneurial philosophy (entrepreneurial posture) penetrates an entire organization, affecting its outlook and operations. From these phenomena, Covin and Miles (1999) link entrepreneurial orientation to the entrepreneurial philosophy aspect, whereby firms, per se, act in an entrepreneurial manner. The relationship between EO and the new-entry aspect of corporate entrepreneurship can, in turn, be interpreted on the basis of Lumpkin and Dess (1996) so that entrepreneurial orientation describes how a new entry is undertaken. An intrapreneurship situation of corporate entrepreneurship focuses on individual-level behavior in championing new product ideas within an organization (Covin & Miles 1999) instead of firm-level behavior, which is the unit of analysis in entrepreneurial orientation, as previously discussed. However, the intrapreneurship aspect may be interpreted to be partly included in the autonomy dimension of entrepreneurial orientation. Some EO studies evidence this, whereby autonomy has been measured by using some items from corporate entrepreneurship scales (see e.g., Hughes & Morgan 2007).

EO and company strategy. Entrepreneurial orientation and the firm's strategy are tied closely together. EO, or some of its attributes, has been interpreted as specific, entrepreneurial dimensions of a strategy (Wiklund 1998) or as strategic beliefs that guide strategic actions (Lau & Bruton 2011). Indeed, if strategy is examined through formulation (goals) and implementation (means) (Venkatraman 1989), then EO has been used to describe both the strategy formulation process (Anderson & Paine 1975; Lumpkin & Dess 1996; Dess et al., 1997) and the strategic actions taken in the market (Miller 1983). The close relationship between entrepreneurial orientation and strategy is clearly visible in the works of Anderson and Paine (1975), Miller (1983) and Covin and Slevin (1989), who build their work on Mintzberg's (1973) entrepreneurial strategy formulation modes, as well as on Miles and Snow's (1978).

EO and company culture. Entrepreneurial orientation can be interpreted as an organization culture-related concept. Lumpkin and colleagues (1996; 1997) suggest that entrepreneurially oriented strategy formulation includes aspects of company culture, although they do not delve deeper into the topic and eventually treat culture as a separate concept. Organizational culture can be analyzed at different levels, ranging from underlying assumptions to values, artifacts and creations (including behavior) (Schein 1984). The attitudinal interpretation (willingness) of EO could be understood from this perspective to reflect the entrepreneurial values within the firm and the behavioral interpretation of EO the visible level of a firm's entrepreneurial culture. For example, O'Reilly and others (1991) identify eight dimensions that characterize an organization's culture. Of these shared values, innovation, risk taking and competitive aggressiveness can be matched to three dimensions of entrepreneurial orientation (see Lumpkin & Dess 1996). Moreno and Casillas (2008), in turn, identify EO explicitly as a firm's cultural attribute.

EO and strategic entrepreneurship. The strategic entrepreneurship research associates entrepreneurial activity with opportunity seeking and strategic management with advantage seeking. An entrepreneurial posture is needed to discover opportunities in this viewpoint, while strategic management is required to successfully exploit these opportunities (Ireland et al., 2003). This is essentially the same interpretation that Penrose (1959) had made, according to which entrepreneurship is about creating and choosing new opportunities, whereas administration is about executing them and running the firms' current operations. If EO is understood as a behavioral concept, it could well be construed as an opportunity-seeking component of strategic entrepreneurship.

3.1.2 Conceptual theme of entrepreneurial orientation

The conceptual theme clarifies the set of characteristics that gives a meaning to a construct (MacKenzie et al., 2011), enabling a construct to be measured and differentiated from other constructs. The literature is scarce on studies that explicitly and thoroughly focus on theoretical specifications of the EO construct's attributes. Lumpkin and Dess (2001) stated that empirical research would benefit from richer and more fine-grained conceptualizations of the EO dimensions. This would provide a means to increase the number of items used to cover the EO dimensions and would also help to build a closer fit between measurement and theory (Lumpkin & Dess 2001). The conceptual theme of entrepreneurial orientation is next examined in detail based on the common theme, unique characteristics, dimensionality and stability of the entrepreneurial orientation construct.

Common theme of EO characteristics

A construct may include one or more characteristics that give it a meaning. No general list of various attributes exists, but there are two criteria for them. Every characteristic of a concept has, ideally, both a common and a unique theme (MacKenzie et al., 2011). We need to understand to which common and unique characteristics the "entrepreneurial" part of the construct refers in the case of entrepreneurial orientation. To begin with, Oxford Dictionaries (2011) characterize entrepreneurial as "taking of financial risks in the hope of profit." This is, indeed, identified as one aspect of entrepreneurial orientation in the literature (see e.g., Miller 1983). Whether risk taking, among others, is a common, over-arching theme to all EO characteristics or a unique feature, will be examined next. A common theme is something that ties all the attributes of the concept together. EO was previously identified alternatively as an attitudinal, a behavioral or a mixture (of both) construct. The question now arises as to what kind of attitude or behavior entrepreneurial orientation refers.

Three candidates for the unifying theme for all EO characteristics can be identified. Miller's (1983) approach identifies the common theme as organizational renewal, which means that firms renew both themselves and their market. Miller (1983) does not specify the renewal in detail. His reference to the Schumpeterian entrepreneurial role suggests that renewal comes very close to innovation. This is backed up by his other work, in which he discusses innovation as a key attribute of entrepreneurial firms (e.g., Miller & Friesen 1982; Miller & Friesen 1978) and classifies EO-related characteristics (new products, risk taking and proactiveness) under the innovation heading (Miller & Friesen 1983). Covin and Miles (1999), in turn, propose directly that innovativeness lies at the heart of EO. They con-

clude that a firm should not be labeled entrepreneurial unless it is innovative. Following this line of argumentation, the common theme to all characteristics of EO is either organizational renewal or innovation. Lumpkin and Dess's (1996) conceptualization of EO, in turn, suggests that the common theme would be new entry and, therefore, not necessarily renewal. They refer to new entry as a diversification of a business unit through a new venture. New entry involves four types of product-market combinations based on whether the markets and products are new or existing. New entry may be related to innovation but is not limited to it. Firms may also enter new markets by innovating new products or by acquiring existing firms that may not require innovativeness (Lumpkin & Dess 1996). Furthermore, new entry is not limited to establishing a new position in the market but also includes the protection of the gained position against competitors' actions (Lumpkin & Dess 2001).

The theme of new opportunities represents a possible way to combine various perspectives on the common theme for EO attributes. Anderson and Paine (1975) relate EO with a search for new opportunities, and Covin and Miles (1999) discuss developing and exploiting opportunities for innovation. Both Miller (1983) and Lumpkin and Dess (1996) discuss how firms may pursue new opportunities for profit making, although they do not refer to exactly the same type of opportunities. Miller (1983) focuses on Schumpeterian opportunities, whereas Lumpkin and Dess (1996) additionally accept incremental innovation and rule out opportunities that are unrelated to new entry, for example buying discounted resources or reorganizing production through outsourcing. Taken together, the search for new alternatives, or opportunities, for profit making could be a common theme for EO attributes, and these opportunities could be pursued through new entry or through organizational renewal (or innovation).

Unique themes of EO characteristics

It is important to specify what is unique to each of entrepreneurial orientation's characteristics, in addition to determining its common theme. Unique features prevent the construct to be defined overly broadly and to be mixed up with other closely related constructs (MacKenzie et al., 2011). For example, if EO was conceptualized solely as a new entry, it would be difficult to differentiate it from a concept like internationalization that also includes an entry into new markets.

There are at least three competing listings in the theoretical literature about EO's characteristics and some modifications of them in the empirical research. Anderson and Paine (1975) assigned it such attributes as proactiveness, centralized structure, boldness and growth. They basically used EO as a synonym for Mintzberg's (1973) entrepreneurial mode of strategy formulation and derived the

four characteristics from his work. Anderson and Paine (1975) represent a classificatory approach to construct formation. Such a typology is based on parsimonious dimensions, but its weaknesses are its sensitivity to the chosen set of dimensions and the measurement method, and it cannot reflect the differences within any particular cell of the typology along the underlying dimensions (Venkatraman 1989). Perhaps these limitations are the reason why the typology has not gained wider attention in the EO literature. The common interpretation is that EO comprises three characteristics: innovation, proactiveness and risk taking (see Miller 1983; Covin & Slevin 1989). The third option put forward by Lumpkin and Dess (1996) consists of two more dimensions, autonomy and aggressiveness. The last two listings represent a comparative approach to construct formation in which the aim is to capture differences along a set of dimensions that collectively describe the construct (Venkatraman 1989). These two conceptualizations differ from one another not only in the number of characteristics but also in how they specify each character as will be shown next.

Innovativeness[34] is a hodge podge of different interpretations in the EO literature. Miller (1983), along with Lumpkin and Dess (1996), take Schumpeter's work as a starting point when they determine innovativeness as an important EO attribute. In Miller's (1983) view innovativeness is a necessary feature of entrepreneurially oriented firms. Similarly, Covin and Miles (1999, 49) take a position that the presence of innovation is "a commonality among all the firms that could be reasonably described as entrepreneurial." Lumpkin and Dess (1996), in turn, do not accept this but follow Schollhammer (1982) and suggest that an entrepreneurially oriented firm may enter into new markets by for example purchasing existing firms, which requires little or no innovativeness. Anderson and Paine (1975) differ from the other works in that, for them, innovativeness is not an attribute of entrepreneurial orientation. This means basically that they understand new opportunities to include more than just innovations.

Innovativeness has various aspects, including frequency, volume, degree and type. Miller and Friesen (1982) argue that innovativeness, as such, is a feature of both so-called entrepreneurial and conservative. However, in their view entrepreneurial firms perceive innovation as a vital and central part of competitive strategy through which they try to gain advantage over rivals. Conservative firms, in turn, innovate reluctantly mainly in response to serious pressures, threats, challenges and instabilities in the environment, such as tight competition or shifting

[34] As was discussed earlier, EO can refer to attitude, action or some mixture of property types. The description of the EO dimensions is aimed to be neutral here in regard to these various interpretations. So, for example, innovativeness as a dimension refers here equally to willingness and actions. Lumpkin and Dess (1996) distinguish between innovativeness and innovations. They state that innovativeness reflects a willingness to venture beyond the current state of the art, whereas innovations represent the potential results of innovativeness. However, here innovativeness is not intended to have this kind of interpretation but, rather, to capture both meanings.

customer needs. It follows from this that entrepreneurial firms innovate continuously and aggressively so that the volume of innovation is high, whereas conservative firms innovate infrequently and with low volume (Miller & Friesen 1982). Various researchers have differing views on the degree of novelty of innovativeness. Some suggest that entrepreneurially oriented firms are committed to dramatically altering themselves and markets (Miller & Friesen 1982; Covin & Slevin 1989; Covin & Miles 1999). According to Lumpkin and Dess's (1996) alternative interpretation, innovations can vary in their degree of radicalness in entrepreneurially oriented firms. Innovativeness referred primarily to product-markets in the early studies of entrepreneurial orientation (see Miller 1983; Miller & Friesen 1982). Lumpkin and Dess (1996) noticed this and also addressed the importance of technological innovativeness, including process development, engineering, research and emphasis on technical expertise. Covin and Miles (1999) adopted an even wider perspective by referring to innovation as introduction of a new product, process, technology, system, technique, resource or capability.

Proactiveness has been recognized as a dimension of entrepreneurial orientation ever since the work of Paine and Anderson (1975). Proactiveness suggests a forward-looking perspective within the firm and refers to anticipating and acting on future needs. Proactive firms seize initiative and act opportunistically to influence trends and create demand (Lumpkin & Dess 1996). New resources and attractive market niches are created through such exploratory, organizational learning (Lumpkin & Dess 2001). EO's proactiveness dimension resembles closely Miles and Snow's (1978) prospector type of firm that shapes its environment rather than merely reacts to trends. Such a firm has the will and the foresight to seek and seize new opportunities, making it a leader rather than a follower. (Lumpkin & Dess 1996)

Differing views exist on how far ahead of competitors a proactive firm operates. Miller (1983) and Covin and Slevin (1989) argue that proactive firms are the first to innovate. However, for Lumpkin and Dess (1996) the idea of being first is too limited. They suggest (p. 146) that a firm can be "novel, forward-thinking and fast without always being first to market." If proactiveness is considered as a continuum, the opposite end is reactiveness or passiveness. Miller and Friesen (1978) argue that a firm may be proactive and shape the environment or merely react to changes. Lumpkin and Dess (1996) describe the latter as passivity and suggest that a passive firm is indifferent to or disabled from seizing opportunities or leading in the marketplace.

The **risk-taking** dimension is recognized in all the central definitions of entrepreneurial orientation. In general, riskiness is characterized based on how uncertain the outcomes are, how difficult the goals are to achieve and how extreme some of the potential outcomes may be in their consequences (Sitkin & Pablo

1992). The EO construct captures all three aspects of riskiness (see Covin & Slevin 1989). The concept of risk taking generally includes four property types: preference, propensity, perception and behavior (Sitkin & Pablo 1992). Risk preference indicates how highly a decision maker values the challenge that risks entail.A tendency to prefer risk seeking versus risk avoidance at the organization level reflects both the leader's and the collective cultural values. Control systems within the firm can either encourage or discourage a willingness to take risks. Risk preferences, in turn, affect risk propensity, which can be understood as a decision maker's tendency, that is, willingness, to take or avoid risks. Risk perception describes decision makers' assessment of a situation's inherent risk(s). Risk perception and propensity to take risks can, together, affect the actual risk-taking behavior in organizations. (Sitkin & Pablo 1992) Entrepreneurial orientation has been described to capture the propensity to take risks (Covin & Slevin 1989), preferences as reflected in beliefs (see Lumpkin & Dess 1996) and actions (Miller 1983). Specifically, EO is characterized as a propensity for boldness in uncertain decision-making conditions, a belief that boldness is necessary to achieve a firm's objectives and a propensity for high-risk, high-reward situations (Covin & Slevin 1989; see also Miller & Friesen 1982) and undertaking risky ventures (Miller 1983).

At least some level of risk is incurred in every business activity from organizational context; thus, it is not meaningful to assume that behaviors with no risk would be possible in the first place (Lumpkin & Dess 1996). The range of risk generally extends from nominal to high (Lumpkin & Dess 1996) or from low to intermediate to high (Brockhaus 1980). Entrepreneurial orientation reflects high risk that is expressed in terms of heavy borrowing, large resource commitments, a strong risk-taking propensity, and boldness in order to obtain high returns (see Lumpkin & Dess 1996; Miller & Friesen 1978; Covin & Slevin 1989). However, Miller (1983) uses a slightly more restrained tone, when he describes entrepreneurial firms as constructive in risk taking and engaging in somewhat risky activities.

Early works on entrepreneurial orientation focused on risk taking's financial component, including high financial leverage (Miller 1983) and large resource commitments to obtain high returns (Miller & Friesen 1978). Lumpkin and Dess (2001) notice this and suggest that the other aspect that EO should also cover is business risk related to venturing into unknown markets. They associate business risk with personal, psychological and social risk. Taken together, it seems that the EO concept covers preferences, propensities and actions related to risk to some extent but lacks the aspect of risk perception. This may be an important aspect, since entrepreneurial decision makers may frame a given situation differently, thereby perceiving the probability of favorable outcomes higher than others (Palich & Bagby 1995; Shane & Venkataraman 2000).

Autonomy was present in the early works on entrepreneurial orientation in the discussions about the centralization of power (Paine & Anderson 1975; Miller 1983). However, Lumpkin and Dess (1996) have suggested it as a separate dimension of the EO construct. Autonomy is also a key approach in corporate entrepreneurship research (Bouchard 2002); hence, the inclusion of autonomy ties EO closer to the corporate entrepreneurship construct and, especially, intrapreneurship. Many major empirical EO studies have excluded autonomy, because it is not one of the original dimensions, has lacked an effective means of measurement, and moreover, some researchers also believe it to be an antecedent of entrepreneurial behavior rather than one of its key components (Lumpkin et al., 2009).

In general, autonomy refers to a degree of decision-making power possessed by an individual, organization or its subunit (Brock 2003). Lumpkin and Dess (1996) interpret autonomy at the individual or group level within an organization. Autonomy may be centralized in principle and concern only specific individuals, like managers, or decentralized and dispersed to all organizational members (Brock 2003). Anderson and Paine's (1975) early work on entrepreneurial orientation observed that firms ought to have centralized power structures. This applies especially to young firms, new venture divisions of larger firms or those firms in crisis (Anderson & Paine 1975). Miller (1983), in turn, explains that centralized power is natural for small firms run by owner managers, whereas authority needs to be decentralized from top management to lower level managers in medium-sized firms that operate in highly dynamic and complex environments. Lumpkin and colleagues (1996; 2009) extend autonomy from managers to all employees. Furthermore, they see that autonomy may not be of specific interest among independently owned and managed small firms, because the founders already act autonomously. Autonomy reflects management's tendency to believe in the benefits and importance of individuals' and teams' autonomy and to support their independent thinking and behavior in forming and pursuing opportunities (Lumpkin et al., 2009).

The general concept of autonomy differentiates between strategic autonomy of both goals and means and structural autonomy of only means (Bouchard 2002). The focus is on strategic autonomy from an EO perspective, which enables actors to define the goal or problem and set the targets to achieve or solve it. Autonomy allows individuals to develop and enact new initiatives (Lumpkin et al., 2009.) More specifically, individuals and groups have independence in introducing an idea or a vision and executing it (Lumpkin & Dess 1996). Autonomy as an EO dimension may be encouraged to some extent through a top-down approach but primarily through a bottom-up approach. Management supports independent thinking and acting throughout the whole organization in the top-down approach, whereas autonomy functions from the bottom up when key individuals act as

champions and provide an impetus to pursue opportunities (Lumpkin et al., 2009.)

Competitive aggressiveness as a separate dimension of entrepreneurial orientation was suggested by Lumpkin and Dess (1996). However, it had already been recognized as a relevant EO feature in the works of Miller (1983) and Covin & Slevin (1989). The potential importance of competitive aggressiveness has been mentioned frequently in the literature outside the strictly EO literature. For example, Miles and others (1978) argue that a firm may need to aggressively maintain its domain to hold its position in the market. Venkatraman (1989), in turn, describes aggressiveness as one of the key strategic means for a firm to achieve profitability. Ferrier (2001) concludes from a literature review that competitive aggressiveness is related to better firm performance.

Competitive aggressiveness has been linked to several topics in the EO literature. Miller and colleagues' work is an example of this. First, aggressiveness, for Miller and Friesen (1982), describes the amount of innovation. Elsewhere, Miller and Friesen (1980b) associate aggressiveness with proactiveness and being ahead of competitors in innovation. Miller (1983, 771) then discusses "beating competitors to the punch," which Covin and Slevin (1989) interpret to refer to proactiveness. Covin and colleagues have, indeed, used aggressiveness and proactiveness interchangeably (Covin & Slevin 1989; 1991; Covin & Covin 1990; see also Merz et al., 1994). Moreover, Covin and Slevin (1989) apply competitive aggressiveness broadly as a means to competive superiority through innovation, risk taking and proactiveness. The association with proactiveness may be one of the reasons why competitive aggressiveness has not fully gained an independent position among EO dimensions. Lumpkin and Dess (1996; 2001) consider competitive aggressiveness in entrepreneurial orientation context as a firm's propensity to directly and intensely challenge its rivals to defend or improve its market position. It describes a firm's responsiveness to rivals' actions in competition for existing demand (Lumpkin & Dess 1996). Lumpkin and Dess (2001) further suggest that the competitive aggressiveness dimension of entrepreneurial orientation represents exploitative organizational learning, in that aggressive firms seek to protect their existing market niche and resource combinations.

The four aspects of the general concept of competitive aggressiveness are volume, duration, complexity and unpredictability of actions (Ferrier 2001). Of these, entrepreneurial orientation has been discussed in terms of volume, or, intensity (see Lumpkin & Dess 1996). Means to compete aggressively include, for example, quickly imitating competitors' actions, cutting prices even at the expense of temporarily sacrificing profits and spending heavily on advertising and marketing (Lumpkin & Dess 1996; see also Ferrier 2001; Venkatraman 1989). Miller (1983) takes a different route from Lumpkin and Dess (1996) by not in-

cluding imitation to competitive aggressiveness and to EO thereafter; imitation, for him, is a sign of a nonentrepreneurial firm.

The way that the EO construct's competitive aggressiveness aspect is interpreted is more important that it may seem to be initially, since it not only affects the dimension's content and the total number of dimensions that are included in EO, but it also has a profound effect on the nature of the whole construct. For example, when aggressiveness is interpreted as the amount of product innovation, it keeps the focus of the EO construct on economizing. When it is defined as a posture towards eliminating competitors, the boundaries of the entire EO construct enlarge to also capture monopolizing.

There are some **other dimensions of EO** that are less well examined in addition to the five dimensions just discussed. Anderson and Paine (1975) argue that growth as a goal is a central attribute of entrepreneurial orientation. Some other researchers (e.g., Morris & Paul 1987) have also recognized the goal of rapid growth but have treated it as a part of the EO construct through other dimensions (innovativeness, proactiveness and risk taking) instead of as a stand-alone characteristic. Smart and Conant (1994) adopt a somewhat different route to examining the EO dimensions. Their study recognizes innovativeness and risk taking but also addresses engagement in strategic planning and, especially, abilities. They divide abilities into three separate dimensions: an ability to identify customer needs and wants, to identify new opportunities and to persevere in making the vision of the business a reality. The first two abilities are, for them, about creative thinking and scanning; the last is about managing and securing resources and adapting to the environment. Kropp and others (2006) have introduced communication as yet another EO dimension. Communication, for them, represents an ability to emphasize and interact with various stakeholders, such as employees, customers and suppliers.

Dimensionality of EO

Several researchers have been calling for a better understanding of the relationships between the dimensions of entrepreneurial orientation. Covin and Miles (1999) propose that innovativeness is central to EO, while the other attributes could be antecedents, consequences or simple correlates of innovation. Zahra and Neubaum (1998) call for greater attention to independently exploring the dimensions of EO and their interaction in various environmental contexts. Similarly, Zahra and others (1999) have argued that it might be too early for researchers to agree on a common measure without establishing its dimensionality. Lumpkin and others (2009) conclude that a need exists to more thoroughly investigate each unique dimension; for example, the relationship between autonomy and other

dimensions of EO is not properly explored. Currently, opposing interpretations and findings in the literature exist about the dimensionality of entrepreneurial orientation. The discussion can be grouped into three topics: uni- versus multi-dimensionality, the number of dimensions and co-variation between dimensions.

A construct can be unidimensional or multidimensional, depending on how many conceptually distinguishable facets it has (MacKenzie et al., 2011). If there is only one such facet, the construct is unidimensional; otherwise, it is multidimensional. A unidimensional construct is a first-order construct, while a multidimensional construct may be second-order, third-order or even higher, depending on the relationship between the subdimensions (MacKenzie et al., 2011). Those who argue that EO is unidimensional are, in practice, suggesting that some of its dimensions are not distinctive and, therefore, not that important in defining the construct. Supporters exist in the research literature for both unidimensional and multidimensional interpretations of the EO construct. Covin and Slevin (1989) have argued for the idea of unidimensional EO. Based on their assessment of construct validity through factor analysis, Covin and Slevin (1989) conclude that, although the items of EO depict different aspects, they are empirically related and constitute a unidimensional strategic orientation. The dimensions have been aggregated together in many studies that have shown high levels of reliability and validity (e.g., Naman & Slevin 1993; Becherer & Maurer 1997). However, concerns have emerged pertaining to the psychometric properties of the unidimensional measure (Kreiser et al., 2002). Both Miller (1983) and Lumpkin and Dess's (1996) work interpret EO as a multidimensional, second-order construct. Several other studies (e.g., Kreiser et al. 2002; Chadwick et al., 2008) have found empirical evidence for the multidimensional nature of EO. The proponents of the multi-dimensional approach acknowledge the parsimony of the unidimensional measure, but they are concerned that unidimensionality may obscure the unique contributions that each EO dimension offers to the entrepreneurial process (Kreiser et al. 2002).

The number and type of the dimensions regarding EO's multidimensionality has been a subject of disagreement. Theoretical arguments have ranged from three (Miller 1983) to four (Anderson & Paine 1975) to five (Lumpkin & Dess 1996) and even six attributes (Smart & Conant 1994). Moreover, the studies cover altogether more than ten different dimensions. Empirical studies have also shown varying results about each dimension's uniqueness. Kreiser et al. (2002) tested Covin and Slevin's (1989) measure and received support for modeling EO with all three subdimensions of innovativeness, proactiveness and risk taking. Chadwick and colleagues (2008), in turn, found in their analyses of Covin and Slevin's (1989) scales that the items of proactiveness and risk taking showed clear loadings on one factor and innovativeness on another, thus resulting in a two-dimensional construct. Morris and Paul (1987) reported, using partly similar

items to Covin and Slevin (1989), that the same dimension captured both innovativeness and proactiveness, while identifying risk taking as a separate dimension. Furthermore, Lumpkin and his fellow scholars (2009) identified numerous EO items with cross loadings over different dimensions that indicate problems in either the conceptualization of EO or operationalization of scale items or both. Relatedly, EO and its dimensions have been measured with many different items. Covin and Slevin's (1989) scale is arguably the landmark, but many other operationalizations also exist (e.g., Morris & Paul 1987; Smart & Conant 1994; Lumpkin & Dess 2001; Kropp et al., 2006; Madsen 2007; Lin et al., 2008; Wang 2008).

Another area of discussion is related to the covariation between the attributes of a multidimensional EO construct. The relationship between the EO dimensions may be reflective or formative in principle (George 2011). According to the latent variable theory, reflective attributes are manifestations of the focal construct, and changes in the construct are associated with changes in all its dimensions. Formative dimensions, in turn, are viewed as defining characteristics of the focal construct, and changes in the construct are a function of changes in one or more, though not necessarily all, of its dimensions. (MacKenzie et al., 2011) Two competing views exist in the literature about the dependency between the EO characteristics. Covin and Slevin (1989) argue that various dimensions of entrepreneurial orientation should necessarily covariate. This would make EO a reflective construct, wherein each attribute is a manifestation of a deeper, more embedded level of the construct. Lumpkin and Dess (1996) disagree and theorize, instead, that either all or part of the dimensions may be present when a firm engages in new entry. This view identifies entrepreneurial orientation as a formative construct that is a function of its defining characteristics. The proponents of this view perceive that each of the EO dimensions may vary independently of one another, depending on the environmental and organizational context (Lumpkin & Dess 1996).

How the characteristics jointly form the focal construct should be identified when a construct is viewed as formative. The relationships are formative-multiplicative (composite) when the construct can be regarded as an interaction among the dimensions. Each attribute is individually necessary and jointly sufficient to produce the meaning of the focal construct (MacKenzie et al., 2011). Miller's (1983) approach can be interpreted to follow this perspective, arguing that EO as a composite construct is theoretically and intuitively reasonable. Entrepreneurship is a result of composite weighting of innovation, proactiveness and risk taking in his view. A firm can have high levels on only some of the dimensions, but it should not be considered entrepreneurial unless it qualifies for all the three features simultaneously (Miller 1983). For example, firms that are highly leveraged financially may be determined to be risk takers, but they are not

considered entrepreneurial unless they also engage in technological or product-market innovation and are the first to do so. Hence, an entrepreneurially oriented firm must be simultaneously innovative, proactive and risk taking (Miller 1983).

Lumpkin and Dess (1996) state, however, that this may be too narrow an approach to explain some types of entrepreneurial behavior, which implies that their approach to the EO construct can be interpreted as a formative-additive concept. Formative relationships are additive (causal) when the magnitude of the effect of one dimension is unrelated to the effects of the others (MacKenzie et al., 2011). Each single dimension is sufficient but not necessary to create a change in the focal construct. The effects of each attribute to the construct are summed together to estimate its overall magnitude. (MacKenzie et al., 2011) Accordingly, there can be different combinations of EO dimensions (Lumpkin & Dess 1996). In this view a firm is entrepreneurially oriented if it shows high magnitude in any one of the characteristics. An entrepreneurially oriented firm may, for example, enter into new markets by purchasing existing firms that require little or no innovation; even the risks may be relatively low if the acquired business is well established (Lumpkin & Dess 1996). In summary, an entrepreneurially oriented firm must be innovative or proactive or take risks or have a high level of any other dimension but not necessarily all of them simultaneously. The idea of independently varying dimensions has gained some empirical support. Hughes and Morgan (2007) studied the effect of EO's five dimensions on business performance independent of each other and found that each dimension had quite a different influence on performance, ranging from negative to neutral and to positive. Lumpkin and Dess's (2001) work supported this, finding that proactiveness is an appropriate mode for firms in dynamic environments, while competitive aggressiveness may favor firms in hostile environments.

When the discussions of the distinctiveness and dependency of the characteristics (dimensions) are combined, several competing views in the literature about the EO construct can be recognized. First is the broad categorization between uni- and multidimensional EO, followed by the dichotomization between reflective (dependent) and formative (independent) characteristics of EO; moreover, differentiating views exist about substitute (additive) and complement (multiplicative) types of formative characteristics to form the EO construct. This leads to the identification of four types of EO constructs in the literature: a) unidimensional with reflective indicators (e.g., Covin & Slevin 1989); b) multidimensional with reflective attributes (e.g., Kreiser et al., 2002); c) multidimensional with formative-multiplicative attributes (e.g., Miller 1983); and d) multidimensional with formative-additive attributes (e.g., Lumpkin & Dess 1996). This abundance of various conceptual themes of EO in the research literature raises the question of whether or not they can all be correct and relevant or, should one of them, or possibly a completely new interpretation, be preferred to clarify and unify the

conceptual discussion about entrepreneurial orientation? However, MacKenzie and colleagues (2011) highlight the fact that constructs are not inherently of any specific nature, for example, reflective or formative; rather, it is the researcher's task to conceptualize the construct to suit the theoretical expectations in the given research setting.

Stability of EO

The specification of the conceptual theme also includes the expected stability of the construct. A construct may be relatively stable or instable over time and across situations and cases (MacKenzie et al., 2011). In general, changes in internal (goals, resources) and external conditions (hostility, uncertainty) may affect it when a construct is about action (MacCrimmon 1993). Both theoretical and empirical research on entrepreneurial orientation is rather scarce in specification of the EO construct's stability. Lumpkin and Dess (1996) state that a firm may choose to be entrepreneurially oriented throughout its entire existence, but a firm could also become passive over time or decline to take risks and exercise creativity and, thereafter, no longer be entrepreneurial. The decision to decline acting entrepreneurially hints that there may be some changes in the firm's internal resources, especially in its preferences. However, the fact that the authors do not provide any specific antecedents that would affect to the level of intensity of EO implies that they consider it to be rather stable.

Miller, together with Friesen (1980a; 1982), has suggested that firms tend to maintain their momentum, so that entrepreneurial firms remain entrepreneurial over prolonged periods of time until something dramatic happens and forces the firm to reorient itself. Accordingly, the level of entrepreneurial orientation reflects differing internal motivations when the external conditions are less dynamic and hostile, whereas firms may be forced to adopt an entrepreneurially oriented posture to maintain its viability in highly dynamic and hostile conditions (Miller 1983; Anderson & Paine 1975). Furthermore, Miller and Friesen (1982) identify as entrepreneurial only those firms in which innovation is internally motivated and that innovate continuously, irrespective of external conditions. They consider other firms that innovate only episodically and as a result of external forces as conservative. Anderson and Paine (1975), however, recognize both types of firms as entrepreneurially oriented. Regarding the boundary conditions of EO, it is arguably applicable to any size of firms, and as well to start-ups as established businesses (Morris & Paul 1987).

3.1.3 Firm performance and entrepreneurial orientation

Many potential benefits have been attached to entrepreneurial orientation. It keeps firms alert. Entrepreneurially orientated firms focus on industry changes and customer demand and, therefore, expose to new technologies and are aware of marketplace trends, which help them to identify opportunities and launch new ventures. (Lumpkin et al., 2009) Empirical evidence warrants these assumptions to a degree. Rauch and others (2009) as well as Saeed and colleagues (2014) found in their meta-analytical study that EO has, in general, a fairly large, positive correlation with firm performance. Individual dimensions of EO, when studied separately, all had positive association, the strongest being related to innovativeness and the weakest to risk taking (Rauch et al., 2009).

However, there may not be any automatic mechanism that would make EO an all-around remedy for high performance. Entrepreneurship and entrepreneurial orientation research have been criticized of having a normative bias towards an inherent value and an assumption of positive impact on firm performance (Lumpkin & Dess 1996). The logic here is that entrepreneurial orientation would be a "best practice" and suitable for all situations. Accordingly, Zahra and others (1999) point out that although there is an implicit assumption that first-mover firm, taking the greatest risks and innovating the most, would always be rewarded in the market place, this, however, may not be the case. Critics have reminded that a firm can be too entrepreneurial or not entrepreneurial enough for its environment (Naman & Slevin 1993; Slevin & Covin 1990). Similarly, Miller and Friesen (1982) warn about the dangers of conservative and entrepreneurial extremes in innovation. They state that firms may innovate either too much or too little, which both may lead to diminishing returns. The two (1980a) have found that past practices, trends and strategies tend to keep evolving in the same direction in organizations, perhaps eventually passing the point of dramatically diminished benefits. Innovation-embracing ideology and proclivity towards taking risks can result in tendency to innovate too much. Pace of innovation becomes overly rapid, when these firms squander resources in the pursuit of excess novelty. They may become more and more innovative, sometimes up to the point where returns start to diminish. (Miller & Friesen 1982.) Relatedly, there has been some evidence demonstrating that the relationship between EO and firm performance is curvilinear, especially an inverted U-shape (Tang et al., 2008). Lumpkin and others (2009) make note of the potential benefits and risks of entrepreneurial orientation, and conclude that there is a need for further research on the effects of entrepreneurial orientation construct on various measures of organizational outcomes and/or venture success. This suggests that there needs to be a balance between entrepreneurial orientation and the internal and external context of the firm.

Contingency approach strives to respond to this challenge by focusing on examining when entrepreneurial orientation may be beneficial to a firm's performance. EO-performance relationship may depend on both external and internal context. Potential organizational factors include structure, resources, culture, size, strategy (goals), strategy-making process and top management characteristics (values, philosophies) (Covin & Slevin 1991; Lumpkin & Dess 1996). The logic in internal fit is that effective implementation of entrepreneurially oriented posture requires supportive organizational characteristics such as various types of finance, equipment and personnel related resources and capabilities (Covin & Slevin 1991). Rauch and colleagues (2009) observe that there have not been very many studies linking EO with performance that are also interested in moderating effects. However, they use meta-analytical techniques to assess EO-performance relationship across different samples and conclude that there is some evidence to support the moderating effect of size so that the association is strongest among small firms. The assumption above was that entrepreneurial orientation is interpreted as an action. However, if its property type is considered to be attitude (mindset, value or preference) then EO may become a moderator itself. Wiklund and Shepherd (2003) interpret EO to represent how a firm is organized to search opportunities. They argue further that EO moderates the relationship between knowledge-based resources and firm performance. With knowledge-based resources firms know where to look for opportunities and have the ability to assess and exploit them but without willingness to grasp these opportunities the resources will probably be underutilized (Wiklund & Shepherd 2003).

Possible environmental contingencies include such as dynamism, munificence, complexity and industry characteristics (Covin & Slevin 1991; Lumpkin & Dess 1996). External fit is based on the idea that EO may have a positive effect on firm performance in some environmental conditions but not in others. To be valuable to the firm there needs to be congruence among entrepreneurial orientation and the external environment in which the firm operates (Lumpkin & Dess 1996). Empirical investigations have shown, for example, that entrepreneurial orientation may have a positive impact on firm performance in dynamic (Miller & Friesen 1983; Naman & Slevin 1993), heterogeneous (Miller & Friesen 1983) or hostile (Covin & Slevin 1989) environmental conditions. Naman and Slevin (1993) studied how closely entrepreneurship (defined as entrepreneurial orientation and some other organizational characteristics) match with market environment. They considered the level of environmental turbulence as a desired level for entrepreneurship and found that a close match was positively associated with firm performance. Covin and Slevin (1989), in turn, took a moderation approach to studying the fit between entrepreneurial orientation and firm performance. They reported that entrepreneurial orientation was not a significant independent (stand-alone) predictor of small firm performance. Hostile environments contain

fewer opportunities and are more competitive than benign environments and require, therefore, proactive, innovative and risk taking rather than passive and reactive efforts. In benign environments firms are not typically forced to engage in uncertain, resource-consuming actions in order to maintain viability. In such circumstances entrepreneurial orientation might not be essential for superior performance, but could possibly represent an unwarranted risk for smaller firms. (Covin & Slevin 1989) Rauch and colleagues (2009) were not able to study the moderating effects of hostility in their meta-analysis of EO-performance relationship but found instead that environmental dynamism, operationalized as a high-tech versus non-high-tech industry may be a relevant moderator, so that EO is more beneficiary in high-tech industries where technology and (or) customer preferences change fast. In another meta-analysis on the EO-performance relationship, Saeed and others (2014) focus on informal and formal national institutions and find out that national culture (low uncertainty avoidance, low power distance and high in-group collectivism) is a positive moderator strengthening the EO-performance linkage. Also, some moderating factors of economic (a developing nation) and political contexts (high political stability) result in a stronger relationship between entrepreneurial orientation and firm performance (Saeed et al., 2014).

Another approach to EO-performance fit investigates why firms' may be entrepreneurially oriented. Miller and Friesen (1982) discuss about risk taking and innovation-embracing ideology in firms and make a distinction between innovation as an ideology and behavior. They suggest that entrepreneurial motives of innovating and risk taking and abilities of identifying market opportunities as well as market environment affect (independently) on innovative behavior of firms, and eventually performance. In similar fashion, Wiklund (1998; 1999) together with colleagues (2009) argue that entrepreneurially oriented action mediates the effects of resources (through capabilities), motivation and market environment to firm performance. Covin and Slevin (1991) take a broader view and suggest that the same organizational and environmental attributes that are possible moderators of EO-performance relationship may also be antecedents to entrepreneurial orientation as a firm-level action. The logic is that beliefs, values, competencies (capabilities) and other internal characters facilitate or deter entrepreneurial orientation. For example, abundant resource would influence positively on engaging in EO that is considered to be resource-consuming. In case of external context, EO is perceived as a firm's response to challenging market conditions. In addition, EO itself may influence on the fore-mentioned internal and external characteristics, for example, by inducing a change in market circumstances. (Covin & Slevin 1991) Innovation prompts imitation exhilarating the speed of change and competition and it may also increase heterogeneity, since the firms are likely to come up with products and services that can be exploited

in different markets (Miller & Friesen 1982). Consequently, entrepreneurial orientation of the firm is potentially a product of and a cause to external and internal conditions.

3.2 Conceptualization of dynamic capabilities

This chapter reviews and examines dynamic capabilities (DC) through how the extant literature defines its conceptual domain and theme.

3.2.1 Domain of dynamic capabilities

This stage of conceptual definition identifies what the construct represents (MacKenzie et al., 2011). These issues are examined next in terms of how dynamic capabilities have been defined in the literature, the nature of the construct, especially the type of property and the entity to which it applies, and the congruence of dynamic capabilities with closely related constructs.

Definitions of DC

No single, universally accepted term exists for describing the capabilities for changing a firm's operations. The concept of dynamic capabilities (Teece et al., 1994; 1997) is a strong candidate, but there have been many other labels in the literature before and after that to capture the same phenomenon (for a review, see e.g., Zollo & Winter 2002; Wang & Ahmed 2007). These other names include, for example, orchestration capacities (Teece 2007), entrepreneurial abilities (Penrose 1959), search competences (Levinthal & March 1981), entrepreneurial capacity (Helfat et al., 2007) and entrepreneurship skills (Newbert et al., 2008). A large number of different definitions of the dynamic capabilities construct (see Table 3) exist, besides terminological plurality.

The term dynamic capabilities was coined by Teece, Pisano and Shuen (1994) and Teece and Pisano (1994)[35]. Teece and Pisano (1994, 541) define dynamic capabilities as "the subset of the competences/capabilities which allow the firm to create new products and processes, and respond to changing market circumstances." They continue (p. 538), stating that dynamic capabilities are about "adapting, integrating and re-configuring internal and external organizational skills, resources and functional competences toward changing environment." For

[35] This article draws on the working paper of Teece, Pisano and Shuen (1994).

them DC is about gaining and maintaining competitive advantage by renewing competences through adaptation, integration and reconfiguration. The authors repeat the definition a few years later (Teece et al., 1997).

Table 3 Selected definitions of dynamic capabilities

Author(s)	*Definition*	*Objective*	*Dimensions*	*Parallel terms*
Teece & Pisano (1994)	"The subset of the competences/capabilities which allow the firm to create new products and processes, and respond to changing market circumstances." (p. 541)	Competitive advantage	Adaptation, integration, reconfiguration	-
Teece et al. (1997)	"The firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments." (p. 516)	Competitive advantage	Building (adaptation), integration, reconfiguration	-
Eisenhardt & Martin (2000)	"The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change." (p. 1107)	Competitive advantage	Integration, reconfiguration, gaining, releasing	Combinative capabilities, architectural competence, capabilities
Zollo & Winter (2002)	"A learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness." (p. 340)	Improved effectiveness	Generation, modification	Distinctive competence, organizational routines, absorptive capacity, architectural knowledge
Winter (2003)	"Those that operate to extend, modify or create ordinary capabilities." (p. 991)	Hedge against obsolescence of existing capability	Extension, modification, creation	-
Zahra et al., (2006)	"The abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)." (p. 918)	Success or survival	Many (not detailed)	-
Helfat et al., (2007)	"The capacity of an organization to purposefully create, extend, or modify its resource base." (p. 4)	Survival, growth, value creation, competitive advantage, sustained competitive advantage, profit	Creation, extention and modification	-
Wang & Ahmed (2007)	"A firm's behavioural orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage." (p. 35)	Competitive advantage	Adaptive, absorptive and innovative components	Core competence, core capability and rigidity
Barreto (2010)	"The firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base." (p. 271)	Problem solving	Sensing, decision making (timely and market-oriented), changing the resource base	-

Eisenhardt and Martin (2000) suggest that DC is a means to alter the resource base in order to create new value-creating strategies and achieve competitive advantage thereafter. They define dynamic capabilities as "the firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change." Thus, dynamic capabilities, for them, are the "routines by which firms achieve new resource combinations as markets emerge, collide, split, evolve, and die" (p. 1107). The authors note that dynamic capabilities as a construct is equal to what others have termed combinative capabilities (Kogut & Zander 1992), architectural competence (Henderson & Cockburn 1994) and, simply, capabilities (Amit & Schoemaker 1993). Eisenhardt and Martin (2000) also extend the relevance of dynamic capabilities from high velocity to moderately dynamic markets.

Zollo and Winter (2002, 340), in turn, define dynamic capabilities as "a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness." They recognize that dynamic capabilities characterize the same phenomenon that others have been labeling, for example, as distinctive competence (Selznick 1957), search routines (Nelson & Winter 1982a), absorptive capacity (Cohen & Levinthal 1990) and architectural knowledge (Henderson & Clark 1990). Zollo and Winter (2002) further address that dynamic capabilities are relevant not only in rapidly changing environments but also in environments in which the rate of change is lower. They exemplify DC to include such individual capabilities as process research and development, restructuring and post-acquisition integration.

Winter (2003, 991) continued his work to define dynamic capabilities and identify the construct as higher-order (above zero) capabilities "that operate to extend, modify or create ordinary capabilities." He concludes that dynamic capabilities do not automatically lead to improved performance and that it is a patterned way to change, but firms can also commit to ad hoc ways to solve problems. Helfat and colleagues' (2007, 4) definition comes very close to Winter's (2003) when they identify DC as "the capacity of an organization to purposefully create, extend, or modify its resource base." A firm can utilize dynamic capabilities to achieve survival, growth, value creation, competitive advantage, sustained competitive advantage or profit, but there is no inherent link between DC and firm performance (Helfat et al., 2007).

Zahra and others (2006, 918) suggest that dynamic capabilities are "the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)." They see that firms aim at success or survival with the help of dynamic capabilities but that it is not guaranteed. DC may enable a firm to pursue opportunities in a new way that may or may not turn out to be effective.

Wang and Ahmed (2007, 35) conceptualize dynamic capabilities as "a firm's behavioral orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage." They trace the roots of the DC concept to such terms as, for example, core competence (Prahalad & Hamel 1990), core capability and rigidity (Leonard-Barton 1992), besides the ones that were already identified by others (see above). The authors recognize the hierarchical nature of resources and capabilities, but contrary to, for example, Winter (2003), they do not recognize all higher order capabilities as dynamic but only those at the third and highest level that may help the firm to address environmental change. Furthermore, Wang and Ahmed (2007) see integration, reconfiguration, renewal and recreation as underlying processes of dynamic capabilities, whereas the actual dimension includes adaptive, absorptive and innovative capabilities.

Barreto (2010, 271) specifies DC as "the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base." His definition captures three dimensions of dynamic capabilities, including sensing, decision making (timely and market-oriented) and changing the resource base through creation, extension and reconfiguration.

Overall, the dynamic capabilities approach has been criticized for mixed use and interpretation of terminology, and further definitional clarity has been called for (Wang & Ahmed 2007; Barreto 2010). Each conceptualization captures different attributes of the phenomenon (Helfat et al., 2007). These issues are further examined next.

Property type of DC

A property type of a construct may generally refer to many things, such as a value, an intention, an attitude, a perception, an action, an outcome, an ability or a structure (MacKenzie et al., 2011).

To start with, Oxford Dictionaries (2017) characterize a capability as "the power or ability to do something." The concept of dynamic capabilities has been identified being either abilities or processes (Barreto 2010). Barreto (2010) is not explicit about the exact difference between the two views, but it seems that it is a matter of how close capabilities are to action. Dynamic capabilities are patterned actions that the firm takes to manipulate its resource base in the process view (Eisenhardt & Martin 2000; Zollo & Winter 2002). Dynamic capabilities in this case are, by nature, what Nelson and Winter (1982) term routines, that is, regular and predictable behavioral patterns of firms. When dynamic capabilities are iden-

tified as abilities and something different from action, that implies an interpretation in which abilities are equal to knowledge and, therefore, are antecedents to action (see Locke 2000; cf. Schreyögg & Gliesch-Eberl 2007). Along this line of interpretation, dynamic capabilities are decision options for action, meaning that they need to be practically applied to have value (Helfat et al., 2007; Winter 2003). The specific nature of dynamic capabilities is important when studying the relationship between dynamic capabilities and other organizational characteristics and firm performance. The relationship with other features is different when dynamic capabilities are identified as an antecedent to action or alternatively as an action and, furthermore, as an action that is affected by other characteristics or that is a mixture of those characteristics.

Entity of DC

Entity generally indicates the object to which the construct applies, including, for example, an individual, a group, an organization or a network (MacKenzie et al., 2011). Dynamic capabilities are commonly applied to organizations, especially firms (e.g., Teece et al., 1997; Eisenhardt & Martin 2000). They are typically present within a single firm, but interorganizational capabilities can also exist related to, for example, strategic alliances or supply chains (Helfat & Peteraf 2003). Dynamic capabilities can exist at two levels in large corporations, strategic business units and headquarters, and each unit may have its own capabilities (Bowman & Ambrosini 2003). Furthermore, the microfoundations are at lower levels of the organizations; that is, the decisions to develop and deploy the capabilities are taken by individuals and teams (Zahra et al., 2006; Teece 2007). Dynamic capabilities have even been considered to reside primarily with top management in some cases, where the team or individuals possess these capabilities that eventually benefit the entire firm (Teece 2007).

DC and related constructs

Organizational capabilities. Dynamic capabilities are closely related to organizational capabilities. Organizational capabilities or, simply, capabilities, are hierarchical to one another (Collis 1994). Firms have basically two broad categories of capabilities, those for running its daily operations and those for changing the way it operates (Winter 2003; Nelson & Winter 1982a). The latter category can be divided into two or more subcategories. The first level has the operational, or functional, ordinary, substantive or zero-order, capabilities that relate to everyday activities and make it possible for the firm to earn its living in the short run (Win-

ter 2003; Nelson & Winter 1982a; Collis 1994; Zahra et al., 2006; Wang & Ahmed 2007). The second-level capabilities make it possible for a firm to learn to do operational things differently from what they are doing currently (Collis 1994). The literature has differing views about whether these capabilities are called dynamic or not. Many scholars argue that a firm utilizes dynamic capabilities to change its existing operations (Winter 2003; Zollo & Winter 2002; Helfat et al., 2007). These first-order dynamic capabilities alter the operational characteristics, especially the products, the production processes, the scale or the customer-base (Winter 2003). They include, for example, product development, alliancing, acquisitions of other firms and creation of new outlets (Eisenhardt & Martin 2000; Winter 2003; Helfat et al., 2007). A firm can change its second-level capabilities through third-level, learning-to-learn types of capabilities (Collis 1994; Winter 2003; Nelson & Winter 1982a). Some researchers consider that only these are dynamic capabilities (Ahmed & Wang 2007), whereas others see them as second-order dynamic capabilities (Winter 2003). These capabilities change the second-level capabilities, for example, the ways a firm innovates (Collis 1994; Helfat et al., 2007) or how firms simultaneously balance between exploration and exploitation to succeed in changing market conditions (Wang & Ahmed 2007; O'Reilly & Tushman 2008). Third-level capabilities can possibly be further altered by even higher level capabilities, and so on (Collis 1994; Winter 2003).

Organizational resources. The views about the relationship between dynamic capabilities and a firm's resources are varied and tied to how resources are defined. Helfat and others (2007) specify resources as anything, be it an action or a thing, that the organization owns, controls or has access to and, accordingly, identify dynamic capabilities as one type of resources. Teece and colleagues (1997) take a different stance when they differentiate between resources, factors of production, competences/routines and dynamic capabilities. They specify resources as firm-specific assets that are difficult to imitate and further assert that they are different from factors of production that are inputs available in factor markets. Furthermore, the authors do not accept activities as resources but define them as competences, routines or processes and, eventually, identify dynamic capabilities as an ability to alter these competences.

Organizational structure and culture. There are varying views about the difference between organizational structure, culture and dynamic capabilities. Culture and structure can be seen to form an antecedent that enables the dynamic capabilities. Alternatively, culture and structure, together with human and physical capital, can be seen to be the resources that jointly compose dynamic capabilities (Verona & Ravasi 2003). Dynamic capabilities cannot then be identified as a separate construct but rather as an embodiment of the culture, structure, strategy and some other organizational elements (Lawson & Samson 2001).

Company strategy. The relationship between dynamic capabilities and strategy adds another angle to the discussion about the construct and its organizational context. The essence of a strategy is to indicate how a firm tries to achieve and sustain its competitive advantage (Teece et al., 1997; Hax & Majluf 1988; Harreld et al., 2007). The compatibility of the strategy and dynamic capabilities is tied to whether strategy is understood as goals or actions and dynamic capabilities as abilities or actions. Some researchers draw a direct link between dynamic capabilities and strategies. For Aragón-Correa and Sharma (2003), dynamic capabilities as a construct is a synonym for a strategy. The firm's actions are at the heart of both concepts in their view. Others consider that a strict conceptual distinction cannot be made between the two constructs; rather, strategy and other organizational elements (e.g., culture and structure) comprise dynamic capabilities (Lawson & Samson 2001). According to a different perspective, a strategy and dynamic capabilities can be examined as two separate constructs. Wang and Ahmed (2007) propose that the overall business strategy dictates the ordinary capabilities that the dynamic capabilities alter. When modelled, a strategy is a mediator between dynamic capabilities and development of ordinary capabilities that, in turn, affect firm performance (Wang & Ahmed 2007).

3.2.2 Conceptual theme of dynamic capabilities

An examination of the conceptual theme of dynamic capabilities untangles the various perspectives on its meaning, dimensionality and stability.

Common theme of DC characteristics

A construct may include one or more characteristics that give it a meaning. If is has multiple characteristics, they ought to have a common and a unique theme (MacKenzie et al., 2011).

A common theme is something that ties all the characteristics of the concept together. One way to express the common theme for dynamic capabilities is that they can be identified as a systematic, problem-solving ability (Barreto 2010; see also Winter 2003). However, even at such a high-level of abstraction, there are two competing views according to which dynamic capabilities represent either all systematic problem solving (Barreto 2010; Winter 2003) or, alternatively, only a systematic ability for the firm to change the way problems are currently solved (Zahra et al., 2006; Schreyögg & Kliesch-Eberl 2007). Another way to capture dynamic capabilities, in brief, could be to see them as innovation related (Teece et al., 1997; Lawson & Samson 2001; Schreyögg & Kliesch-Eberl 2007), alt-

hough some researchers would disagree and see innovation merely as one of several subdimensions of DC (see Ahmed & Wang 2007).

Oxford Dictionaries (2017) characterizes dynamic (process) as "constant change, activity, or progress." Following this, common to all the individual dimensions of DC is that they change the firm's operations. There are two sides to making changes to the operations. From the output perspective, dynamic capabilities alter products (Teece & Pisano 1994), the scale or the customer-base of the firm (Winter 2003). From the input perspective, dynamic capabilities change the firm's resource-base (Eisenhardt & Martin 2000; Helfat et al., 2007; Zollo & Winter 2002; Teece et al., 1997). A closely related perspective is that dynamic capabilities are an organizational ability to search profit opportunities (Teece 2007; Augier & Teece 2009).

Unique themes of DC characteristics

Many researchers believe that, in principal, some general classifications of the dimensions of dynamic capabilities can be made (Eisenhardt & Martin 2000; Helfat et al., 2007). However, this task has proven to be a challenge in practice. There is no agreement on what the individual capabilities are, and, therefore, various propositions have been made (e.g., Teece et al., 1997; Eisenhardt & Martin 2000; Zollo & Winter 2002; Helfat et al., 2007; Wang & Ahmed 2007; Verona & Ravasi 2003; Teece 2007; Madsen 2010; Barreto 2010). When examining dynamic capabilities from an evolutionary perspective, they are divided into three individual capabilities, including a capacity to form (sense and shape), seize (deploy) and maintain (protect) internal and external opportunities (Teece 2007; Augier & Teece 2009). From an organizational ecology perspective of variation-selection-retention, dynamic capabilities are a capacity to generate variation within the firm through new ideas, to select the most appropriate ones through evaluation and legitimization and finally to replicate and retain changes within the firm through knowledge transfer (Zollo & Winter 2002; Madsen 2010).

The broadest possible definition states that any abilities to alter the operational characteristics of the firm, including products, production processes, scale or customer-base, are identified as dynamic capabilities (Winter 2003). Relatedly, dynamic capabilities can be categorized into changing a firm's resource base through creating new resources and resource combinations (for example, product innovation, acquisition of and alliances with other firms), modifying resources (including destroying parts of the resource base through selling, closing and discarding) and extending the current resources to have more of the same (for example, promoting the growth of the ongoing operations) (Helfat et al. 2007; Winter 2003). However, a more critical view is that replication is not a dynamic ca-

pability (Teece 2007) and, accordingly, an ability to change the scale would probably not count as a dynamic capability.

Another way to identify the dimensions of dynamic capabilities is to divide them into the resource side and the market side. Some dimensions, such as absorptive and adaptive, change the firm's resource base and potentially help the firm to align its resources with external changes. Other dimensions, such as innovative capability, link a firm's resources into potential marketplace advantage in terms of products, the scale or the customer-base of the firm (Wang & Ahmed 2007). Yet another, closely related, way is to divide the dimensions of dynamic capabilities into altering and deployment of the resource base. A firm needs first to identify and select the preferred changes between gaining (creating, acquiring), extending (more of the same) and releasing resources and, after that, to transform (integrate and reconfigure) resources into new combinations or to enhance them (more of the same) (Helfat et al., 2007; Eisenhardt & Martin 2000; Teece et al., 1997).

One more alternative description of the dimensions of dynamic capabilities is to divide them into exploratory and exploitative. Dynamic capabilities can be utilized to develop (explore) new firm-specific external and internal resources or to modify (exploit) existing ones (O'Reilly & Tushman 2008; Benner & Tushman 2003; Teece & Pisano 1994; Teece et al., 1997). Exploratory capabilities are a capacity to generate variation and selection, while exploitative capabilities are about replication and retention (Zollo & Winter 2002; Madsen 2010). A firm needs to possess both capabilities simultaneously to try to be successful at all times (Benner & Tushman 2003). Some authors identify an ambidextrous capacity to balance between exploration and exploitation as a dynamic capability. Such an ambidextrous organization is capable of enhancing and refining its existing operations in the short run in mature (equilibrating) markets and is simultaneously capable of developing new ones in the long run in rapidly changing (disequilibrating) conditions (O'Reilly & Tushman 2008). Although there is widespread agreement about the need for a firm to be able to both exploit existing opportunities and explore new ones (see e.g., March 1991), there has been some disagreement about whether these two qualities, that are to some extent opposites, can both merged into one conception of dynamic capabilities (see Schreyögg & Kliesch-Eberl 2007).

Dimensionality of DC

Theoretical constructs are either unidimensional or multidimensional based on how many unique aspects they have. Unique dimensions can be either reflective

manifestations of the focal construct or formative characteristics that define it. (MacKentzie et al., 2011.)

Dynamic capabilities have been interpreted as both a unidimensional and a multidimensional construct (see Barreto 2010). A multidimensional approach consists of several distinct but related capabilities (Barreto 2010; Wang & Ahmed 2007). Some empirical studies have, in turn, identified it as a unidimensional measure, where all the items load on a single first-order factor (see e.g., Wu et al., 2007; Wu 2006). Dynamic capabilities have also been viewed, alternatively, as a formative or a reflective construct. Helfat and others (2007) take a stance towards formative construct in their definition, according to which a firm can conduct any of the three individual dynamic capabilities, including creation, extension *or* modification of its resource base. Similarly, Barreto (2010) suggests that formative dynamic capabilities are an aggregate of individual capabilities that can but need not be covariate. Hence, a firm may perform high levels of one capability but low levels of another capability (Barreto 2010; Pavlou & Sawy 2011). Teece and colleagues (1997), in turn, interpret dynamic capabilities as a reflective construct when they define it as a firm's ability to build, integrate *and* reconfigure competences. Teece (2007) similarly suggests that a firm with dynamic capabilities is can simultaneously manage (develop and apply) the entire process of opportunity search, including all the three elements of sensing, seizing and maintaining opportunities. This simultaneous development and application of dynamic capabilities may not be necessary at the product level but, rather, at the organization level (Teece 20007). The measurement has also been based in some empirical studies on a reflectiveness assumption, whereby a firm exhibits similar levels of all capabilities (see e.g., Hung et al., 2010; Wu 2006). In conclusion, there is a lack of empirical, especially quantitative, research on validating the dimensionality of the construct (Wang & Ahmed 2007).

Stability of DC

Theoretical constructs can, in general, be stable or unstable over time and across instances (MacKenzie et al., 2011). Organizational capabilities, including dynamic, are considered to be largely routinized. This means they are somewhat stable, systematic, heritable, patterned, repetitious, regular, predictable and automatic within a firm (Zollo & Winter 2002; Winter 2003; Nelson & Winter 1982a). Although they are relatively stable, dynamic capabilities probably change over time in a way similar to other capabilities (Helfat et al., 2007; Helfat & Peteraf 2003). Capabilities change through organizational learning when firms get feedback on how well they are working and they search alternative ways to improve their performance (Zollo & Winter 2002).

Furthermore, interpretations vary to a degree about how patterned and intentional dynamic capabilities are. A means to clarify further what is meant by routinized operations is to distinguish what they are not. Not all tasks of the firm are routinized, but there are also stochastic elements (Nelson & Winter 1982a). A firm engages in these ad hoc efforts to solve problems, for example, under crisis conditions (Nelson & Winter 1982a). There seems to be a consensus that an ad hoc, idiosyncratic one-time action is unrelated to dynamic capabilities when it is based on accident, luck or randomness (Winter 2003; Helfat et al., 2007; Teece 2007). However, differences of opinion are reflected in the categorization of dynamic capabilities into highly intentional and emergent. According to Winter (2003), improvised search is not routine in itself when routine is understood as highly patterned and repetitious behavior. He states that brilliant, creative, non-repetitive and intentionally rational improvisation is not a dynamic capability, although at a higher level of abstraction there may be patterns even in improvisation and in that sense it can be akin to a routine. In Winter's (2003) view, then, an alternative way for a firm to change without dynamic capabilities is to use improvisation as a means of ad hoc problem solving to search novel solutions to challenges that a firm is not well prepared for. Helfat and others (2007), on the other hand, see that dynamic capabilities need not to be fully planned; it is enough when a firm has some emergent streams of activity with some implicit aim. Eisenhardt and Martin (2000) express the same thing by arguing that there is more than one type of routine, that is, dynamic capabilities can have different characters depending on the form of search. Capabilities have only a little structure in case of improvised search: They are simple, experiential and iterative (processes), relying on situation-specific, newly created knowledge (Eisenhardt & Martin 2000).

The pattern of dynamic capabilities can vary across two different market conditions. Routines are planned, in a way, in moderately changing environments, since they are detailed (complicated), predictable and analytic. However, in rapidly changing environments, routines are emergent in the sense that they have only a little structure (simple), are experimental and iterative, relying on situational contingencies (Eisenhardt & Martin 2000). Furthermore, there are two views of the stability of dynamic capabilities across firms. On the one hand, dynamic capabilities are firm specific (Teece et al., 1997; Teece 2007; see also Collis 1994). They are unique in details of the firm (Eisenhardt & Martin 2000), a result of each firm's individual history, including previous investments, learned habits, and current asset endowment (Teece et al., 1997). Specificity means that dynamic capabilities cannot be bought in the market but must be built within the firm (Teece & Pisano 1994). On the other hand, there are commonalities in key features of dynamic capabilities across firms (Eisenhardt & Martin 2000). Dy-

namic capabilities are relatively stable over various cases of organizations in this sense.

Dynamic capabilities are also suggested as being applicable to various types of organizations, ranging from private firms to not-for-profit organizations, since both have resources they may decide to manipulate (Helfat et al., 2007). Similarly, the construct arguably applies to both new and well-established organizations (Helfat et al., 2007; Zahra et al., 2006). However, Zahra and others (2006) state that the exact nature of capabilities varies according to a firm's age. New firms' dynamic capabilities are simple, change often and follow the logic of improvisation, trial-and-error and imitation, whereas established firms have dynamic capabilities that are more complex, more resistant to change and are based on planned behavior (Zahra et al., 2006). These differences closely resemble those between dynamic capabilities in moderately and highly volatile markets, as previously discussed. Furthermore, Barreto (2010) believes that dynamic capabilities may be relevant to all sizes of organizations but states that further research should be conducted to find out more accurately for which types of organizations dynamic capabilities are very important and for which it might be less valuable.

3.2.3 Firm performance and dynamic capabilities

Dynamic capabilities are closely related to a firm's performance as well as to its internal and external environments (Ambrosini & Bowman 2009). Different views have been presented about whether dynamic capabilities suggest a guarantee of a better performance. Teece and others (1994; 1997) argue that dynamic capabilities are abilities to achieve competitive advantage. These types of dynamic capabilities definitions imply that they are always valuable and result in a better performance, but such conceptualizations have been considered tautological and impossible to falsify (Cepeda & Vera 2007; Eisenhardt & Martin 2000). Consequently, many researchers have been more cautious in drawing such linkages and have, instead, argued that dynamic capabilities generate changes but that these changes may be for the firm's better or worse (Winter 2003; Helfat et al., 2007).

Following this latter line of argumentation, the mere possession of dynamic capabilities is not enough; a firm needs to target and deploy them as well. It also costs a firm to create and use dynamic capabilities, and the possible benefits need to be greater than the preceding costs for the firm to gain from them; otherwise, they will lead to losses (Zahra et al., 2006). DC also influences performance only indirectly through mediating operative capabilities (Eisenhardt & Martin 2000). It changes a firm's resource base which, in turn, may have an impact on actual performance (Zahra et al., 2006). However, any changes in the resource base

simply show that a firm is doing something different than before, but this is not necessarily anything better than before; therefore, changes do not automatically lead to success (competitive advantage) (Helfat et al., 2007; Winter 2003; Barreto 2010).

Slightly differing views exist about the capacity of dynamic capabilities to provide sustained advantage in competition. On the one hand, dynamic capabilities are considered to have so-called VRIN qualities, that is, to be valuable and rare (unique) to provide competitive advantage and, furthermore, to be difficult to imitate and substitute to make the advantage sustain (Teece 2007; Wang & Ahmed 2007). Difficulty imitating the capabilities is a result of imperfect mobility (e.g., causal ambiguity) and mobility barriers (e.g., property rights) (Teece et al., 1997; Teece 2007). According to another viewpoint, dynamic capabilities are valuable and possibly rare, which provides competitive advantage in the short run but not in the long run, because other firms need not to try to imitate them but can instead discover similar capabilities on their own or substitute them, since dynamic capabilities can be different in many details and still be effective (Eisenhardt & Martin 2000).

Eisenhardt and Martin (2000) conclude that dynamic capabilities are not a sufficient condition for a superior performance, although they may be required for success. The value of DC depends on the context, especially how well they are aligned with the firm's internal and external environments (Winter 2003; Helfat et al., 2007; Barreto 2010; see also Collis 1994). Internal fitness describes how good (quality) a firm is in what it is doing and, especially, how effectively (quality per cost) it can perform its capabilities (Helfat et al., 2007). Internal fitness is linked to various types of resources including actors, physical capital, structure (and systems) and culture. Actors bring individual specialized knowledge and physical capital represents the collective knowledge of the firm. Structure defined as roles and incentives, and culture, as shared values and beliefs, guide people's behavior and knowledge flows in the firm (Verona & Ravasi 2003). The relationship between the types of resources and dynamic capabilities can be interpreted in terms of antecedents, contingencies or composites. Zahra and others (2006) state that an internal pressure towards change may trigger capability development and usage when the firm falls well below aspirations with current substantive capabilities. Furthermore, creation and deployment of dynamic capabilities is largely determined by key decision maker's ability and willingness to make changes (Zahra et al., 2006). More generally, culture and structure can be seen to form an antecedent that enables the dynamic capabilities as actions (Verona & Ravasi 2003). Teece (2007) differentiates dynamic capabilities themselves from what he calls microfoundations that support capabilities from underneath. Internal environment, especially managerial behaviors and perceptions, can also moderate between creation and deployment of dynamic capabilities

(Ambrosini & Bowman 2009). Culture and structure, together with human and physical capital, can additionally be seen to be the resources that jointly compose dynamic capabilities (Verona & Ravasi 2003). DC cannot be identified as a separate construct in this view but, rather, as an embodiment of the culture, structure, strategy and some other organizational elements (Lawson & Samson 2001).[36]

External fit is a matter of alignment between dynamic capabilities and conditions in the market environment (Helfat et al., 2007). When environment is viewed in a contingent role, various characteristics such as uncertainty, complexity and munificence moderate the relationship between DC and firm performance (Aragón-Correa & Sharma 2003; Zahra et al., 2006; see also Benner & Tushman 2003). A firm utilizes dynamic capabilities to achieve evolutionary fitness, that is, congruence with the changing market environment (Helfat et al., 2007; Teece et al., 1997). Dynamic capabilities are associated with both short-run effectiveness in moderately dynamic (i.e., mature or equilibrating) markets and long-run competitiveness in high-velocity (i.e., new or disequilibrating) markets (Eisenhardt & Martin 2000; O'Reilly & Tushman 2008). Environment may be changing rapidly involving high levels of uncertainty (Teece et al., 1997) or moderately along more predictable paths (Eisenhardt & Martin 2000; Zahra et al., 2006). Originally dynamic capabilities were associated with Schumpeterian market conditions of uncertainty and rapid change in knowledge (Teece et al., 1997; see also Williamson 1991). A firm is very entrepreneurial in the sense that it innovates and tries to shape the market environment when it possesses strong dynamic capabilities. Also Kirznerian conditions of differential access to existing knowledge have been introduced to dynamic capabilities approach (Teece 2007). Consequently, dynamic capabilities change a firm's operations in response to a changing environment (Teece & Pisano 1994; Wang & Ahmed 2007). A firm tries to adapt to the requirements of its external environment and even shape further the conditions in the market by making changes (Teece 2007; Eisenhardt & Martin 2000). More specifically, firms may benefit from exploratory dynamic capabilities in emerging markets and from exploitative capabilities in mature markets (O'Reilly & Tushman 2008).

Environment may also act as an antecedent to dynamic capabilities. Rapid or continuous changes in external conditions trigger the development and utilization of dynamic capabilities (Zahra et al., 2006; Wang & Ahmed 2007). Environment may provide substance for improving capabilities, or it may provide feedback on

[36] An ambidextrous ability to simultaneously explore and exploit adds another layer of complexity to the internal fitness. Decentralization and local autonomy in organizational structure, and organizational culture supporting risk-taking, assist dynamic capabilities in exploration, whereas centralization, formal systems and control assist dynamic capabilities in exploitation (O'Reilly & Tushman 2008; Benner & Tushman 2003). This seemingly paradoxical need for dual structure can be solved in an ambidextrous firm through having simultaneously highly differentiated but weakly integrated subunits (Benner & Tushman 2003).

the viability of firms' current actions (Zollo & Winter 2002; Helfat & Peteraf 2003). For example, market dynamism may influence the evolution of dynamic capabilities over time through organizational learning (Eisenhardt & Martin 2000; Zahra et al., 2006). Zahra and others (2006) note that there may even be no dynamism in the environment, but a firm may simply learn about the existing conditions for the first time and respond to them by developing dynamic capabilities.

Overall, there is, arguably, a lack of empirical, specifically quantitative, research on how and under which conditions dynamic capabilities can provide superior performance to the firm (Wang & Ahmed 2007). More research is especially needed regarding the external and internal factors that may enable or inhibit the potential benefits of dynamic capabilities to firm performance (Barreto 2010; Wang & Ahmed 2007). Rather than putting much effort into finding generalized effects of DC on performance, more effort is required to include both external and internal fit in the analysis (Barreto 2010). Put differently, dynamic capabilities need to be further examined as part of a framework that also includes antecedents and consequences (Wang & Ahmed 2007).

3.3 Entrepreneurial orientation, dynamic capabilities and opportunity search

This stage of conceptual identification discusses how the core constructs are embedded in a broader theoretical view and to other related concepts within it (see Fry & Smith 1987; Venkatraman 1989). Specifically, the concepts of entrepreneurial orientation and dynamic capabilities are embedded in the theoretical framework of opportunity search. The study of entrepreneurial orientation has not been entirely homogenous over the years, but various theoretical efforts can be identified to develop the concept, each with at least partly differing assumptions, as the previous chapters have discussed. These differences also influence the role of entrepreneurial orientation in organizational search. Similarly, research on dynamic capabilities, as presented earlier in the text, consists of various substreams with at least partly differing assumptions about the nature and content of the construct. These differences also matter when considering the role of dynamic capabilities in organizational search. Each of the two concepts is first examined separately, followed by a focus on the fit between them.

Entrepreneurial orientation's three alternative property types are action, attitude and a mixture of various types, as discussed previously. The first two are selected to examine how entrepreneurial orientation can possibly be embedded in the conceptual framework of opportunity search. Innovation and opportunity search are two alternatives for the common theme for EO as an action. First, EO

can be identified as a multi-dimensional, second-order construct in which each of its dimensions represent different attributes of the common theme of innovation. The dimension labeled as innovativeness can be interpreted to describe the frequency and the degree of novelty of innovation, proactiveness to represent the speed of innovation and risk-taking to capture the volume of innovation. Second, competitive aggressiveness can also be interpreted to represent the type of innovation, especially whether the firm is focusing on creating additional value or capturing a larger portion of the existing value. Finally, autonomy can be seen to describe the form of innovation so that a high level of autonomy would indicate the emergent approach and a low level, in turn, the planned approach.

The problem with this interpretation is that it does not fully capture the theorizing of Lumpkin and Dess (1996) about competitive aggressiveness, which could simply mean predatory pricing without any connotation with innovation. This deficit can be overcome when the common theme is switched to opportunity search. Interpretation of EO as an opportunity search-related construct makes it also possible to integrate it into the framework of opportunity search presented in the previous chapter. Opportunity search was defined as a firm's purposeful effort to form profitable alternatives to its present operations, which, hence, covers innovation as one means of opportunity search but is not limited to it. Now, the dimensions of EO would contribute to opportunity search by describing frequency and novelty (through the dimension of innovativeness), speed (proactiveness), volume (risk taking), type of alternatives (competitive aggressiveness) and form (autonomy) of search. It is notable that within the theoretical framework new entry is an integral part of search behavior (outcomes of search), and therefore, entrepreneurial orientation as action is interpreted to capture also new entry (cf. Lumpkin & Dess 1996).

EO as an attitudinal construct describes willingness, and it can, therefore, be seen as parallel to the concept of search preferences as part of search resources within the conceptual framework of search. A five dimensional EO can be interpreted to match relatively well with the six types of preferences within the framework. Innovativeness matches with a preference for curiosity and a preference for challenge, as they concern organizational commitment towards doing things differently. EO's risk-taking dimension pairs clearly with a preference for uncertainty describing the desired degree of change. Proactiveness and initiative are closely related, specifying how willing the firm is to act before others. Aggressiveness corresponds well with opportunism, as they both specify a firm's stance on preying competitors in the market. EO's autonomy dimension describes the organizational decision-making mindset, especially the preferred degree of independence of employees in creating something new. Autonomy can be linked to organizational attitudes towards deliberation versus experimentation within the framework of search. One aspect of the autonomy dimension is a pref-

erence for having a hierarchical versus a participatory structure within the firm. This preference for rate of employee participation matches to some extent with the deliberation versus experimentation dimension of search, so that a preference for hierarchies would correspond with deliberation and a preference for participation with experimentation. A viewpoint that has not been fully covered so far in this study is whether EO is associated with a preference for deliberation and, consequently, with the planned form of search, or with a preference for experimentation and the emergent form of search. Suddaby and others (2015) see EO describing discovery rather than creation of opportunities, thus tying entrepreneurial orientation to planned search as opposed to emergent search. Lumpkin and others (2009), in turn, link the autonomy dimension of EO to the development and enactment of new alternatives. This implies that entrepreneurial orientation could also be related to the emergent form of search.

Entrepreneurial orientation is associated with high levels of most of the individual dimensions, except for the degree of innovativeness for which lower levels may be possible, as discussed earlier. This tentatively points EO towards disruptive and accumulative search, but it requires a closer examination of the relationships between the dimensions of EO. Defining EO as a multidimensional construct with a common theme of opportunity search does not, as such, imply either formative or reflective associations between the construct and its dimensions, but any of the interpretations (formative-additive, formative-multiplicative or reflective) are possible. In fact, there is no need to try to argue for the superiority of one relationship over the others, but the decision can be left open to be decided separately in each research setting. What is relevant, though, is to realize the implications of each choice. Independence of the dimensions would mean that EO is actually a collection of alternative means to search for new opportunities. The advocates of the formative-additive approach, then, basically accept that there are as many as 31 different entrepreneurially oriented ways to conduct search if there are five EO dimensions, and a firm can, for example, have either a low or high level (exemplified as simplicity) of any of them. The only instance in which a firm would not be entrepreneurially oriented is when it shows a low level of involvement simultaneously in all the five attributes. The formative-multiplicative view, in turn, suggests that there are several ways (eight with three dimensions and 32 with five dimensions) to search, but only one of them should be labeled as entrepreneurially oriented. So, there is only one possible combination of the separately varying dimensions that makes a firm entrepreneurially oriented; that is the case when a firm is engaged simultaneously in a high level of innovativeness, proactiveness and risk-taking (as well as aggressiveness and autonomy in the case of five dimensional EO). A reflective perspective, in turn, can be seen to represent one possible way of searching for new alternatives so that

entrepreneurially oriented firms have higher levels and other firms have lower levels of the search attributes.

The main definitions of entrepreneurial orientation disagree about the relationships between the underlying dimensions as discussed earlier. The most important divide concerns the type of covariation (formative vs. reflective). This division has a profound significance in placing EO in the conceptual framework of organizational search. A formative-multiplicative interpretation of EO would mean that firms can have various combinations of EO dimensions, but only those engaging in disruptive search would have high levels on all of them simultaneously and would, therefore, be named as entrepreneurially oriented (see Table 4). The reflective approach, in turn, would suggest that all the dimensions co-vary and that only firms engaging in disruptive search (high levels of intensity) would be identified as entrepreneurially oriented, and the other firms in decreasing levels of intensity would be interpreted as engaging in accumulative search (moderately high levels of intensity), positioning search (moderately low levels of intensity) and optimizing search (low levels of intensity).

If EO is defined as a formative-additive construct, then a firm engaging in any of the four search behaviors in the framework of opportunity search could be labeled as entrepreneurially oriented. The key dimension here is competitive aggressiveness and its interpretation as opportunism. In case entrepreneurially oriented firms are defined as having a high level of preference for opportunism, various types of monopolizing resource combinations come into the picture. Otherwise, entrepreneurial orientation captures only resource combinations that are related to productive efficiency. For example, a firm that engages in perfectly competitive rent-seeking would be considered to have a high level of competitive aggressiveness that would be enough to call the optimizing firm entrepreneurially oriented. Similarly, a firm that engages in market positioning would be seen as entrepreneurially oriented because of its aggressiveness towards competitors. Moreover, a pioneering firm in search of disruptive (untried) ways of monopolizing the market and another firm quickly imitating the pioneers' initiatives would both be identified as entrepreneurially oriented. Another important attribute is the degree of novelty of the alternatives. If incrementally new alternatives are accepted as part of the EO concept (as suggest by Lumpkin and Dess 1996), then the formative-additive approach makes it possible to interpret EO as an accumulative type of search.

It is notable that the requirement for a high level of proactiveness, indicating continuous involvement in search, would mean, in the case of a formative-multiplicative and reflective approach, that firms following an episodic disruptive search, as suggested by a punctuated equilibrium approach (see Romanelli & Tushman 1985), would not qualify as entrepreneurially oriented. The formative-additive nature of EO, in turn, would make it possible to also identify these firms

as entrepreneurially oriented through other dimensions of EO, especially the high degree of novelty. Another important observation concerns ambidexterity. If the exploitation element of ambidexterity is understood as incremental innovation (accumulative search) and/or more efficient use of the given ordinary resources (positioning search), then formative-multiplicative and reflective interpretations of EO assume, at least implicitly, that entrepreneurially oriented firms are not ambidextrous but only engage in exploration (disruptive search). This is because low (incremental) and high (radical) levels of newness are seen to be the opposite ends of the same continuum.

The formative-additive approach, together with Lumpkin and Dess's (1996) looser requirement for the degree of novelty or their later (2001) interpretation of competitive aggressiveness explicitly as exploitation (protection of established position), would allow EO to be interpreted as an exploitative element of ambidexterity. However, this would not yet capture both elements (simultaneously or sequentially) that are the essence of ambidexterity. It is possible for a researcher who wishes to deal with ambidexterity through EO to interpret the competitive aggressiveness dimension as exploitation and define the construct as either formative-multiplicative or reflective. However, this would still leave open the incremental innovation aspect of exploitation, unless it would also be included in competitive aggressiveness.[37]

[37] The ambidexterity discussion is rooted in the planned form of search. Ambidexterity makes less sense in the emergent approach to search, since the idea is that incremental and radical changes are not two different things but are intertwined, so that smaller modifications eventually add up to larger changes (see e.g., Brown & Eisenhardt 1997; Weick & Quinn 1999). This raises two potential questions regarding the EO literature: Is EO implicitly rooted in the planned approach to search (with the possible exception of Lumpkin & Dess 1996) and, furthermore, if it is desired that EO can represent either planned or emergent approach, should the dimension of innovativeness be modified so that it does focus on radicalness?

Table 4 Entrepreneurial orientation and dynamic capabilities in the framework of opportunity search

	Optimizing search	*Position-pursuing*	*Disruptive search*	*Accumulative search*
Entrepreneurial orientation	Lumpkin&Dess (1996) - formative-additive - high aggressiveness (perfectly competitive rent-seeking)	Lumpkin&Dess (1996) - formative-additive - moderately low novelty - high aggressiveness (market power)	Miller (1983); Covin & Slevin (1989); - formative-multiplicat. or reflective - high innovativ. - high risk-taking - high proactive. Lumpkin&Dess (1996) - formative-additive - all 5 dimensions	Lumpkin&Dess (1996) - formative-additive - moderately high novelty - high aggressiveness (rapid imitation)
Dynamic capabilities	Winter (2003) - simple capabilities (replication, reduction)	Winter (2003) - less complex capabilities (release and reallocation of resources)	Teece et al., (1997); Winter (2003); Teece (2007) - higly complex (e.g., related to new products)	Teece (2007); Winter (2003) - somewhat complex (exploitation)

The concept of dynamic capabilities has been connected with various common themes, one of which is identification of new opportunities, as has been demonstrated earlier. This provides a sound basis for examining the concept in the light of the conceptual framework of opportunity search. Dynamic capabilities include various categorizations, depending on the definition, but three dimensions stand out: sensing, selecting and transforming (cf. Barreto 2010). Furthermore, the dynamic capabilities concept has two alternative properties, ability and action. From the perspective of action, the match between DC dimensions and search behavior is relatively straightforward. Sensing is related to frequency, volume and speed of search, selecting the type and novelty of outcomes, and transforming the form of search. Ability as a property type of DC describes a set of firm-level skills and is, thus, comparable to the concept of search abilities as one type of search resource within the framework. Dynamic capabilities can be interpreted to correspond rather well with the three types of abilities within the organizational search framework. Sensing is a close match with ideation, as they both describe organizational abilities of forming potential combinations of resources. Selecting and assessment are clearly analogous, specifying the abilities needed to evaluate and choose among alternative combinations. Transforming and introduction are natural equivalents, since they detail the abilities required to bring resource combinations into use.

The central divide in research on DC concerns the complexity of actions and abilities. Dynamic capabilities are grounded on the assumption of complex changes, related, for example, to introducing new products (see e.g., Teece & Pisano 1994). This places DC with disruptive search within the framework (see Table 4 above). However, moderate levels of complexity have also been attached to dynamic capabilities in the form of exploitation (Teece 2007), linking DC to accumulative search. However, some researchers state that relatively simple capabilities to replicate, extend or destroy (more or less of the same; change in scale) existing resources is also a relevant dynamic capability (e.g., Winter 2003; Helfat et al., 2007). This suggests that DC could also be embedded in optimizing search. Furthermore, any ability to change the production process is also, according to some interpretations (e.g. Winter 2003), a dynamic capability, which would embed the concept also in position-pursuing search. Others (e.g., Teece 2007), however, quite explicitly exclude replication from dynamic capabilities. Teece and others (1997) also argue that market power-based strategies and strategies utilizing unique, ordinary resources are missing or at least have not, in the main, focused on the principal features of innovation, rapid change and uncertainty. This view quite straightforwardly suggests that positioning search is not part of the dynamic capabilities in their approach.

Another relevant aspect of dynamic capabilities is that the complexity refers to different levels or different kinds of abilities or actions across the four types of search behavior. For example, it could be argued that it is enough for firms to have a minimum level of calculation capacity in optimizing search to decide (only) about the production volume, whereas a high level of such abilities may be required in disruptive search to choose among alternative, untried combinations, and the DC levels would determine which of the searches it captures. Conversely, it could be that a firm needs different kinds of assessment abilities in different types of search so that computation would be needed in optimizing search and judgment in disruptive search, for example, and the types of DC would determine its position among the alternative search behaviors.

One more way to approach the question could be through competitive advantage. If it is assumed that dynamic capabilities are responsible for achievement and sustainment of superior firm performance (see e.g., Teece 2007), then DC would not be placed in optimizing search. Additionally, researchers do not fully agree on the type of change process to which dynamic capabilities apply. More favorable (e.g., Eisenhardt & Martin 2000; Helfat et al., 2007) and less favorable (e.g., Winter 2003) opinions exist about the emergent form. This does not directly affect the position of DC among different forms of organizational search, but it influences how the role of dynamic capabilities is understood within a single search type, for example, disruptive search.

In summary, the core idea of dynamic capabilities is that all abilities or actions for changing a firm's resource base are identified as dynamic capabilities (see Helfat et al., 2007). When considering how to embed dynamic capabilities in the framework of organizational change, a question arises as to what counts for a change in the resource base. If increasing or decreasing the production volume (see optimizing search) is accepted as change, and if releasing a given resource from one given combination to be used (more efficiently) in another given combination (see position-pursuing search) is accepted as a change to a resource base, then dynamic capabilities could be embedded in any of the four forms of organizational search. Put differently, if the answer is affirmative to the question about whether all changes in a resource base are relevant from the dynamic capabilities point of view, then dynamic capabilities are present in all forms of organizational change, albeit that they may not be exactly the same in details (e.g., less, moderately or highly complex). However, it is unnecessary to conceptually limit dynamic capabilities to deal with only one or some of the search behaviors, but the choice can be left for each research setting as long as the specification is done with due care.

Entrepreneurial orientation and dynamic capabilities have been discussed separately so far in the organizational search framework. A simultaneous examination shows that embeddedness in disruptive search is at the heart of both. Early works on EO (e.g., Miller 1983) and DC (e.g., Teece & Pisano 1994) explicitly associate the concept with Schumpeterian entrepreneurship, which places them firmly within disruptive search within the framework. However, further research has expanded their conceptual domain to potentially also cover the other three search types. Probably the least controversial issue is the extension towards accumulative search, and the most controversial is the position within optimizing search. A common ground for various EO and DC definitions is that they exclude the situation in which the firm does not change its operations in any purposeful way. This type of behavior, while an entirely possible option for any firm, is not directly present in the framework of purposeful opportunity search.

One way to position the two constructs in the framework of search could be so that the levels of EO and DC arguably represent different types of search. A high level would place EO and DC in disruptive search, moderately high in accumulative search, moderately low in positioning search and low in optimizing search. Having no entrepreneurial orientation and dynamic capabilities would suggest that the firm does not engage in any type of purposeful search. The downside of this categorization is that it only captures the possibility that firms engage in one type of search at one time and none of them simultaneously. For example, this interpretation would make it possible to consider EO and DC as a firm's effort to balance between disruptive and accumulative search through sequential ambidexterity but not through simultaneous ambidexterity (cf. O'Reilly & Tushman

2008). An alternative interpretation could be that high levels of EO or DC represent any of the four types of search depending on how the constructs are defined in a given research setting. Then, a low(er) level would simply indicate that a firm is not committed to this one type of search, for example, disruptive search, but it would not point specifically to any of the other three search types or to the possibility of no search at all. So, a high level of one type of search would not exclude the possibility of simultaneous engagement in some other types. A third alternative is that EO and DC could be interpreted so that they capture sequential and simultaneous ambidexterity. Some of the subdimensions (e.g., EO innovativeness or risk-taking) would then describe engagement in searching radically new alternatives, and other dimensions (e.g., competitive aggressiveness of EO) would represent commitment to searching incremental changes. Now, reflective subdimensions would capture simultaneous ambidexterity and formative subdimensions either simultaneous or sequential ambidexterity.

The relationship between entrepreneurial orientation and dynamic capabilities within any form of search depends on their property type. When EO is interpreted as an attitude and DC as an ability, two alternatives exist for fit within the conceptual framework of organizational search. The evolutionary view suggests that EO preferences and DC abilities cannot be examined separately, but they covary and are embedded in the search routines. According to the orthodox view, entrepreneurial orientation and dynamic capabilities as search resources are antecedents to search behavior, which, in turn, affects firm performance. Specifically, EO as a set of search preferences influences search in the case of loose fit, but the association depends on DC as a set of search abilities. If the fit is tight, entrepreneurial orientation affects the building, or selection, of dynamic capabilities that mediate the relationship between EO preference and search behavior, which eventually impacts firm performance. Some research exists on the relationship between EO and DC from this perspective. Entrepreneurial orientation has been interpreted as an organizational and managerial mindset that makes it possible for a firm to construct its dynamic capabilities (Jiao et al 2010; Weerawardena et al., 2007). Besides loose and tight fit, it is possible that EO and DC as search resources have independent effects on firm performance through search behavior. The research operating explicitly with the concepts of entrepreneurial orientation and dynamic capabilities has also touched upon this perspective. Jantunen and others (2005) examined independent effects of entrepreneurial orientation and dynamic capabilities on firms' internationalization, without elaborating on their potential mutual relationship in the model. Their results provide some support for independent effects.

Another possibility is that one of the two constructs is specified as a search resource (EO as preference or DC as ability) and the other as a search behavior. Then the relationship would change so that EO as a search preference influences

DC as a search behavior or the other way around. This kind of resources-to-action-to-performance standpoint can be found in Wiklund and colleagues' (2009) work, in which dynamic capabilities are considered as a prerequisite for the entrepreneurially oriented strategy of the firm and in Lau and Bruton (2011), in which the aggressiveness and risk-taking dimensions are interpreted as beliefs that underpin the development of capabilities as a strategic action. DC could also be a moderator to a relationship between search preferences and EO as a search action.

Furthermore, if entrepreneurial orientation and dynamic capabilities are interpreted as an action, they both represent search behavior within the conceptual framework. Since there is basically only one kind of behavior within each form of search, this implies that EO and DC are fully overlapping, or interchangeable, constructs. From the different dimensions of the two constructs, EO innovativeness and proactiveness would, arguably, be equal with the sensing of DC, EO-related risk-taking and competitive aggressiveness with DC-related selecting and EO autonomy with DC transforming. Not to be identical would require that they be a mixture of actions and organizational characteristics, that is, EO a mixture of actions and preferences and DC a mixture of actions and abilities. Alternatively, they could represent different search behaviors. For example, EO could be identified as disruptive search and DC as accumulative search, and together they would represent organizational ambidexterity. However, this would require a slightly atypical interpretation of one of the two constructs, since they are both rooted in disruptive search through their historically strong, theoretical underpinnings in Schumpeter's work. Moreover, one of the two constructs could be dominant and the other a proxy for it. For example, dynamic capabilities could, alone, capture ambidexterity and EO only disruptive search, which would make it a proxy for DC. Specifically, EO would substitute the disruptive dimension in the DC as a global construct representing ambidexterity.

EO and DC research has additionally been concerned about the fit of the concept with the market environment (and internal characteristics). According to both streams of research, the effects of EO and DC on firms' performance depend on the environment. The two constructs are also influenced by market circumstances. These two situations match with the loose and tight fit between the core elements within the opportunity search framework. Environment is a moderator between EO and DC as search resources or as search behavior and firm performance (loose fit), or as an antecedent to EO and DC and firm performance. Furthermore, it is present in both research fields that EO and DC can shape the environment. This means that a firm can be a leader and increase the level of dynamism, hostility and complexity in the market through its active search efforts. However, sometimes a firm may be too much ahead of the level of change in the

environment or lag too far behind, suggesting that it is important that the level of search be in balance with the level of environmental circumstances.

3.4 Specification of alternative models of internal and external fit

When the extant research is not powerful enough to be used to reject some of the alternative forms of fit among constructs, it is beneficial to specify several potentially relevant models and compare them to one another (Venkatraman 1989). This chapter will specify the competing conceptual models of entrepreneurial orientation's and dynamic capabilities' internal and external fit so as to discover which of the models gain the most support in the empirical testing in the next chapters. Specification of structural models involves assigning dependency relationships between constructs. The purpose is to test how the proposed theories about the dependencies explain the input data (Hair et al., 2010). Five theoretically equally possible models of internal fit between EO, DC and firm performance are specified based on the considerations above. The premise in the models is that EO and DC represent disruptive search either as an independent search or as a part of ambidextrous search. The alternative models include covariation, independence, mediation with either EO or DC as a mediator and moderation (see the following figure). Common to all the models is that at least one construct is independent and another is dependent.

The first alternative model depicts the evolutionary approach, according to which abilities and preferences cannot be distinguished from actions, but they are all intertwined. Entrepreneurial orientation and dynamic capabilities both influence firm performance so that the higher the level of EO and DC, the better the performance. The constructs also co-vary, indicating that they represent the same underlying construct. If this model gains support in the analysis, the overlap between the constructs should be examined more closely. EO and DC are interchangeable in the case of complete overlap. They portray search behavior in an exactly the same way and, consequently, are equal to one another so that DC can replace EO or the other way around. Hence, they would be theoretical substitutes accomplishing the same function of opportunity search. If overlap is partial, EO and DC could possibly be combined to form a single construct of search behavior in which some or all the subdimensions are unique. The subdimensions of EO and DC then complement each other so that they capture different types of resources or activities embedded in search behavior. In a third option, one of the two constructs could be a proxy to the other so that the more general concept already contains all the dimensions of the proxy and also has some additional dimensions.

The next models portray the neoclassical approach. The independent effects model (model 2 in the next figure) assumes that EO and DC are uncorrelated constructs that both affect firm performance directly, or more precisely, through search behavior that construct is not specified in the model. Here, EO describes search preferences and DC search abilities. In the first of the two mediation models (model 3), EO represents search behavior that completely mediates the relationship between DC as a search ability and firm performance. Specifically, a high level of DC ability results in a high level of EO activity and, eventually, increased performance. The other mediation model (model 4) characterizes EO as a search preference, whose influence on performance is totally mediated by DC. Now, a high level of DC mediates between a high level of EO preference and firm performance. Dynamic capabilities can equally well describe search abilities from a modelling viewpoint, based on the tight fit approach or search behavior. Specifically, there is a serial mediation, where EO preference affects performance through a causal chain of search abilities and search behavior, but of the two mediators only the one is specified in the model that represents DC.[38] The moderation effects model (model 5) portrays EO as a search preference that affects firm performance through an unspecified construct of search behavior; the influence depends on DC as an ability to search. More precisely, high EO preference has a positive impact on performance when the firm also has a high level of abilities to search.

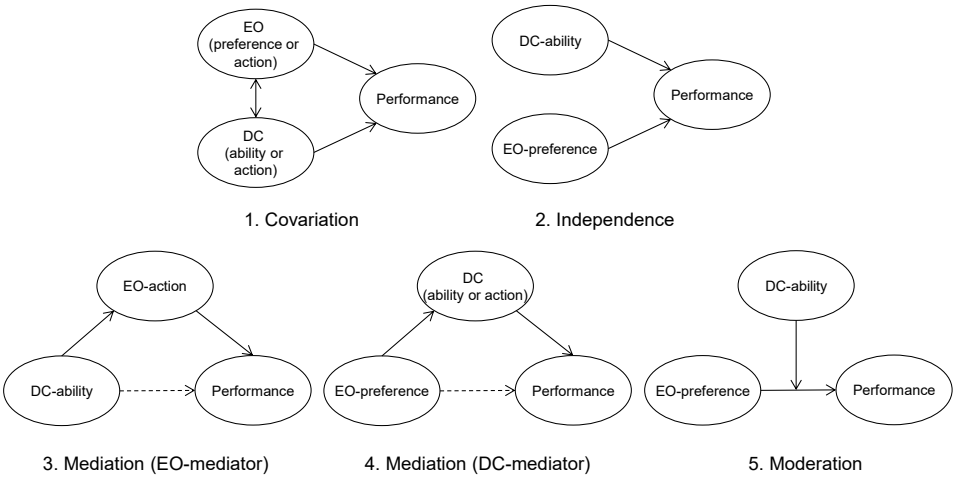

Figure 2 Competing models of internal fit between EO, DC and firms' performance

[38] If DC illustrates search abilities, then search behavior would be implicitly present in the model and, similarly, abilities would not be directly expressed in the model if DC depicts search behavior.

An important issue in model specification is the existence of equivalent models that differ in the dependency relationships from the specified models but produce the same goodness of fit to the data (MacCallum & Austin 2000). Some of them may not be theoretically viable, while others may be quite plausible, for which reason their recognition supports the conceptual validity of the specified model (Brown 2006). There are several equivalent models in this study, since any of the specified unidimensional paths could, in principle, be reversed, and each new model would have an equal fit to the data. Confounding, suppression and partial mediation are equivalent to the covariation model. A third construct causes both the independent and the dependent construct in a confounding situation and at least partly explains the spurious relationship between the two, whereas suppression occurs when a third construct increases the magnitude of the relationship between the other two (MacKinnon et al., 2002). Here, confounding would occur if EO was a common cause of DC (or the other way around) and firm performance. DC (or EO) would increase the relationship between EO (or DC) and firm performance in the case of suppression. These are plausible equivalent models and can be examined more closely in the empirical analysis by estimating the models with and without the third variable and comparing the results (see MacKinnon et al., 2002).

Prominent equivalent models are those in which the effect of the predictor to the mediator (see models 3 & 4 above) is reversed so that the original mediator becomes an independent construct. Now, EO represents a global construct that captures dynamic capabilities as one of its components in the first equivalent model, so that the direct effect of DC on performance is nonexistent when EO is present in the model. Similarly, DC is the dominant construct and EO as a proxy merely reflects one of its subdimensions in the other equivalent model (see Kraemer et al., 2001, for a general discussion of proxy constructs). These cases resemble confounding, but the difference is that the proxy and the dependent construct are causally related and not only through a common confounder. Another plausible equivalent model (cf. model 5 above) is one in which entrepreneurial orientation moderates a path from dynamic capabilities to firm performance. This is theoretically viable, and it is a matter of interest which to choose over the other. Wiklund and Shepherd (2003), for example, apply an approach in their work in which EO is moderator to the relationship between some knowledge-based resources (not explicitly specified as dynamic capabilities although closely resembling them) and firm performance. Entrepreneurial orientation as a search preference is considered as the primary concept in the model here, which scrutinizes its influence on performance. Furthermore, firm performance can be portrayed as an exogenous construct that affects EO and DC in an equivalent model to any of the five specified models. Such equivalent models are theoretically reasonable. High performance would provide some financial slack, which could al-

low the firm to invest more in opportunity search (see Cyert & March 1963; Levinthal & March 1981). However, performance, by definition, is a result of some actions taken by the firm. Therefore, some initial actions precede performance, and performance may or may not influence the firm's later actions. Put differently, some first-round actions are a necessary condition preceding performance, and an alteration of some second-round actions based on performance is a possible but not a necessary event. So, without specific knowledge of the situation at hand, it is logical to assume that performance is primarily a consequence of some preceding actions and events. Consequently, the proposed models are more relevant in this respect than the equivalent models in this research setting.

Four models of the fit between market environment, search and firm performance are specified on the basis of the theoretical discussion in the previous chapters. The models include independent, moderation, mediation and matching effects (see the next figure). The first model represents the independent effects of the market environment and opportunity search on firm performance. The model follows the logic whereby a fixed, superior search behavior is applicable for all situations. Specifically, high levels of EO and DC as search resources or search actions are likely to improve firm performance irrespective of market conditions. The second model describes loose fit. The market environment as a moderator changes the causal relationship between search and firm performance. Here, a high level of search has a positive influence on performance when the market environment is hostile, dynamic and complex. The market environment moderates between search behavior and performance in the evolutionary approach, whereas according to the neoclassical interpretation, the environment is a moderator of the relation between search preferences and search behavior (see model 5 above).

The third model illustrates tight fit in which there is an indirect effect between the market environment and firm performance through search as a mediator. In this approach firms adapt to hostile, dynamic and complex market environment through search that functions as a generative mechanism between external circumstances and firm performance. Again, the exact relationship between environment and EO and DC as constructs of search is different across evolutionary and neoclassical models. Search resources are embedded into actions in the former, so the environment affects search activity. Following the neoclassical interpretation, there is a serial mediation in which the indirect effects of the market environment on firm performance pass through preferences, abilities and activities of search. The fourth model depicts fit as matching. It assumes that a balance between the level of search and the level of environmental circumstances has a positive impact on firm performance. Specifically, highly dynamic, hostile and complex market conditions fit with a high level of search, or alternatively, a stable, benign and simple environment is best matched with a low level of search. In

this model, the environment can be interpreted as a benchmark against which the level of search is compared. This approach does not take a stand on whether or not firms are inert (cf. loose fit and moderation) or adaptive (cf. tight fit and mediation). The model demonstrates how lucky (or unlucky) inert firms are to have a fixed level of search that matches well with the environment or how well firms pursuing an adaptive approach succeed in their efforts. Depending on the approach, there should be a balance between environment and EO and DC as a search routine (evolutionary perspective) or between environment, EO preference and DC ability.

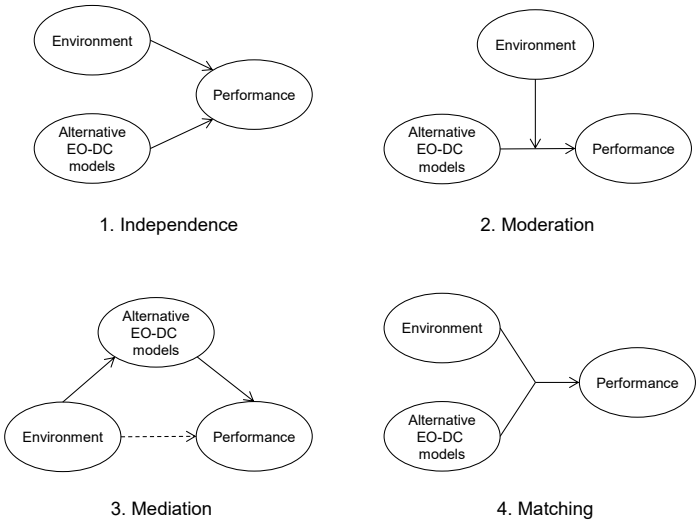

Figure 3 Competing models of external fit between EO, DC, market environment and firms' performance

Relevant models exist that are equivalent to the specified models of external fit. Firms are not separate from their surroundings but may not only be affected by the market environment but also influence it. Thus, it may be that there is an iterative process between the environment and firm conduct when both causal directions interact over time (see Miller 1988; Welter 2011). For example, performance may both a cause and an effect. In model equivalent to the specified independent effects model, a well performing firm could affect the market environment through a growth in market share that might result in intensified competition, as the rivals would try to gain back their position. Similarly, search could be an antecedent to market circumstances. A model equivalent to the specified mediation model is one in which opportunity search influences firm performance through the market environment as a mediator. This is a highly plausible situa-

tion; in fact, the premise in disruptive search, for example, is that firms create further changes in the market environment through their own actions. An introduction of new resource combinations cannot result in performance benefits unless the introduction changes the market conditions first. The reason why the causal link in the specified model is from environment to performance is that the market environment is highlighted in this way as a potential trigger for firms' search behavior.

The impact of market environment on firm performance depends on search in a model equivalent to the specified moderation. This is again a plausible, rather than a nonsensical, solution. The choice between the two models reflects differing underlying theoretical rationales. The equivalent model follows the Bain type of industrial organization tradition whereby the industry structure is assumed to determine average profitability, but each firm's position within the industry would dictate whether its profits are above or below that average (see Porter 1985). However, the assumption in the specified model is that the market environment has not a deterministic but a conditional role, so that firms' own actions influence their performance. Whether the profitability is above or below the industry average depends on market circumstances. The next chapters focus on testing the specified conceptual models.

A model equivalent to the specified model of fit as matching is one in which performance influences on the balance between opportunity search and the market environment. This is also a viable solution. For example, poor performance could signal to a firm's management that the environment has changed and their search effort is no longer in balance with it. A firm could then engage in more search behavior with the consequence that there would be a better match between search and the market environment, which would ultimately result in increased firm performance. Following the argumentation in alternative models previously presented, it is assumed that the order of appearance for the events is such that performance is primarily a consequence of some preceding actions and only secondarily a potential antecedent.

4 RESEARCH METHODS

The study can be described to be positivist. Accordingly, it carries along a set of philosophical assumptions about the nature of reality, understanding it and attaining knowledge about it. The work follows realist ontology according to which reality exists outside the mind, and this real world is driven by cause-effect mechanisms. Epistemologically, the study adopts an objectivist posture in which learning about the mechanisms is distant, noninteractive and free from values, consciousness and experience. The methodological stance is empirical. Various alternative models about the real world mechanisms are tested empirically to examine which one(s) receive support. (see Guba 1990; Crotty 1998.) The exact methods of collecting and analyzing data are discussed next.

4.1 Operationalization of the constructs

The following scales and items were adopted from previous works to operationalize the latent constructs of the study (see Appendices 1-4 for the full list of items and their sources). Firm performance as a dependent variable in this study is measured using two different scales, one reporting growth and the other profitability. Both are drawn from several sources (see Dess & Robinson 1984; Allen & Helms 2006; Venkatraman 1989; Madsen 2007; Zou et al., 1998). The measures are subjective, 7-point Likert scales with anchors of "strongly disagree" and "strongly agree." The scale for growth contains four items, and the scale for profitability five items. Each scale has one item that is a global measure of the perceived growth or profitability, while the other items measure more closely how the firm's performance is perceived compared to its competitors. Subjective measures of performance were chosen instead of objective data to acquire more complete information. Small firms are often either unable or unwilling to provide financial figures; their financial statements are not widely available from public sources and absolute figures on financial performance are industry related, making direct comparison between firms from different industries difficult and even misleading (see Covin & Slevin 1989).

Entrepreneurial orientation (EO) is culturally dependent so that national culture impacts the level of its dimensions (Kreiser et al. 2010; Lee & Peterson 2000). Strong support exists for the cross-cultural validity of the Covin and Slevin's (1989) scale (Knight 1997; Kreiser et al. 2002). The EO-performance

relationship also is robust to different operationalizations and cultural contexts (Rauch et al. 2009). EO is measured in this study by Covin and Slevin's (1989) instrument; they base their EO definition on Miller (1983). Theirs is considered the most commonly used instrument of the EO scales (Rauch et al., 2009). It contains three reflective EO dimensions: innovativeness, proactiveness and risk taking. The scale was supplemented with one additional item from Lumpkin and Dess (2001). The original semantic differential scale was modified into a 7-point Likert scale ranging from "strongly disagree" to "strongly agree." EO can be interpreted to be a mixture of preferences and actions (cf. the chapter 3.1) with this operationalization and to represent disruptive search among the four types of search (cf. the table in the chapter 3.3).

Contrary to entrepreneurial orientation, there are no well-established, commonly applied scales of dynamic capabilities (DC). This study adopts one of the pioneering scales from Alsos and others (2008), comprising four dimensions and 28 items. Two reasons favored the choice. First, their conceptualization of dynamic capabilities was based on the articles of Teece and colleagues (1997) and of Eisenhardt and Martin (2000); these are considered landmark works for theorizing dynamic capabilities (see Wang & Ahmed 2007; Barreto 2010). Second, the previous tests of the scale's reliability showed some satisfactory results (see Alsos et al., 2008). The instrument represents four dimensions of dynamic capabilities, including external observation and evaluation, external resource acquisition, internal resource configuration and internal resource renewal (Alsos et al., 2008). The authors define DC as patterns of actions or routines and suggest that it balances between the exploration and exploitation of opportunities. When this is interpreted in light of this study's theoretical discussion, the chosen operationalization places DC on both disruptive and accumulative types of search, portraying it as a mixture of abilities and actions.

Environment is an exogenous (independent) construct in this study. Environmental dynamism is captured as technological dynamism and measured with three items from Jaworski and Kohli (1993) and one item from Jantunen (2005), as well as from Autio and others (2007). This operationalization does not cover the whole construct of dynamism. It encompasses (partly) market-controlled resources but not uncertainty of demand and competition. A four-item scale developed by Jaworski and Kohli (1993) measures environmental hostility in terms of competitive intensity. The measurement scale in both instruments was a 7-point Likert. Again, this operationalization captures one aspect of munificence but not richness of demand and market-controlled resources. Control variables include firm size measured as number of employees and firm age and industry, which are self-reported, objective measures.

4.2 Study design and sample

A cross-sectional sample survey was utilized as a data collection method. This approach makes it possible to meet the covariation criteria but not temporal ordering and elimination of alternative explanations that are often identified as necessary conditions for causality (see Hayes 2013). However, according to Hayes (2013), an imperfect data collection design should not be a reason to not try to analyze the data to understand the mechanisms of interest as well as possible. Directional inferences are products of researchers' interpretations of the observed associations. It is important to recognize the limitations of the data and make interpretations cautiously but to not let the correlational nature of the data be an obstacle for making claims (Hayes 2013).

The sampling frame was constructed from Business Register held by Statistics Finland that has contact information for all firms registered in Finland. Small and medium-sized firms (SMEs) with fewer than 250 employees were selected for sampling in two sectors, the food industry (NACE Rev. 2: 10–11) and the media sector (NACE 18, 58–61). A disproportionate, stratified sampling was adopted. Two strata were selected comprising firms with fewer than five and at least five employees. A systematic sample was drawn from the first stratum, whereas all firms were selected in the latter. The sample was also supplemented with SMEs from the marine cluster. The study's aim was to include the entire population. The gathering of firms was based on judgement, since no official statistical classification exists to describe the marine cluster. Instead, information on shipbuilding (e.g., NACE 301, 3315), sea transport (e.g,. NACE 501, 502) and cargo handling (NACE 5224) firms and their subcontracting sectors (furnishing, maintenance, etc.) was gathered from various public and private sources (for example, the Orbis database) to identify and include as many firms in the sample as possible.

The targeted sample size was set to about 500 firms based on the intended use of structural equation modeling (SEM) as an analysis method. There are generally no strict guidelines for the minimum sample size, but it is affected by the distribution of the data, estimation technique, complexity of the model, rate of missing data and communalities, as well as by the number of items per construct. The more constructs, the lower the communalities and the fewer items there are in the model, the larger the sample size ought to be. As a rule of thumb, the minimum sample size would preferably be about 500 cases when there are more than seven constructs, some low communalities and, possibly, constructs with fewer than three items. (Hair et al., 2010.) This was the expectation in this study, since the constructs were presumably multidimensional. Entrepreneurial orientation would potentially consist of four first- and second-level constructs, dynamic capabilities would have five, environment would have three and performance would have

two constructs, making a total of 14 constructs (see the operationalization chapter for more details). The sample's target size was set to 500 to prepare for such complex models with a large number of constructs.

Variance between measures that results from the measurement method rather than the underlying constructs they represent is a potential problem in cross-sectional studies relying on single informants (Podsakoff et al., 2003). The issue of common method variance was tackled in this study during the questionnaire design by locating the focal measurement scales so they are not asked all in a row, by using reverse-worded items in the scales and by intermixing (instead of grouping) items across different constructs, which are all recommended practices to reduce common method bias (see Podsakoff et al., 2003). Furthermore, some research evidence suggests that the potential common method bias is generally not a major issue in examining the relationship between EO and firm performance. A meta-analysis of EO-performance studies found that the majority relies on cross-sectional, self-reported data. However, the analysis showed no statistically significant differences in correlations between EO and subjective or objective measures of performance (nonfinancial, growth and profitability) (Rauch et al., 2009). The authors concluded that common method variance associated with self-perceived performance measures in cross-sectional studies is not a serious threat to the validity of the relationship between EO and firm performance (Rauch et al., 2009).

Pretesting may be advisable if variables are original or they are used in atypical contexts (Hair et al., 2010). This study conducted pretesting only to check the wording of individual variables but not to statistically test the appropriateness of the scales, since there was a strong belief that the use of already existing scales would alleviate the need. The context (SMEs) was also considered to be within the scales' normal use. Pretesting would probably have made the (measurement) model analysis much easier, in retrospect, as the validity of some of the items and scales could have been improved by removing or refining them at early stages of the study. The draft of the survey questionnaire was sent for a friendly review to four independent colleagues (three from the USA and one from Norway) who are all experts in the field of entrepreneurship and strategic management and are experienced users of survey data in their research. Adjustments were made based on their expert advice. Additionally, the first contacts with the sampled firms were treated as pilot responses, and some minor changes were made to the questionnaire.

The survey was targeted to a Finnish-speaking member of the top management team of the firm, preferably the CEO or owner-manager. The CEOs or owner managers were not available in some instances and then another executive was interviewed. In the end, 87.3% of respondents were CEOs or owner managers and 12.7% other executives (see also Data description -chapter).

The survey was conducted from May to August (excluding July) 2009 through computer-aided telephone interviews, with an option to respond through an Internet-based questionnaire if requested by the respondent at the time of the initial telephone contact. The telephone medium was chosen over a mail survey to try to increase the response rate, make it easier for respondents to ask for advice and to control the pace and rhythm of answering. The idea was to avoid a situation in which the respondent loses interest and either switches to auto-pilot mode, paying no attention to the questions, or does not answer all the questions. However, the possible causes of respondents' lack of visual perception were not considered in advance. This, combined with reverse-worded items and intermixed scales, may have actually done more harm than good in this study, as the measurement model testing chapters will discuss.

The contacting of 2583 firms resulted in 495 responses, giving a response rate of 20.4%.[39] The sample size is considered to be adequate in terms of providing the statistical power to detect an effect that actually exists. Wolf and others (2013) found in their simulation study that the required sample size ranged from 30 to 460 cases, so models with more factors (e.g., 2 or 3 factors), fewer items per factor (3 to 4) and lower factor loadings (around 0.5) required a larger sample to detect effects with the assumption of 80% or higher power (and alpha of 0.05). This study's models contain several factors, sometimes only a minimum of three items per factor (e.g., the measure of entrepreneurial orientation), and many of the factor loadings are expected to be in the range of 0.5 based on previous empirical studies on the core constructs (for example, see Alsos et al., 2008, for factor loadings in the measurement of dynamic capabilities). With this study design, the minimum sample size requirement is assumed to be closer to the aforementioned threshold of 460 to avoid a situation where an effect is undetected, although it is present (a Type II error).

A nonresponse is a potential threat in survey studies. If those who respond differ significantly from those who do not, the results may not reflect the answers of the entire sample, which is important when generalizing the sample to the population (Armstrong & Overton 1977). There are many reasons for a nonresponse. This study categorized the sample into completed questionnaires (19.1%), uncontacted phone numbers (9.6%), unanswered calls (7.2%), unreached contact persons (15.2%), refusals (27.4%), agreed but unanswered questionnaires (7.8%), ineligible[40] contacts (3.2%), invalid contact information (2.0%) and unclear sta-

[39] The data were collected as part of "Innovativeness as a success factor in changing competitive environment (INNOCAS)" research project funded by TEKES, the Finnish funding agency for innovation.
[40] Ineligible contacts include incorrect industries and non-Finnish speaking contact persons.

tus[41] (8.5%). Nonresponse bias was estimated by comparing known[42] values for the sampled firms (see Armstrong & Overto 1977) in terms of the categorized[43] number of employees. The differences were statistically significant. Specifically, small firms with fewer than five employees are under-represented in the data. A next step is to try to estimate the direction of nonresponse bias (Armstrong & Overton 1977). Rauch and colleagues (2009) found in a meta-analysis of EO-performance studies that firm size is a significant moderator and that the effect is strongest among small firms (fewer than 50 employees). This suggests that the EO-performance association might be weaker in the data than in the sample.

The survey's representativeness can be further estimated by comparing the differences in the number of employees between the data and the sample as well as with the framework population (see Table 5). Overall, small firms with fewer than five employees are under-represented in the data. This is especially the case in the food and media sectors due to the nonresponse bias as well as to the sampling method. Data is representative of the entire population in the marine cluster, which shows that the nonresponse bias is negligible. Taken together, the data do not fully represent the entire population across the three sectors, and any generalization of the results should be done cautiously.

[41] Unclear status is something other than a completed questionnaire, but the exact information is missing for some reason. It can be, for example, an invalid contact information or non-Finnish speaking contact person.
[42] Known values were available for the food industry and media sectors.
[43] Six categories existed for the number of employees.

Table 5 Representativeness of the data (number of employees, %)

	Data (%)	*Sample (%)*	*Framework population (%)*
Overall[1]			
Unknown	15.8	11.9	4.7
... 4 employees	12.9	22.7	67.9
5... 9	27.1	24.1	10.3
10... 19	19.0	16.8	7.0
20... 49	14.3	13.6	5.5
50... 99	7.5	6.2	2.7
100... 249	3.4	4.7	1.9
Total (%)	100.0	100.0	100.0
Frequency (n)	495	2602	6487
Food[2]			
Unknown	2.5		0.0
... 4 employees	16.9	33.8	68.7
5... 9	30.5	24.4	11.9
10... 19	20.3	17.8	8.3
20... 49	17.8	14.3	6.3
50... 99	8.5	5.5	3.1
100... 249	3.4	4.3	1.7
Total (%)	100.0	100.0	100.0
Frequency (n)	118	788	1798
Media[3]			
Unknown	0.9	0.3	0.0
... 4 employees	15.1	24.3	77.1
5... 9	37.5	33.1	10.1
10... 19	25.4	20.6	6.2
20... 49	10.8	12.8	3.8
50... 99	7.8	5.6	1.7
100... 249	2.6	3.4	1.1
Total (%)	100.0	100.0	100.0
Frequency (n)	232	1184	4059
Marine[4]			
Unknown	50.3	48.6	48.6
... 4 employees	6.2	5.9	5.9
5... 9	7.6	6.8	6.8
10... 19	7.6	8.6	8.6
20... 49	17.2	14.4	14.4
50... 99	6.2	8.3	8.3
100... 249	4.8	7.5	7.5
Total (%)	100.0	100.0	100.0
Frequency (n)	145	630	630

[1] Size differences statistically significant ($p<.001$)
[2] Size differences statistically significant ($p<.01$)
[3] Size differences statistically significant ($p<.01$)
[4] Size differences between the data and the sample not statistically significant ($p>.05$). The sample and the framework population are the same for the marine cluster, since the entire population was included in the study.

4.3 Data description

Appendices 1-5 present the descriptive statistics for each measured variable, including means and standard deviations, as well as their abbreviations. The next

chapter reports the reliability tests and descriptive statistics for the latent constructs as part of the findings. This is because the reliability testing is an integral part of the analysis of the competitive models, especially of examining whether or not EO and DC are embedded within the same construct of search behavior. Some attributes of the respondents and the firms are presented next to provide an overview of the sample.

The respondents were from the highest levels of the management hierarchy in their firm. Most were CEOs or owner-managers (87.3%), followed by marketing managers (3.2%), division managers (3.2%), chairs of the board (1.6%) as well as production (1.2%), development (1.0%) and financial managers (0.8%).[44] Of the three sectors, media firms are the largest group (46.9%), and the other two groups are nearly the same size (marine: 29.3%, food: 23.8%). The firms' age and size range is quite wide. Some of the firms had been established just recently, whereas the oldest firms had been operating over 100 years. An average firm has been in operation for about 29 years (see Table 6). Firms had an average of just over 30 employees, ranging from one to 240 employees. The distribution was slightly skewed towards larger firms as reflected in the median number of 12 employees. The annual turnover was a little under 6.5 million, on average, and the median turnover 1.5 million euros. The firms had a turnover of 0.25 million euros in the first decile, at most, while the cutoff value for the last decile was about 18 million euros.

Table 6 Descriptive statistics

	Firm age	***Employees***	***Turnover (million euros)***
Mean	29.2	31.2	6.42
Median	20	12	1.50
Std. Deviation	29.4	45.1	1.42
Minimum	1	1	0.00
Maximum	159	240	210.00
Percentiles:			
10	5	3	0.25
25	11	6	0.74
50	20	12	1.5
75	33.3	35	6.0
90	72.5	92	18.35
Number of responses	494	495	462

The quality of the data impacts the results of multivariate analysis, such as structural equation modelling. The data were examined to assess missing values, to identify outliers and to test the assumptions of multivariate analysis following

[44] There were also several other individual titles (0.6 %) and a few persons with unknown titles (1.0 %).

the guidelines provided by Hair and colleagues (2010) and Brown (2006). The screening on the raw data was conducted using IBM SPSS 22.0 software.

There were two types of missing values, questions to which a respondent did not answer at all or, alternatively, answered as "don't know." Both types of missing data were recoded into the same value (-99). The extent of the missing values was analyzed separately for cases and variables. Missing values should, preferably, remain under 10% for any individual case or variable. Moreover, if the number of missing values exceeds 50% for any individual case or variable, they should be deleted from the data (Hair et al., 2010). The share of missing values was more than 10% (highest 34.1%) in 22 cases out of 495 (4.4%). Altogether, 272 cases had complete data with no missing values. One variable had over 10% missing values (PERFC7: 10.3%). The diagnosing of missing values resulted in a decision not to delete any variables or cases from the data. The pattern of randomness of the missing values was tested with Little's MCAR test, which indicated that the values are not missing completely at random (Chi-Square = 23196.869, DF = 21382, $p<.001$). When the values are not missing completely at random (MCAR), there is often no way to test whether they are missing at random (MAR) or if the pattern is nonrandom (Brown 2006; Enders & Bandalos 2001). When analyzing data in a structural equation modeling context, a recommendation is to make a choice between techniques using either maximum likelihood (e.g., EM or FIML estimators) or multiple imputation over ad-hoc techniques (e.g., list-wise deletion) to handle missing values (Brown 2006; Allison 2003; Schafer & Graham 2002). This study chose a maximum likelihood method, because it has been suggested to work rather effectively not only with ignorable (MCAR and MAR) but also with non-ignorable (nonrandom) missing data (see Hair et al., 2010; Enders & Bandalos 2001; Múthen et al., 1987). Furthermore, the full information maximum likelihood (FIML) estimator was applied, since it is regarded superior to EM algorithm in common situations in which the knowledge about the exact mechanism of missing data is absent in the research (see Enders & Bandalos 2001; Brown 2006; Allison 2003; Hair et al., 2010).

The study used univariate and multivariate methods to detect observations with extreme characteristics (outliers). Each variable was standardized for the univariate identification, and an observation was considered as an outlier if the standard score was 4 or higher (see Hair et al., 2010). Altogether, 12 observations (2 for variable DCREC1, 2 for DCREC3, 1 for AGE and 7 for SIZE) exceeded the threshold. The multivariate detection of outliers was based on the Mahalanobis D^2 measure that was calculated separately for the study's four key sets of variables (see Hair et al 2010): environment, entrepreneurial orientation, dynamic capabilities and performance. The D^2 measure was then divided by the number of variables (D^2/df), and the value of four or higher was considered as an outlier threshold (see Hair et al 2010). Two observations fall outside the typical distribu-

tion for the environment, five for entrepreneurial orientation, six for dynamic capabilities and 14 for performance.

Following the guidelines given by Hair and colleagues (2010), all but one of the outliers of univariate examination are categorized as extraordinary observations for which there is no explanation. The one exception is the outlier for the AGE variable, which was identified as a coding mistake. The year of the firm's establishment was checked from the trade register center, and the observation was recoded to reflect this information (the corrected value was presented in the previous table). Outliers detected through a multivariate method can be classified with one exception as unique combinations of observations that fall within a typical range of values on single variables but have extraordinary values across a combination of variables (see Hair et al., 2010). The one exception in multivariate analysis was the same as one of the two in univariate examination, making it a most prominent candidate for elimination. Finally, a decision was made to retain rather than omit all the identified outliers. Hair and others (2010) suggest that outliers should not be deleted unless a strong proof can be presented that they do not represent valid members of the population. No such evidence could be found to support omission of the outliers in this case.

The assumptions of a multivariate analysis were tested by examining the univariate normality of data distribution for each variable. Normality was addressed by kurtosis and skewness measures for which the criteria for univariate normal distribution were set to +/- 7 (kurtosis) and +/- 2 (skewness) (see Curran et al., 1996). The departures from normality were relatively small for all the Likert scale variables, indicated by the maximum value of 2.695 for kurtosis and 1.894 for skewness. Among the control variables, the variation exceeds the distribution criteria for firm size that was measured by the number of employees (kurtosis: 6.152, skewness: 2.482), suggesting non-normal distribution. The variable was transformed by computing a logarithm to the base 10 to correct the distribution. The transformed variable for the number of employees was distributed within the set limits for normality (kurtosis: -0.390, skewness: 0.170).

An important issue in analyzing the antecedents of firm performance is the possibility of success bias (see Aldrich & Ruef 2006). The examination of performance variables (see Appendix 1) shows that their mean values are close to the mid-point of the seven-point Likert scale, and the standard deviations are around 1.5, indicating that the majority of the values are spread between two and five in the scale. These observations, together with the normal distribution of variables, alleviate the concerns of the possible survivor bias.

4.4 Methods of data analysis

The study follows the structural equation modeling (SEM) approach and uses confirmatory factor analysis (CFA) as a part of it. SEM and CFA are used, in general, to assess how well a theory fits reality by examining relationships among measured items and latent constructs in the data. There are different ways to apply them in a research study (Brown 2006; Hair et al., 2010; Anderson & Gerbing 1988). This study uses CFA for construct validation by assessing each construct's convergent and discriminant validity. SEM is applied to test the relationships between constructs within each model and across the alternative models.

The measurement and structural aspects of the model are estimated separately by specifically applying a two-stage SEM. The first stage specifies and tests a measurement model through confirmatory factor analysis; the second stage establishes structural relationships between the validated constructs (see Anderson & Gerbing 1988; Hair et al., 2010). The two-stage approach is used because there are many potential sources of poor fit of the solution and it is important to be able to distinguish whether the problems are attributable to measurement (number of factor, factor loadings, indicator errors) or structural (relationships between factors) aspects of the model (Brown 2006). Finally, the alternative models are compared with each other to assess which of them fits the data best. The analysis is conducted using the Mplus 6.0 software package. Parameters are estimated using the full information maximum-likelihood (FIML) method as discussed earlier in more detail in respect to missing data. The type of the analyzed input matrix is variance-covariance (see Brown 2006).

Statistical specification and estimation techniques for the measurement part of the models

The general recommendation is to specify a minimum of three items or first-order constructs for every construct (see Hair et al., 2010). The measurement unit of each latent construct is defined by setting the first reflective variable as a reference indicator (see Brown 2006). The association between first- and second-order latent constructs and between first-order latent constructs and measured variables is reflective in all instances, meaning that the item or lower level construct portrays rather than explains the construct (see Hair et al., 2010). Every measured variable and first-order latent construct has an error term, which describes the extent to which the variation in it is not explained by the higher-order latent construct (see Hair et al., 2010).

Moreover, each first-order construct is assumed to be unidimensional. Specifically, each item is determined by a single underlying construct, so there are no significant cross-loadings between constructs. Cross-loadings and correlating error terms indicate lack of construct validity (Hair et al., 2010). A correlation of error terms within a construct is a sign of lack of convergent validity, and correlating error terms between constructs show lack of discriminant validity. Similarly, significant cross-loadings are an evidence of lack of discriminant validity. Correlations of error terms of items to control these issues, both within and between constructs, are assumed to be zero in all the models.

The measurement models are estimated sequentially (see Brown 2006). At the beginning, a first-order CFA solution is estimated, then the correlations between first-order factors are examined, and, finally, the possible second-order factor structure is estimated. The completely standardized parameters are presented (see Brown 2006). Each measurement model is assessed in terms of overall goodness of fit, model diagnostics (localized areas of misfit) and parameter estimates (see Hair et al., 2010; Brown 2006). The overall model fit is examined through chi-square test and fit indices. The chi-square goodness-of-fit statistic is sensitive to larger sample sizes (Jöreskog & Sörbom 1993); therefore, specific indices are examined to assess the approximate fit. These include Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Squared Error of Approximation (RMSEA) with 90% confidence intervals and Standardized Root Mean Squared Residual (SRMR), which are commonly used and represent together a mixture of both absolute and incremental fit indices (Hu & Bentler 1999; Brown 2006).

The model's evaluation is not based on any single index, but all the indices are considered together. Moreover, the fit indices are not interpreted simply as fail or pass but as a range, whereby the model fitness can vary from good to acceptable or to poor depending on the indices' values (see Brown 2006). If the indices show a good or an acceptable fit, the model qualifies for further analysis, and if the model does not meet the criteria, it is either rejected or modified. The model is considered to have a good fit when it exceeds or is close to the universal thresholds suggested by Hu and Bentler (1999: CFI>0.95, TLI>0.95, RMSEA<0.06, SRMR<0.08). The model's fit is deemed acceptable if the index values are in the range of 0.90-0.95 for CFI (Brown 2006), 0.06-0.10 for RMSEA (MacCallum et al., 1996) and 0.08-0.10 for SRMR (Williams et al., 2009).

The overall analytic situation is considered, including model complexity, localized areas of strain and parameter estimates (see Brown 2006) in case the measurement model only meets the guidelines for an acceptable fit. Modified

cutoff values[45] for the fit indices are utilized to take into account the sample size and the number of observed variables for complex models (see Hair et al., 2010). Each model is diagnosed with standardized residuals and modification indices to find local areas of misfit (see Brown 2006). Values greater than 4.0 are considered an indication of potential problems in the model (see Hair et al., 2010). However, the values are sensitive to sample size (Brown 2006) and will, therefore, be interpreted as guidelines rather than normative thresholds. The parameter estimates utilized in this study involve factor loadings (direction, size, statistical significance), average variance extracted (AVE), construct reliability (CR) and inter-construct correlations. A critical value for factor loading is 0.5, for AVE 0.5 and for CR 0.7, below which the value indicates a potential need to modify the model (see Hair et al., 2010). The models are respecified if there is a strong theoretical or methodological grounding for that.

Statistical specification and estimation techniques for the structural part of the models

All the relationships between independent and dependent variables are specified to be linear. Exogenous constructs are allowed to correlate freely with one another unless stated differently. The dependence relationships consist of direct effects, mediation, moderation and matching. Direct effects are estimated at one step by including all the independent variables of interest to the model simultaneously. Mediation can be tested in many ways; the causal steps procedure popularized by Baron and Kenny (1986) are considered to be the most common in many fields (Williams et al., 2009; MacKinnon et al., 2002). A series of models should be estimated separately in this approach, and mediation is suggested to occur on the condition that the independent variable affects the mediator and the dependent variable, the mediator affects the dependent variable and, finally, the effect of the independent variable on the dependent variable is reduced when the mediator is present (Baron & Kenny 1986). However, this method has been criticized for having a low ability to detect mediation when it actually exists, not providing a statistical test of the size of the indirect effect and not detecting inconsistent mediation (MacKinnon et al., 2002; MacKinnon et al., 2000; Collins et al., 1998; Zhao et al., 2010). Notice is taken of the critique, and this study applied a modified version of the Kenny-Baron approach based on Shrout and Bolger (2002). The requirement of a direct effect between the independent and the de-

[45] Hair and others (2010) suggest, for example, that CFI>.92, TLI>.92, RMSEA<0.07 and SRMR<0.08 are acceptable with over 250 observations and between 12 and 30 observed variables, which are common model features in this study.

pendent variable is relaxed to address the first and the third issue, and the size of the indirect effect is estimated through bootstrapping, which improves the statistical power as it takes skewness of indirect effects into account. Significance tests and confidence intervals for path estimates are reported. Technically, this approach does not require hierarchical testing with separate models, but all the variables can be added together to the same model, and all the parameters can be estimated simultaneously (see Zhao et al., 2010). Bootstrapping with 500 samples is applied using the method available in the Mplus software package (Muthén & Muthén 2012).

Moderation can, in principle, be tested in the SEM context using either multigroup or interaction effects estimation. This study applies the latter, as the categorization of the metric moderator variables could be problematic due to unimodality and because information would be lost and the power to detect moderation would be reduced accordingly (see Frazier et al., 2004; Cohen et al., 2003). There are many estimation techniques to test interaction effects with metric variables, but none of them has gained a dominant position as a default method (Kline 2011). Here, the latent moderated structural equations (LMS) method introduced by Klein and Moosbrugger (2000) is selected. The method has been considered especially relevant for situations similar to this study, where questionnaire scale items have been used to form independent and/or moderator variables (see Dawson 2014). Furthermore, the method has been considered promising and precise, and simulation studies have shown it to perform well (Williams et al., 2009; Kline 2011). The technique is implemented in the MPLUS software package (Muthén & Muthén 2012). The traditional goodness-of-fit statistics are not available for testing latent interactions with the LMS method (Kline 2011). Therefore, the model is estimated both without and with the interactions; then, the results are compared with a likelihood ratio test to assess which one best fits the data (Muthén 2012; Klein & Moosbrugger 2000). There is more than one moderator in the study, and each of them is tested separately and then together to see if there are still unique effects after controlling for the others (see Little 2013). Additionally, the form of any statistically significant interaction effect is inspected using simple regression lines based on low (-1 SD), mean and high (+1 SD) values of the moderator (Muthén 2012; Frazier 2004; Cohen et al., 2003).

Several different methods exist for calculating the match between two variables, including deviation score analysis, residual analysis and analysis of variance (Venkatraman 1989), to test fit as matching. This study applies the deviation score method for its intuitive appeal and straightforward calculation (see Venktraman 1989) and also because the same method has been successfully adopted in some previous research on firm performance by, for example, He and Wong (2004), Huselid (1995) and Naman and Slevin (1993). The deviation score is calculated as an absolute difference of centered factor scores of two variables

(Venkatraman 1989). Moreover, matching effects models are estimated in this study hierarchically based on the same steps as in moderation. The dependent variables are first regressed on the deviation score variables in the null model in which the paths are fixed to zero. The matching effects are estimated in consecutive steps by freeing the corresponding path and comparing the models with the chi-square difference test utilizing loglikelihood values.

Comparison techniques for the competitive models of fit

Nested models containing the same set of variables but a different number of freely estimated paths are compared using the chi-square difference test (see Hair et al., 2010). The study applies the robust maximum likelihood estimation method and, therefore utilizes the chi-square difference test based on loglikelihood values and scaling correction factors.[46] If the chi-square difference between the two compared models is statistically significant ($p<.05$), then the model with a larger number of free parameters provides a better fit to the data (Kline 2011; Hair et al., 2010). However, the conclusion is justified only if the chosen model provides an acceptable level of fit to the data (Brown 2006). Each parameter estimate is also examined to see if they are statistically significant, in the predicted direction and nontrivial (see Hair et al., 2010). The rules of thumb provided by Cohen (1992) are utilized to assess the size of the statistically significant standardized path estimates so that values above 0.5 are considered large, above 0.3 medium and above 0.1 small but not trivial.

Selection among non-nested models is conducted with predictive fit indices, of which the Akaike Information Criterion (AIC) is highly acclaimed (Burnham & Anderson 2004) and widely used under the maximum likelihood estimation (Kline 2011). The AIC index is applicable to both nested and non-nested models as long as they are fitted to the same data set (same observations) and have the same dependent variable (Burnham & Anderson 2002). The index is adjusted to the degrees of freedom, meaning that it penalizes complex models and favors parsimonious models (Kline 2011; Wagenmakers & Farrell 2004; Cohen et al., 2003). AIC varies according to sample size, so there are no absolute criteria for small or large values, but the model with the smallest (closest to zero) AIC value is preferred (Kline 2011). Furthermore, the relative fit of the models can be compared based on AIC differences (Burnham & Anderson 2002; 2004). The rescaled AIC values are calculated by subtracting the minimum AIC from each of the AIC values ($\Delta AIC=AIC-minAIC$). This provides a rank order in which the model with zero difference is the best approximation, and the model with the

[46] See https://www.statmodel.com/chidiff.shtml

largest difference is the weakest. The difference between AIC values describes the loss of information experienced using any of the other models instead of the best fitting one. Burnham and Anderson (2002; 2004) also provide some criteria for assessing the relative fit of the models to the data. When the AIC difference between the best and the second best model is ten or more, the model is clearly superior to the other(s), and if the difference is somewhere around four to seven the other model receives some but considerably less support, and, finally, if the difference is around two or less, the other model(s) gains also substantial empirical support. The fit of the competing models is assessed further with the help of Akaike weights, which are gained for each model by calculating its relative likelihood and then dividing it by the sum of likelihoods of all models in the comparison (Burnham & Anderson 2004; Wagenmakers & Farrell 2004). The weights range between 0 and 1, and higher weights indicate greater importance.

Model selection always involves uncertainty. Conclusions can be drawn from the full set of models (Burnham & Anderson 2004) to overcome some of the uncertainty related in choosing just one model over the others. The multimodel inference is applied in this study in comparison to the alternative models of external fit. Then there is no need to consider only those variables in the best model to be important, but the relative importance of variables in all candidate models can be estimated (Burnham & Anderson 2004). This is achieved by summing Akaike weights for all the models containing the given variable and, if it is not in the model, Akaike weight for that model is zero (Burnham & Anderson 2004). The variable with the largest sum of weights is considered most important, and the one with the smallest sum is interpreted to be the least important. Further information about the importance of individual variables across different models is reached through the magnitude of effect sizes that are based on model-averaged parameter estimates (see Burnham & Anderson 2002; 2004). The natural averages of standardized parameter estimates were calculated from the alternative models for this.

Robustness tests with control variables

It is a common practice to include control variables that are of less theoretical interest in analysis to obtain more accurate estimates about the relationships between the underlying constructs. Adding a third variable is presumed to be a conservative approach to safeguard against the possibility that the estimate of interest reflected an overlooked variable. However, the inclusion of control variables has been criticized for being poorly justified and inadequately executed (Spector & Brannick 2011; Williams et al. 2009). Adding control variables can just as well decrease as increase the accuracy of the results' interpretation. There are

many alternative but often ignored mechanisms that can link control variables to variables of primary interest, including contamination, confounding, epiphenomenal association and mediation or moderation (Spector & Brannick 2011; Williams et al., 2009; Edwards 2008; Becker 2005; Hayes 2013). Researchers should be explicit about a specific, theory-based mechanism they believe occurs to draw conclusions based on the analysis. Control variables could be used to form and test alternative hypothesis about the relationships among variables of interest in an ideal case (Spector & Brannick 2011; Becker 2005). This study added three control variables -- age, size and sector of the firm -- to the models to test the results' robustness. These control variables are not of specific interest in the research setting, although it is recognized that they have been treated differently in other works, for example, size has been investigated as a moderator between entrepreneurial orientation and firm performance (see Rauch et al., 2009). Being of no conceptual interest here, the control variables were excluded from the conceptual models of fit that were specified previously.

It is common to follow a hierarchical method in which the control variables are entered as a first step into the analysis when they are included in the models to test the robustness of the effects (Frazier et al., 2004; Spector & Brannick 2011; Williams et al., 2009). The problem with this approach is that the results depend on the controls, but the theorized relationships are not accounting for the interplay among variables (Spector & Brannick 2011; see also Edwards 2008). Comparative tests should be done with and without control variables to avoid this and to detect whether their inclusion influences relationships among the substantive variables (Spector & Brannick 2011; Becker 2005). Accordingly, this study estimates models first without and then with control variables to examine if the results remain unchanged.

5 FINDINGS

Chapters two and three have discussed the conceptual basis and prior empirical research on the study's competing models in detail. The empirical analysis focuses on testing the specified alternative relationships between entrepreneurial orientation, dynamic capabilities, market environment and firm performance. The measurement models are assessed first, then comparisons are conducted among internal and external structural models of fit.

5.1 Assessment of the measurement models

There are six latent factors of interest forming three thematic subgroups: dynamic capabilities (abbreviated to DC), entrepreneurial orientation (EO) related to search, competitive intensity (COMP) and technological dynamism (TECH) portraying market environment, growth (GROWTH) and profitability (PROFIT) illustrating firm performance. The measurement models are specified and assessed in steps, first separate models for each factor, then a full model. The purpose is to confirm that the fit of each construct to the data is at an appropriate level.

The measurement model of entrepreneurial orientation

A separate measurement model is first estimated for entrepreneurial orientation, which is specified as a second-order factor reflecting three first-order factors. Innovativeness (abbreviated to EOINN) and risk-taking (EORIS) of the subdimensions are measured with three items, and proactiveness (EOPRO) is measured with four items. Both the lower-order and the higher-order solution need to be identified (Brown 2006) in the case of higher-order measurement models. The first-order structure is overidentified, since the amount of known information exceeds the number of unknown parameters, a requirement for finding a solution to the model (see Hair et al., 2010; Brown 2006). Specifically, the model contains 55 known elements (10 variances and 45 covariances of items) and 23 unknown elements (7 factor loadings with first item in every factor set as a marker indicator, 10 error variances, 3 factor variances and 3 factor covariances), resulting in 32 degrees of freedom.

The assessment of the measurement model starts with the first-order structure. The fit statistics ($\chi^2(32)=142.194$, $p<0.001$; CFI=.908; TLI=.870; RMSEA=.083; SRMR=.047) show that the solution is not good enough, as the chi-square test is statistically significant, and the other fit indices also do not meet the thresholds suggested by Hu & Bentler (1999: CFI>.95, TLI>.95, RMSEA<.06, SRMR<.08). Furthermore, the model does not achieve the critical levels given by Hair et al., (2010) after taking into account the sample size and model complexity in terms of number of observed variables. Next, the model diagnostics and parameter estimates are examined in order to evaluate the model fit more closely.

Modification diagnostics show that two item pairs (EOINN1-EOINN3 and EOINN1-EOPRO2) have standardized residuals greater than the critical value of 4.0, which would suggest potential problems and, possibly, a need to eliminate some of the items (see Hair et al., 2010). According to modification indices, one item pair (EOINN2-EOINN3) has a relatively high error term correlation (MI value = 90.223), thus indicating that the fit of the model could be improved if the corresponding path was freely estimated (see Hair et al., 2010; Brown 2006). Furthermore, one item (EOINN1) reflecting innovativeness has a rather high cross-loading (MI value = 71.053) on the proactiveness subdimension, which suggests a need exists to remedy the model fit. Convergent validity of the latent constructs was estimated through standardized factor loadings, the average variance each factor explained in its items (AVE-value), and the measure of construct reliability (CR). The recommended threshold values were obtained from Hair and colleagues (2010). Path estimates are statistically significant except for one loading (EOPRO4). The factor loading (.076) is well below the recommended cutoff value of 0.5. A factor loading for item EORIS3 is also just above the guidelines. The variables are candidates for deletion as a result. AVE-values are on the border of the rule-of-thumb level of 0.5 for EOINN and EORIS, while EOPRO falls clearly behind. The CR-values exceed the preferred threshold of 0.7 except for EOPRO.

Discriminant validity is assessed to examine the uniqueness of each construct from every other construct in the model. The assessment is conducted both at the construct-to-construct and item-to-construct levels. Any two constructs are compared at first based on their AVE-values and squared correlation estimates. In all but one instance, each latent factor captures more of the variance in its items than it shares with other factors, which signals good discriminant validity (see Hair et al., 2010). However, the squared correlation between EOINN and EOPRO is rather high and exceeds the AVE-values of the two constructs, indicating that they may not be truly distinct from one another. Next, item-to-construct cross-loadings were examined to see if the relatively high correlation between these two constructs was also present at the item level. One item (EOINN1) loads not just on the expected factor (EOINN) but has an even higher loading on another

factor (EOPRO). This is the same item that the modification indices (see above) also pointed out as a potentially problematic one. Hence, it seems that the potential discriminant validity problem may be at the item level, not at the construct level as such. There are two alternative interpretations to the cross-loading: method covariance and number of latent factors (see Brown 2006).

All in all, the most problematic items are EOINN1 and EOPRO4, followed by EORIS3. A respecification of a model based solely on empirical findings is not advisable (Byrne 2001). Statistics can be utilized in detecting problematic areas, but the decision to take action ought to make substantive sense, that is, it should be based on prior research or theoretical justification (Hair et al., 2010; Kline 2011; Brown 2006). The measurement model is modified based on substantive considerations. A methodological argument for the omission of the item (EOPRO4) with a low factor loading is that the low validity is assumed to exist mainly because the item is reverse-worded in the questionnaire (see Brown 2006). After conducting the survey, it was found that a majority of reverse-worded items had atypical correlations with other items within and between scales. Although the use of reverse-worded items is a common procedure in building scales to reduce common method variance it may not work as intended (Podsakoff et al., 2003). This is because it may be difficult for some people to attend to positive-negative wording of items once they have established a pattern of responding to the questionnaire (Schmitt & Stults 1986 in Podsakoff et al., 2003). It seems, in light of this study's data collection, that the use of reverse-worded items may be even more challenging when the scales include a large number of items, the survey is conducted by telephone, and the respondents do not have an opportunity to see the item in written form. There is also a theoretical argument to support the item's elimination. Lumpkin and Dess (1996; 2001) have argued that this item is actually a measure of another dimension of entrepreneurial orientation called competitive aggressiveness. If there were more items for measuring competitive aggressiveness, it would have been possible to try to form a new (fourth) dimension of entrepreneurial orientation for the model here. Since this was the only item, however, it was considered not to be reliable to assign it to a new, single-item latent factor (see Hair et al., 2010).

Eliminating the item (EOPRO4) increases the convergent validity of the EOPRO factor (AVE and CR-values above the thresholds), but that improves the model fit only marginally ($\chi^2(24)=126.375$; CFI=.912; TLI=.869; RMSEA=.093; SRMR=.047). Other candidates for action are the correlated error term between two items (EOINN2-EOINN3) and the high cross-loading of one item (EOINN1). The decision to keep, remove or even switch the EOINN1 item to another construct is crucial and depends on at least two intertwined issues: the item's validity and the study's purpose. The item's validity (EOINN1) is considered first. Previously, the EOPRO4 item was excluded, mainly because it was

considered to have low validity as a result of reversed scale. This type of method effect is based on item characteristics (see Podsakoff et al., 2003), which seems not to be the case with EOINN1 item. However, there is another potential source of method bias worth considering here that is related to questionnaire design and administration, namely the effect of item context (see Podsakoff et al., 2003). The EOINN1 item was located (intermixed) in the same set of statements with EOPRO items, whereas the other two items (EOINN2, EOINN3) reflecting the EOINN construct were located with another set of statements on a different page of the questionnaire. This type of intermixing (instead of grouping) of items across different constructs in the questionnaire is often a recommended practice to reduce common method variance (see Kline et al., 2000 in Podsakoff et al., 2003). However, if the constructs are very similar relative to their content, the mixing of items may result in increased, artefactual, interconstruct correlations while simultaneously decreasing intraconstruct correlations (Podsakoff et al., 2003). This closely resembles the case here, where we have two first-order constructs that are assumed to represent slightly different aspects of the same second-order construct.

Hence, it seems that while intermixing of items might be a solution to reduce common method variance within the construct, it may create a common method variance problem between constructs and, therefore, weaken discriminant validity. Taken together, the common variance between EOINN item (EOINN1) and EOPRO items may be attributable, at least partly, to the measurement method instead of the constructs the items represent. If we consider that the common variance found here is a result of the chosen method, then it would be well advised to eliminate the EOINN1 item. Conversely, if we think it is not a question of method, then this common variance would be an interesting result that could contribute either to the development of theory or the development of better items to reflect the theoretical constructs. In this latter case, the item should probably not be moved from the model. The theoretical underpinnings of the item are next briefly discussed.

The entrepreneurial orientation items in this study appear to have rather high face validity in the sense that they are adopted from the most common scale used in entrepreneurial orientation studies (see Rauch et al., 2009). However, EO has been utilized typically as a unidimensional construct (Rauch et al., 2009), so there has been no need to consider the discriminant validity of each item in detail. Furthermore, the few studies focusing specifically on the relationship between various dimensions of EO do not give a clear answer to how individual items load on different constructs and which items should be assigned to which dimension. For example, Kreiser et al., (2002) found the same item as here (EOINN1) to have poor loading on the EOINN factor, but they decided to keep it in their model, since its elimination would not have significantly improved the fit

of the model and also because maintaining comparison across previous studies was considered important. Furthermore, one theory argues that EOINN and EOPRO are separate but interlinked construct that both focus on different aspects of search. EOINN is related to the volume of search (or preference for novelty), while EOPRO is about frequency of search (or preference for initiative). The EOINN1 item, in turn, asks about a firm's commitment to search through research and development (R&D) activities (see Miller 1983). We could well argue that the intensity of R&D activities is related to both the amount and timing of search. The firm may not produce numerous innovations or be the first to introduce new innovations without committing resources to research and development activities. Hence, an EOINN1 item might actually reflect some underlying theoretical feature that is common to both of the constructs (EOINN and EOPRO). This interpretation would suggest that the problem with the discriminant validity might, at least partly, be in the content validity of the item.

To sum up, the EOINN1 item seems to have a validity problem resulting from a common method bias (intermixed scale) and, possibly, also a content validity issue (theoretically ambiguous item). Both of these reasons could alone be used to also justify the item's elimination or the retention. Therefore, these issues need to be combined with the study's purpose to reach the final decision. If the aim was to study the psychometrics of the measurement scale to examine entrepreneurial orientation, then it would be essential to keep the item in the model (and free the path from EOINN1 item to EOPRO construct) and consider the possible validity problem as one of the study' results. Similarly, if the work was methodological focusing on examining the various sources and effects of common method bias, for example, then the low reliability of the item would probably be an important finding, not a reason to omit it. However, the focus here is not on either of these goals but, instead, on examining causal and other type of relationships between entrepreneurial orientation, dynamic capabilities, performance and environment. Discriminant validity is a sign of multicollinearity, which may have a significant effect on causal relationships, since the common variance between constructs decreases the ability to ascertain the relative roles of each independent construct in the model (Hair et al., 2010). Therefore, the exclusion of an item with cross-loadings might be a viable solution for examining causalities, especially if the effect of each of the EO dimensions on another construct is examined separately. On balance, a comparison of results with previous studies is a strong argument for not modifying the scale too much. After considering these aspects, the item (EOINN1) was finally removed from the model.

The deletion improves the model fit significantly ($\chi^2(17)=36.759$; CFI=.978; TLI=.964; RMSEA=.048; SRMR=.029) and qualifies the thresholds. Furthermore, there is a substantial improvement in convergent validity for the EOINN-dimension as well as in discriminant validity between EOINN and EOPRO. All

the factor loadings are positive and statistically significant. However, the loading of one item (EORIS3) is only marginally above the cutoff criteria. The deletion of the item can be defended methodologically, since it is reverse-worded (like EOPRO4 above). According to Brown (2006), consistency is important in applying decision rules to respecify a model. If one reverse-worded item is handled in a particular way, then all the reverse-worded items should be dealt with according to the same rule. The exclusion of the item slightly improves the model fit ($\chi^2(11)=31.063$; CFI=.975; TLI=.953; RMSEA=.061; SRMR=.026). However, the convergent validity of the EORIS factor increases above the recommended threshold (0.5). Model diagnostics include some borderline modification indices (standardized residuals range from -2.543 to 5.447; highest MI value = 13.960), but they signal only trivial local areas of misfit (see Brown 2006). Consequently, there is no need to consider further modification of the first-order model.

The next step examines the correlations between the first-order factors. All the factors are significantly interrelated. Correlations ranging from 0.476 to 0.568 are in the same direction and roughly the same size (see Brown 2006), so the pattern is consistent with the proposed single factor, second-order structure. The second-order factor model was estimated as a third step (see Table 7). An identification of a second-order factor requires at least three first-order factors, whereby each should have a minimum of two indicators (Kline 2011). The model meets these requirements, but it is a just-identified model. Specifically, in the second-order solution, the degrees of freedom (three variances and three covariances) are equal to the number of freely estimated parameters (two factor loadings since one fixed for measurement scale, three factor loadings and one factor variance). Actions may be taken to solve the identification issue (Byrne 2001), but, generally, it is also substantively meaningful to assess the models as such (Brown 2006). The fit of the just-identified model is (by definition) equal to the first-order solution. All the second-order factor loadings are positive, statistically significant and exceed the cutoff criteria (above 0.5). Good convergent validity of the higher-order factor is confirmed by AVE and CR values, which both exceed the critical thresholds (0.5 and 0.7 consecutively). The conclusion is that the second-order factor model has an acceptable fit to the data.

Table 7 The measurement model of entrepreneurial orientation

Construct	*Item*	*Std loading estimate*	*Fit statistics*	*Construct validity*					
EOINN	EOINN2	.795***	χ2=31.063						
	EOINN3	.776***	df=11		CR	1.	2.	3.	4.
EOPRO	EOPRO1	.745***	p=.0011	1.EOINN	.763	*.617*			
	EOPRO2	.569***	CFI=.975	2.EOPRO	.771	.323	*.535*		
	EOPRO3	.852***	TLI=.953	3.EORIS	.755	.230	.227	*.607*	
EORIS	EORIS1	.756***	RMSEA=.061	4.EO	.758	.573	.564	.402	*.513*
	EORIS2	.801***	(90% CI = .036/.086)						
EO	EOINN	.757***	SRMR=.026						
	EOPRO	.751***							
	EORIS	.634***							

Off-diagonal: squared correlations
Along diagonal (italic): AVE-values

Estimator: Robust Maximum Likelihood (MLR); EOINN: innovativeness, EOPRO: proactiveness, EORIS: risk-taking, EO: entrepreneurial orientation; Statistical significance: *p<.05, **p<.01, ***p<0.001; Number of observations: 495

The measurement model of dynamic capabilities

A separate model is estimated next for dynamic capabilities. When designing the data collection, no well-established scales were available for measuring dynamic capabilities. The chosen measure from Alsos and others (2008) was at early stages of testing and validation. The authors suggested that the appropriate number of factors for representing dynamic capabilities ought to be at least four to represent the dimensions of observation, acquisition, renewal and reconfiguration. Alsos and others (2008) developed a pool of items based on an extensive literature review to test the factorial structure of dynamic capabilities. The results of their exploratory factor analysis indicated a possibility of seven factors (one for observation and two for the other concepts). However, the results were inconclusive, and the authors stated that the number of factors is open for further discussion and development (Alsos et al., 2008).

It is a common approach in construct validation to base a CFA model specification on prior exploratory analysis, especially when the testing is in its early stages (Brown 2006; Hair et al., 2010). This approach is also applied here by taking the exploratory factor analysis (EFA) conducted by Alsos and others (2008) as a starting point. This EFA provides a seven-factor solution, but three of the factors may be problematic regarding either convergent or discriminant validity. The authors identify one factor describing reconfiguration to have low reliability (Cronbach's alpha 0.546). However, another factor representing acquisition also had an alpha value (0.693) below the preferred cutoff criteria of 0.7 (see Alsos et al., 2008). Furthermore, one factor describing renewal had significant cross-loadings (over 0.3 and 0.4) with many other items from different factors (see Alsos et al., 2008) , thus weakening the factor's discriminant validity. The three

potentially problematic factors and the items (DCACQ1-4, DCREN5-8, DCREC5-7) reflecting them in EFA are excluded from the CFA model to avoid a gross misspecification of the number of factors (see Brown 2006) and a need for considerable post hoc model testing (see Brown 2006). This decision is in accordance with the conceptual consideration of Alsos and colleagues (2008), as each of the four remaining factors describes one of the four conceptual themes they associated with dynamic capabilities.

The first-order CFA solution is assessed first. The model qualifies some of the criteria for acceptable fit to the data (see Hu & Bentler 1999) as indicated by the fit statistics ($\chi^2(113)=286.183$, $p<0.001$; CFI=.939; TLI=.926; RMSEA=.056; SRMR=.057). It passes all the adjusted cutoff criteria (see Hair et al., 2010) when taking the specific characteristics of the model (495 observations, 17 items) into account. Model diagnostics and parameter estimates give more detailed information about the model fit. Model diagnostics show multiple item pairs that have standardized residuals greater than the critical value of 4.0 (range from -5.499 to 6.327), which would suggest a possible need to eliminate some of the items. A view of these items (especially DCOBS4, DCOBS5, DCREC1 and DCREC4) appeared more often than others among the problematic pairs. According to modification indices, several item pairs have moderate error term correlation (highest M.I. = 28.534 for DCREN3 with DCREN4). Furthermore, a few items have a moderate cross-loading on another factor (highest M.I. = 43.665 for DCOBS by DCREC4). Together, the modification indices suggest that the fit of the model could possibly be improved by freeing the paths between the items with highest MI values.

A closer examination of convergent and discriminant validity through the parameter estimates sheds additional light on the model fit. All the construct-to-item path estimates are statistically significant, but three of them (DCREC4, DCOBS3, DCOBS4) are only slightly above the cutoff criteria of 0.5. Consequently, the model fit might improve by excluding any or all of the items. The AVE-values exceed the recommendation of 0.5 for good convergent validity for three out of four factors, while one factor (DCOBS) falls slightly behind. All the CR-values exceed the suggested threshold of 0.7. The comparison of AVE-values and inter-construct squared correlation estimates shows that the average communality for each construct is higher than the shared variance with other constructs, which is a sign of good discriminant validity.

It can be concluded from the overall examination of the model diagnostics and the parameter estimates that the most problematic item is DCREC4, followed by DCREN3, DCREN4, DCOBS3, DCOBS4, DCOBS5 and DCREC1. Omission of any or all of these items or freeing of a path between some of the items would probably improve model fit. It is advisable to start the model modification one item at a time, beginning with the most problematic item on the premise that

there is a substantive basis for the change (Jöreskog & Sörbom 1993 as presented in Brown 2006; see also Byrne 2001). DCREC4 is the first item to be removed from the model. The modification is supported by the findings in previous research. In accordance with this study, Alsos and others (2008) reported the item to have the lowest loading and a secondary loading on the observation factor. The model fit improves significantly after modification ($\chi^2(98)=224.398$; CFI=.954; TLI=.943; RMSEA=.051; SRMR=.046). The modification indices now show the highest MI-value (28.459) for the error term correlation between DCREN3 and DCREN4, suggesting that the model could be improved by freeing the corresponding path. The rationale for making the change is conceptual. The first item measures a firm's management involvement in the R&D process; the second item measures the development of the firm's R&D practices. The management arguably has a major task in the development. One of the key ways in which management contributes to R&D process is, thus, by developing practices that make the two items overlapping. The path between the items was freed following this. The modification results in a better fit of the model ($\chi^2(97)=206.172$; CFI=.960; TLI=.950; RMSEA=.048; SRMR=.045).

Yet another slightly problematic item is DCOBS4, which is reported to have relatively high modification indices and a relatively low factor loading. A closer study of the item reveals two substantive reasons for removing it from the model. First, the item measures how systematically a firm identifies resources it can benefit from, but the item is not explicit about whether it refers to external or internal resources, although the factor ought to reflect external resources. Second, the item is double barreled in that it simultaneously addresses two types of resources, which makes it potentially ambiguous or complex for the respondent (see Podsakoff et al., 2003). The item was eliminated from the model on these grounds, which results in significant improvement in the fit ($\chi^2(83)=156.750$, $p<.001$; CFI=.971; TLI=.964; RMSEA=.042; SRMR=.042). Model diagnostics indicate still minor issues in the solution (highest MI-value = 17.448; standardized residuals range from -5.002 to 3.776). However, there were no arguments based on theory, previous empirical findings or methods to support further modification. Additionally, all the factor loadings are statistically significant and interpretable, and AVE- and CR-values are adequate despite the fact that one AVE-value (DCOBS) is marginally below the cutoff criteria (0.5). Moreover, the sample size (495 observations) is relatively large, and the model can be characterized to be somewhat complex (15 observed variables) (see Hair et al., 2010). Consequently, to avoid the unwanted situation of using confirmatory factor analysis as an exploratory tool (Hair et al., 2010), the modification process was stopped here, and the model fit was considered to be acceptable to carry on the analysis to the next step.

All the first-order factors are significantly and positively interrelated. The pattern is consistent with the proposed single factor, second-order structure, although the correlations are not quite the same size (range from .438 to .609). Next, the fit of the second-order factor model was assessed. The solution is over-identified by two degrees of freedom (the lower-order portion contains ten and the higher-order portion eight freely estimated parameters). The fit of the second-order solution is good (see Table 8). Brown (2006) suggests that the chi-square test could be applied to investigate whether the inevitable weakening in the higher-order model fit is statistically significant. The fit of the second-order structure did not decrease significantly according to the nested chi-square difference test with loglikelihood values ($\Delta\chi2(2)=4.071$, $p=.131$), which indicates that correlations among the first-order factors are adequately accounted for by the second-order factor. Model diagnostics show two (both related to DCREC1) moderately high, standardized residuals (range from -5.300 to 9.649). However, according to modification indices, there are only trivial areas for improvement in the model, since both the error term correlations (highest M.I. = 14.073) and the secondary loadings (highest M.I. = 19.283) are low. The good convergent validity of the higher-order factor is confirmed by AVE- and CR-values, which both exceed the critical thresholds (0.5 and 0.7 consecutively). Furthermore, all the factor loadings are statistically significant and exceed the cutoff criteria (above 0.5). It can be concluded that the second-order factor model has an acceptable fit to the data.

Table 8 The measurement model of dynamic capabilities

Construct	*Item*	*Stand. loading estimate*	*Fit statistics*		*Construct validity*					
DCOBS	DCOBS1	.756***	$\chi2$=160.862		CR		Discriminant validity			
	DCOBS2	.725***	df=85			1.	2.	3.	4.	
	DCOBS3	.534***	p<.001	1.DCOBS	.784	*.480*				
	DCOBS5	.732***	CFI= .971	2.DCACQ	.833	.336	*.555*			
DCACQ	DCACQ5	.743***	TLI= .964	3.DCREN	.873	.335	.269	*.634*		
	DCACQ6	.748***	RMSEA=	4.DCREC	.883	.251	.203	.202	*.717*	
	DCACQ7	.727***	.042	5.DC	.810	.646	.521	.518	.388	*.519*
	DCACQ8	.762***	(90% C. I. =							
DCREN	DCREN1	.766***	.032/.052)		Off-diagonal: squared correlations					
	DCREN2	.843***	SRMR= .044		Along diagonal (italic): AVE-values					
	DCREN3	.729***								
	DCREN4	.841***								
DCREC	DCREC1	.914***								
	DCREC2	.850***								
	DCREC3	.770***								
DC	DCOBS	.804***								
	DCACQ	.722***								
	DCREN	.720***								
	DCREC	.623***								

MLR-estimator; DCOBS: observation, DCACQ: acquisition, DCREN: renewal, DCREC: reconfiguration; Statistical significance: *p<.05, **p<.01, ***p<.001; Number of observations: 495

The measurement model of market environment

A separate model is estimated for the market environment, which comprises two constructs: competitive intensity (abbreviated to COMP) and technological dynamism (TECH). TECH is measured with five items and COMP with four items, and the model is identifiable with 26 degrees of freedom. The fit statistics ($\chi^2(26)$=51.386, p=.002; CFI=.976; TLI=.967; RMSEA=.044; SRMR=.044) fulfill the criteria for a good model fit (see Hu & Bentler 1999). The model diagnostics provide more detailed information about the model's ability to reproduce individual relationships. All the standardized residuals between item pairs remain below the critical value of 4.0 (range from -3.112 to 2.845), suggesting there are no localized points of ill fit. According to the modification indices, error term correlation is highest (M.I. value = 13.740) between COMP1 and COMP2, indicating that the model could possibly fit the data slightly better by freeing the corresponding path. No items have noticeable secondary loadings on another factor (highest M.I. = 7.555 for TECH by COMP4).

The parameter estimates provide more detailed information about the model fit. The loading estimates are in the predicted direction and are statistically significant, but one of them (COMP4) is under the suggested cutoff level of 0.5. The AVE- and CR-values exceed the recommendation for TECH but not for the

COMP factor. The comparison of AVE-values and the squared correlation estimates between the two factors shows that the shared variance is lower than the average communality for each factor, which indicates good discriminant validity. It can be concluded from the evaluation of overall goodness of fit, model diagnostics and parameter estimates that COMP4 is the most problematic item in the model. There is a methodological foundation for removing the item, since presumably the low factor loading exists mainly due to reverse-wording of the item in the questionnaire. This is the same situation as with the majority of the reverse-worded items in the survey that have had atypical intra-construct and inter-construct correlations. Consequently, the decision was made to remove the item from the model. The fit of the model improves (see Table 9) and passes the criteria for a good CFA solution. Furthermore, standardized residuals (range from -3.040 to 2.845), modification indices (highest M.I. = 9.227) and parameter estimates (loadings above 0.5, AVE above 0.5, CR above 0.7, factor correlation .170) suggest high validity of the model.

Table 9 The measurement model of market environment

Construct	***Item***	***Std loading estimate***	***Fit statistics***		***Construct validity***	
COMP	COMP1	.769***	χ2=26.389	CR	Discriminant validity	
	COMP2	.651***	df=19		1.	2.
	COMP3	.731***	p=0.1197	1. COMP .761	*.517*	
			CFI=.993	2. TECH .844	.022	*.523*
TECH	TECH1	.666***	TLI=.989			
	TECH2	.757***	RMSEA=.028		Off-diagonal:	
	TECH3	.863***	(90% C. I. =		squared correlations	
	TECH4	.648***	.000/,052)		Along diagonal (italic):	
	TECH5	.660***	SRMR=.030		AVE-values	

MLR-estimator; COMP: competitive intensity, TECH: technological dynamism; Statistical significance: *p<.05, **p<.01, ***p<0.001; Number of observations: 495

Next, the structure of the environment construct is tested by comparing the two-factor solution to an alternative solution in which all the observed items portray a single, nested factor. The models are compared based on a chi-square difference test and goodness-of-fit indices. The chi-square difference test is statistically significant ($\Delta\chi2(1)=183.256$, $p<.001$), suggesting that the two-factor model fits the data better than the one-factor model. The goodness-of-fit indices show good fit for the two-factor solution, whereas the one-factor solution has poor overall fit. The conclusion is that the proposed two-factor solution is superior to the one-factor solution, and it is chosen for further analysis.

The measurement model of firm performance

A model for a firm's performance, including factors for growth (GROWTH) and profitability (abbreviated to PROFIT), is specified and evaluated next. GROWTH reflects four items and PROFIT five items. The model is over-identified with 26 degrees of freedom. The fit statistics ($\chi^2(26)=247.936$, $p<.001$; CFI=.889; TLI=.846; RMSEA=.131; SRMR=.063) do not qualify according to the criteria suggested for a good CFA solution (see Hu & Bentler 1999).

Model diagnostics indicate several high (above 4.0) standardized residuals between item pairs (ranging from -7.505 to 8.364). The highest residuals are for the pair PROFIT5-PROFIT4 and for PROFIT5-GROWTH4. Several items (especially PROFIT1, PROFIT4 and PROFIT5) have a pattern of highly correlating residuals with other items. According to the modification indices, error term correlation is highest (MI value = 176.336) between PROFIT4 and PROFIT5. Furthermore, the item PROFIT2 has a high secondary loading on another factor (MI value = 98.548). Parameter estimates demonstrate that all the loading estimates are in the predicted direction, statistically significant and above the preferred cutoff value of 0.5. AVE- and CR-values display good overall convergent validity of the factors. Discriminant validity is also good in the sense that the shared variance between factors is lower than the average communality for each factor. Furthermore, the factor correlation is rather high (0.756) but below 0.85, which is considered as a cutoff value for problematic discriminant validity (see Brown 2006).

It can be concluded from the evaluation of overall goodness of fit, model diagnostics and parameter estimates a need exists to respecify the model. First, the item PROFIT2 was eliminated on methodological grounds. Item context can produce various types of method effects (Podsakoff et al., 2003). Most of the items measuring growth and profitability were combined to the same set of statements in the survey so that statements about growth were asked first, followed by profitability statements, of which the PROFIT2 was the first item. A superfluous consistency effect occurs in a survey when answers on previous items or scales induce a tendency to answer the following items in a similar way (Harrison et al., 1996). The possibility of such carryover effects increases when the scales have very similar content or are next to each other (Podsakoff et al., 2003). The scales are both rather similar in topic and close to each other in this case, so it is probable that the responses in the preceding items induce a response pattern that especially affects the first item(s) of the following scale. There is also a theoretical justification for the omission. The item PROFIT2 was phrased so that it measured the growth of operating income, for which reason it is not surprising that it had a double-loading on both growth and profit factors. The modification enhances model fit considerably ($\chi^2(19)=115.617$; CFI=.940; TLI=.911;

RMSEA=.101; SRMR=.059), but the model do not pass all the criteria for a satisfactory CFA solution.

The examination of standardized residuals shows that several high (above 4.0) values are attached to item PROFIT3 when it is paired with items (GROWTH2, GROWTH3, GROWTH4) reflecting the growth factor. The modification indices similarly demonstrate that PROFIT3 has a strong secondary loading on the growth factor (M.I.=106.585), suggesting that the item's elimination would improve the CFA solution. The rationale for the respecification is methodological and similar to the item PROFIT2. The item (PROFIT3) was placed in the survey just after the PROFIT2 item, so it possibly drew some of the carryover effect from the previous scale. More importantly, the item is conceptually ambiguous, since it measures the growth of profits. Consequently, it was omitted from the model. The assessment of the respecified model suggests good overall fit (see Table 10). Model diagnostics show only trivial areas of improvement (standardized residuals range from -2.528 to 2.979; highest M.I.=14.766), and the parameter estimates (factor loadings, AVEs, CRs and squared correlations) display good validity of the model. The overall conclusion is that the model fit is satisfactory to carry on the analysis.

Table 10 The measurement model of firm performance

Construct	***Item***	***Std loading estimate***	***Fit statistics***	***Construct validity***			
GROWTH	GROWTH1	.710***	$\chi2$=26.813				
	GROWTH2	.864***	df=13		CR	1.	2.
	GROWHT3	.766***	p=.013	1. GROWTH	.886	*.662*	
	GROWTH4	.901***	CFI=.989	2. PROFIT	.879	.320	*.713*
PROFIT	PROFIT1	.655***	TLI=.982				
	PROFIT4	.909***	RMSEA=.046			Off-diagonal:	
	PROFIT5	.940***	(90% C. I. =			squared correlations	
			.021/.071			Along diagonal (italic):	
			SRMR=.024			AVE-values	

MLR-estimator; GROWTH: growth of the firm, PROFIT: profitability of the firm; Statistical significance: *p<.05, **p<.01, ***p<0.001; Number of observations: 495

Next, the factorial structure of the performance construct is tested. Growth and profit are specified in the model as two distinct factors, but a competing model would be such that there is only one factor representing an overall performance of the firm. The one-factor nested model is specified by assigning all the observed items to a single first-order factor. The two models are compared based on the chi-square difference test and overall goodness of model fit. The difference test is statistically significant ($\Delta\chi2(1)$=233.890, p<.001), supporting the two-factor model. The goodness-of-fit indices show good fit for the two-factor solution but poor fit for the one-factor alternative. Following this, the two-factor model was chosen for further analysis.

The full measurement model

The full measurement model combines the separate models for each individual construct to test the overall validity of the solution. The purpose of the evaluation of the full measurement model is to detect possible areas of misfit between constructs that were estimated individually previously. It means that the focus is on the fit between EO, DC, COMP, TECH, GROWTH and PROFIT factors. The full model is evaluated by examining the overall goodness of fit (chi-square test, fit indices), model diagnostics (standardized residuals, modification indices) and parameter estimates (factor loadings, AVE-values, CR-values and inter-construct correlation).

The specified measurement model contains 37 observed variables, 11 first-order factors and two second-order factors (see Table 11). The model is over-identified with 606 degrees of freedom. The model qualifies most of the general guidelines for good fit to the data (see Hu & Bentler 1999) as indicated by the fit statistics. The values of the comparative fit indices (CFI and TLI) remain slightly below the threshold, but they also pass the adjusted cutoff criteria for an acceptable fit when the number of observations and items of the model are taken into consideration (see Hair et al., 2010). All the path estimates are statistically significant, positive and above 0.5. AVE-values exceed 0.5 for all but one (DCOBS) factor, and the CR-values are all above 0.7. The comparison of the average variances and squared correlation estimates between factors signals good discriminant validity with one exception. The shared variance between EO and DC exceeds the mean variance of each factor. The correlations between first-order factors range from -0.014 to 0.652, whereas the correlation between EO and DC as second-order factors is 0.862, that is, just above the level of 0.85 that could be an indication of some discriminant validity issues (see Brown 2006).

Table 11 The full measurement model

Construct	*Item*	*Std loading estimate*			*Construct validity*						
EOINN	EOINN2	.803***									
	EOINN3	.769***		CR	1.	2.	3.	4.	5.	6.	7.
EOPRO	EOPRO1	.796***	1.EOINN	.764	*.618*						
	EOPRO2	.557***	2.EOPRO	.766	.332	*.528*					
	EOPRO3	.801***	3.EORIS	.757	.181	.262	*.610*				
EORIS	EORIS1	.733***	4.EO	.759	.477	.694	.378	*.517*			
	EORIS2	.826***	5.DCOBS	.783	.294	.425	.232	.613	*.479*		
EO	EOINN	.691***	6.DCACQ	.833	.143	.207	.113	.298	.332	*.555*	
	EOPRO	.833***	7.DCREN	.872	.182	.265	.144	.382	.425	.207	*.632*
	EORIS	.615***	8.DCREC	.883	.106	.153	.084	.221	.245	.119	.153
DCOBS	DCOBS1	.752***	9.DC	.801	.355	.516	.281	.743	.826	.402	.514
	DCOBS2	.715***	10.COMP	.761	.003	.004	.002	.006	.009	.004	.005
	DCOBS5	.751***	11.TECH	.845	.076	.110	.060	.158	.138	.067	.086
	DCOBS3	.525***	12.GROWTH	.886	.176	.255	.139	.367	.157	.077	.098
DCACQ	DCACQ5	.747***	13.PROFIT	.880	.044	.063	.035	.091	.058	.028	.036
	DCACQ6	.747***									
	DCACQ7	.724***									
	DCACQ8	.762***			8.	9.	10.	11.	12.	13.	
DCREN	DCREN1	.768***	8. DCREC		*.716*						
	DCREN2	.844***	9. DC		.297	*.510*					
	DCREN3	.722***	10. COMP		.003	.010	*.516*				
	DCREN4	.839***	11. TECH		.049	.166	.022	*.524*			
DCREC	DCREC1	.914***	12. GROWTH		.057	.190	.007	.014	*.663*		
	DCREC2	.851***	13. PROFIT		.021	.070	.001	.000	.320	*.714*	
	DCREC3	.768***									
DC	DCOBS	.909***									
	DCACQ	.634***			Off-diagonal: squared correlations						
	DCREN	.717***			Along diagonal (italic): AVE-values						
	DCREC	.545***									
COMP	COMP1	.771***									
	COMP2	.648***									
	COMP3	.731***									
TECH	TECH1	.671***									
	TECH2	.755***	Chi-square	975.937							
	TECH3	.858***	Degrees	606							
	TECH4	.645***	of freedom								
	TECH5	.669***	P-Value	<.001							
GROWTH	GROWTH1	.717***	CFI	.949							
	GROWTH2	.862***	TLI	.944							
	GROWTH3	.763***	RMSEA	.035							
	GROWTH4	.901***	(90% C.I.)	(.031-							
PROFIT	PROFIT1	.655***		.039)							
	PROFIT4	.908***	SRMS	.056							
	PROFIT5	.942***									

MLR Estimator; EOINN: innovation, EOPRO: proactiveness, EORIS: risk-taking, DCOBS: observation, DCACQ: acquisition, DCREN: renewal, DCREC: reconfiguration, EO: entrepreneurial orientation, DC: dynamic capabilities; COMP: competitive intensity; TECH: technological dynamism; GROWTH: growth; PROFIT: profitability; Statistical significance: *p<.05, **p<.01, ***p<0.001; Number of observations: 495

The EO and DC factors are estimated as a two-factor and a one-factor solution to further examine their uniqueness, and the relative fit is compared with the chi-square difference test. The two-factor parent model is specified by combining the

separate measurement models for EO and DC and allowing them to correlate freely. The one-factor nested model is specified by assigning all the first-order factors of EO and DC to a single second-order factor. The fit of both the one-factor and the two-factor solutions is good (see Table 12). The CFI and TLI values are above the threshold value of 0.95, and the other fit indices (RMSEA and SRMR) also pass the criteria for a good measurement model. The chi-square difference test is statistically significant ($\Delta\chi2(1)=13.534$), suggesting that the two-factor model fits the data better than the one factor model. Following this, the measurement was not respecified, and the two-factor solution was selected for structural modelling.

Table 12 Chi-square difference test for the two alternative models of EO-DC relationship

	Fit statistics							***Model comparison***		
Model tested	$\chi2$(df)	p	CFI	TLI	RMSEA	SRMR	Logl	$\Delta\chi2$	Δdf	p
1-factor	362.874 (201)	<.001	.958	.952	.040	.060	-17202.886			
2-factor	345.796 (200)	<.001	.962	.956	.038	.055	-17192.093	13.534	1	<.001

MLR-Estimator; Chi-square difference test with loglikelihood (logl) values; Number of observations: 495

5.2 Comparison of the models of internal fit

Next, the five competing structural models of internal fit are statistically specified, estimated and compared to find out which of the models gains the most support. The first structural model represents internal fit as a covariation between entrepreneurial orientation (EO) and dynamic capabilities (DC) and their direct effects on firm performance. The model includes EO and DC as exogenous factors and GROWTH and PROFIT as endogenous factors[47]. The two performance factors are regressed on both EO and DC. The associations among independent and dependent variables are specified to be correlational and are estimated freely. The model is overidentified (363 degrees of freedom) and recursive on the assumption that one factor is always a cause and the other is an effect in the causal relationships, instead of a situation in which each of them is both a predictor and an outcome of the other (see Hair et al., 2010). The estimated model fits the data rather well, as the test statistics show (see Table 13). The bivariate path between EO and DC is statistically significant and so is one of the univariate paths. The coefficients are also positive and nontrivial, providing some support for model-

[47] A structural error term is assigned to all outcome variables in every model, since estimations are assumed to contain some degree of error (see Hayes 2013).

ling the fit between EO and DC as covariation. The model explains 9.5% of the variance in the PROFIT factor and 38.6% in the GROWTH factor.

Table 13 Estimation of the alternative models of internal fit

Paths	***Covariation*** Beta (b)	***Independence*** Beta (b)	***EO-mediator*** Beta (b)	***DC-mediator*** Beta (b)	***Moderation***[1] Beta (b)
EO→GROWTH	.868 (1.002)***	.545 (.551)***	.567 (.651)***	fixed (0)	(1.020)***
DC→GROWTH	-.310 (-.368)	.153 (.199)*	fixed (0)	.508 (.613)***	(-.377)
EO→PROFIT	.306 (.331)	.162 (.155)†	.312 (.336)***	fixed (0)	(.320)
DC→PROFIT	.002 (.003)	.201 (.250)*	fixed (0)	.295 (.334)***	(.010)
EO↔DC / DC→EO / EO→DC[2]	.861 (.873)***	fixed (0)	.839 (.870)***	.896 (.876)***	(.871)***
DC→EO→GROWTH			.476 (.566)***.		
CI 95%[3]			.392-.560 (.432-.700)		
DC→EO→PROFIT			.262 (.292)***		
CI 95%			.162-.362 (.176-.409)		
EO→DC→GROWTH				.455 (.537)***.	
CI 95%				.350-.561 (.378-.695)	
EO→DC→PROFIT				.264 (.293)***	
CI 95%				.162-.366 (.171-.414)	
EO*DC→GROWTH					(.042)
EO*DC→PROFIT					(-.049)
χ2	616.181	805.199	619.789	639.750	
df	363	364	365	365	
p-value	<.001	<.001	<.001	<.001	
Scaling correction factor	1.197	1.197	1.197	1.197	
CFI	.956	.924	.956	.953	
TLI	.951	.915	.951	.947	
RMSEA	.038	.049	.038	.039	
CI 90%	.032-.043	.045-.054	.032-.043	.034-.044	
SRMR	.056	.137	.056	.060	
Free parameters (nfree)	101	100	99	99	103
Log likelihood (logl)	-22472.676	-22585.809	-22474.797	-22486.890	-22471.117
Observations (n)	495	495	495	495	495

Estimator: MLR; Statistical significance: † marginal (p<.1), *p<.05, **p<.01, ***p<0.001

[1]Chi-Square test, fit indices and std. estimates not available for latent variable interaction models (see Klein 2011)

[2]Covariation, independence and moderation model: EO↔DC; EO-mediator model: DC→EO; DC-mediator model: EO→DC

[3]Bootstrapped (500 times) 95% confidence interval, ML-estimator

The second model illustrates the independent effects of EO and DC on firm performance. The statistical model is specified otherwise similarly to the covariation model, except that the path between EO and DC is fixed to zero. This model is also recursive and over-identified (364 degrees of freedom). The estimated model does not fit the data very well. The fit indices do not meet the threshold values; therefore, the fit as independence between EO and DC gains little empirical support. The model accounts for 6.7% of the variance in the PROFIT factor and 32.0% in the GROWTH factor.

The third model depicts complete mediation where there is an indirect effect between DC and firm performance through EO as a mediator. Specifically,

GROWTH and PROFIT are regressed on EO and EO is regressed on DC, whereas the effects between DC and performance factors are fixed to zero. The relationship between performance factors is not of substantive interest, so they are allowed to correlate freely. The model is recursive and over-identified and it has a good fit on the data. The indirect paths from DC to GROWTH and PROFIT are statistically significant, positive and nontrivial giving some confirmation to modelling fit as mediation. In the model 9.7% of the variance in the PROFIT and 32.1% in the GROWTH is accounted for.

The fourth model represents complete mediation with DC as an intervening mechanism. Now, the paths from EO to DC and from DC to both GROWTH and PROFIT are estimated freely, whereas the EO-performance paths are assumed to be zero. The bidirectional path between the two performance factors is also set free for estimation. The recursive and overidentified model fits the data well. Both indirect paths are statistically significant, suggesting that this mediational model is also plausible. Of the variance in the PROFIT, 8.7% is explained, whereas in the GROWTH, 25.8% is accounted for.

The last model portrays DC as a moderator that alters the effect of EO on firm performance. The model is specified to include GROWTH and PROFIT as outcome variables which are regressed on EO, DC and the latent interaction term (EO*DC). Performance factors are allowed to correlate freely. The model is recursive and overidentified. The model fit cannot be assessed directly, since basic test statistics (chi-square test and fit indices) are unavailable for latent variable interaction models (see Klein 2011). The fit is examined by estimating the model first without and then with the interactions and comparing the results with a likelihood ratio test (see Muthén 2012). The model with the interaction terms has a poorer fit to the data. Also, neither of the effects of the two interaction terms were statistically significant, providing weak support for the fit as moderation between entrepreneurial orientation and dynamic capabilities.[48]

The results of the five models remain unchanged after controlling for the effects of firms' age, size and sector in each of them (see Appendices 6-10). The fit indices in each of the five models and the statistical significances of the coefficients of the variables of focal interest give some indication as to how the models compare against each other. This initial observation implies that the covariation model and the two mediation models are superior to the others. Next the model comparison is done properly based on the chi-square difference test using loglikehood values and on Akaike Information Criterion (AIC). The first four models can be compared with the chi-square difference test, since they are nested to contain the same variables and differ only in the number of freely estimated paths. The preliminary examination of chi-square and loglikehood values sug-

[48] R-squared statistics not available for interaction effects estimation in MPLUS software.

gests that the covariaton model has a relatively better fit to the data than the others. The covariation model is also the parent model with the largest number of free parameters, so the other models are compared to it one by one. The results show that the EO-mediator model should be accepted. It is the only model for which the chi-square difference from the covariation model is not statistically significant, indicating that this more parsimonious model fits the data equally as well as the more complex model (see Table 14).

Table 14 Comparison of the alternative models of internal fit

	Covariation	*Independence*	*EO mediator*	*DC mediator*	*Moderation*
$\chi 2$	616.181	805.199	619.789	639.750	
df	363	364	365	365	
P-value	<.001	<.001	<.001	<.001	
Scaling corr. factor	1.197	1.197	1.197	1.197	
CFI	.956	.924	.956	.953	
TLI	.951	.915	.951	.947	
RMSEA	.038	.049	.038	.039	
CI 90%	.032-.043	.045-.054	.032-.043	.034-.044	
SRMR	.056	.137	.056	.060	
Model comparison (chi-square)[1]:					
Free parameters (nfree)	101	100	99	99	103
Log likelihood (logl)	-22472.676	-22585.809	-22474.797	-22486.890	-22471.117
Scaling corr. factor	1.239	1.239	1.240	1.238	1.232
-2Δlogl (adjusted)	null model	182.620	3.566	22.063	3.549
Δnfree	null model	1	2	2	2
p-value	null model	<.001	.168	<.001	.170
Model comparison (AIC)					
AIC	45147.351	45371.618	45147.595	45171.781	45148.235
ΔAIC[2]	0	224.267	0.244	24.43	0.884
Akaike weight[3]	0.396	<0.000	0.350	<0.000	0.254
Observations (n)	495	495	495	495	495

MLR-estimator; Goodness-of-fit statistics not available for interaction term models (Klein 2011)

[1]All models are compared one by one to the covariation model, which is the parent model in all other instances except for moderation, where it is the nested model.

[2]The rescaled AIC values are calculated by subtracting the minimum AIC from each AIC value (Burnham & Anderson 2002; 2004).

[3]Normalized model likelihoods (see Burnham & Anderson 2004; Wagenmakers & Farrell 2004).

The moderation model contains an interaction term as an additional variable, making it a non-nested model; for this reason, the comparison continues based on the AIC index, which is suitable for both nested and non-nested models. The covariation model has the absolute smallest value and should be preferred over the others. Furthermore, the relative fit of the models is compared based on AIC differences, which provides a rank order of models (see Burnham & Anderson 2002; 2004). The AIC difference of the EO-mediator model (ΔAIC=0.244) and the moderation model (ΔAIC=0.884) to the covarion model is less than the threshold of two (see Burnham & Anderson 2002; 2004), which indicates that

they fit the data nearly equally as well as the covariation model (ΔAIC=0). The additional calculation of Akaike weights (Burnham & Anderson 2004; Wagenmakers & Farrell 2004) shows that the probability for the covariation model to be superior to the others is about 40%, for the EO-mediator model 35% and for the moderation model 25%. The goodness-of-fit statistics of the covariation and of the EO-mediator model demonstrate a good fit, as previously discussed. Some of the parameter estimates are also statistically significant and interpretable, providing additional support for these two models over the moderation model in which the coefficients of the interaction terms were statistically nonsignificant.

Since the covariation model and the mediation model with EO as a mediator gain the strongest support in the model comparison, it is time to scrutinize them more closely. Starting with the covariation model, the underlying assumption is that DC and EO are overlapping in a sense that they would share the same construct. There are several requirements for the exogenous factors to be distinct but overlapping. Their mutual relationships need to be statistically significant, as do the relationships between them and the endogenous factors; they also need to remain unchanged when one of the two factors is removed (see Kraemer et al., 2001). The covariation model does not fulfill these criteria, since only one of the paths differs statistically significantly from zero (see the step 3 in Table 15). This means there may be present some third variable effects, as was previously discussed in the model specification chapter. Third variable effects can be assessed by comparing coefficients between models with and without the potential confounder, suppressor or mediator. Following the guidelines by MacKinnon et al. (2002), a situation in which the total effect in the model without the third variable is of the same sign but larger than the direct effect with the third variable indicates confounding or mediation. If the total effect is smaller than the direct effect, or if they have opposite signs, it suggests suppression. All three third variable effects assume a statistical significance of the relationship between the third variable and the dependent variable in the full model. Furthermore, a situation of suppression requires that the direct effect between the independent and the dependent variable be statistically significant when the third variable is in the model (Zhao et al., 2010). Confounding and mediation, in turn, require a statistically significant association between the third variable and the independent variable in the adjusted model. Additionally, in the case of confounding, the relationship between the independent and the dependent variable should be statistically significant in the model without the third variable, whereas this is not a prerequisite for mediation or suppression (MacKinnon et al., 2002).

Table 15 Assessment of the third variable effects in the covariation model

Paths	***Step 1*** EO only Beta (b)	***Step 2*** DC only Beta (b)	***Step 3*** EO and DC Beta (b)	***Coefficient difference*** Models 1 & 3 Beta (b)	***Coefficient difference*** Models 2 & 3 Beta (b)
EO→GROWTH	.616 (.648)***		.868 (1.002)***	-.252 (-.354)	
EO→PROFIT	.285 (.281)***		.306 (.331)	-.021 (-.050)	
DC→GROWTH		.433 (.563)***	-.310 (-.368)		.743 (.931)
DC→PROFIT		.282 (.345)***	.002 (.003)		.280 (.342)
EO↔DC			.861 (.873)***		
n (observations)	495	495	495		

Estimator: MLR; Unstandardized path estimates in parenthesis; † marginal (p<.1), *p<.05, **p<.01, ***p<0.001

Table 15 presents the results of the assessment of the third variable effects between EO, DC and firm performance in the covariation model. Regarding DC as a third variable, the conditions for any of the three effects are not met. The direct effects (Step 3) are larger than the total effects (Step 1) between EO and GROWTH as well as between EO and PROFIT, as would be expected in suppression, but the other requirements are not supportive. In EO's case there is a large drop in the magnitude of the DC-GROWTH and DC-PROFIT relationships between the two steps (2 and 3), which implies the presence of a third variable effect. The other criteria are not met in the case of DC-PROFIT path, since the EO-PROFIT path is not statistically significant. The coefficients of DC-GROWTH are of opposite sign, but the path is statistically nonsignificant in the full model (step 3), for which reason the smaller coefficient could be an indication of EO either as a confounder or as a mediator. The direct path between DC and GROWTH is statistically nonsignificant (step 3) as would be expected in the model of complete mediation. The decision between the two effects can be made, however, only on substantive grounds (see MacKinnon et al., 2002). The specification of the conceptual model gives grounds for accepting the mediation alternative, since EO as the search behavior could be a mechanism that conveys the effects of DC as the search ability on firm performance.

The examination of the covariation model points, so far, towards the model with EO as the complete mediator to be the most prominent of the five competing models. The equivalent model of DC as a proxy for EO would still be possible, though. Furthermore, there are several peculiar features in the path estimates between the models of complete mediation (EO-mediator and DC-mediator) and the covariation model. Most statistically significant paths disappear in comparison to the restricted models in the covariation model, which is equivalent to a model of partial mediation. The same becomes visible when EO and DC factors are added to the covariation model in a stepwise procedure (see steps 1-3 in Table 15). When the performance factors are regressed on EO and DC factors sepa-

rately, all the relationships are statistically significant. They either disappear or weaken to nonzero in the joined model but are nonsignificant except for the one between EO and GROWTH. Complete mediation could explain the situation for the DC-GROWTH path but not for the others (nonsignificant EO-PROFIT and DC-PROFIT)[49]. Also, other third variable effects are not relevant, as was discussed previously. Some of the path estimates also differ considerably in size or have an opposite sign across the models of covariation and mediation. All these observations match rather well with what Grewal and colleagues (2004) call telltale signs of multicollinearity, including unstable parameter estimates, nonsignificant coefficients and flipped signs of coefficients. It was noted already at the measurement model stage that the correlation between EO and DC is high (0.862 in the full model), which could mean that the two constructs are not distinct. Now, this initial interpretation is supported after conducting the comparison between the alternative models.

Taken together, the covariation model is the most promising of the competing models; it suggests that the two constructs overlap in such a way that they are either interchangeable, some of the subdimensions substitute one another across the constructs, or that EO as a dominant construct with a significant path to performance in the covariation model reflects all the dimensions of dynamic capabilities, making it a proxy of entrepreneurial orientation. An assessment of these alternatives can be conducted by looking more closely at the convergent and discriminant validity of DC and EO constructs and their subdimensions. The fit indices of the two-factor (see Appendix 11) and one-factor (see Appendix 12) solution show that both models have good fit to the data. However, the chi-square difference test indicated that the two-factor model had a slightly better fit over the one-factor model and was chosen for conducting the model comparison. A closer assessment of model diagnostics and parameter estimates of the two models given additional insights about the fit and may help to determine whether the two factors are truly unique or if there are areas of overlap between EO and DC that would point toward respecification of the model.

There are some standardized residuals that are over the recommended 4.0 in both models, and one item (DCREC3) appears more often than others among such pairs but, overall, the correlation of residuals can be considered trivial. According to the modification indices, several items in the two-factor model have a

[49] Confidence intervals (95%) were obtained via bootstrapping (500 times) to improve the accuracy of the estimates. The effects contained zero, suggesting that the indirect DC-EO-PROFIT path is not statistically significant. One explanation could be a lack of statistical power. The effect size of EO-PROFIT path is small/medium, while the DC-PROFIT path weakens to zero in the full model. This is what would be expected in the model in which EO would be a complete mediator. However, the effect size relative to the sample size could, in principle, result in a low statistical power and lead to a situation in which EO would, in fact, be a mediator, but this would not be detected (Type II error). However, this explanation is undermined by the statistically significant paths in the restricted model.

secondary loading on another factor, of which the highest (M.I.=18.972) is for EOPRO1 on DC. From the first-order factors the highest (M.I.=25.611) cross-loading is for EO by DCOBS. The one-factor model reports no issues with modification indices across the dimensions of EO and DC. Furthermore, there are no pairs of items or factors that would have a high error term correlation across the EO and DC dimensions in either of the two models. Overall, the model diagnostics reveal some borderline values, but they signal only marginal local areas of poor fit except for DCOBS factor in the two-factor model.

The parameter estimates provide more information about the validity of the factor structure. All the factor loadings are statistically significant, above 0.5, positive and interpretable in both models. AVE-values exceed 0.5 except for DCOBS in the two-factor model and for DCOBS and the combined factor of EO and DC (EODC) in the one-factor model. The CR-values are all above 0.7, which signals adequate convergent validity. Concerning discriminant validity of the first-order factor, in the two-factor model the AVE-value of each first-order factor is greater than inter-construct squared correlations, which is a sign of good discriminant validity. The shared variance between EOPRO and DCOBS is slightly higher in the one-factor solution than the average communality of each factor. This suggests that all the dimensions of the one factor solution may not be truly distinct. On the other hand, the correlation (.727) between EOPRO and DCOBS is below the level of 0.85 (see Brown 2006), which is deemed to be a sign of potentially problematic discriminant validity. The correlations between first-order factors are all statistically significant and positive but not quite the same size in either of the models (two-factor model: 0.275–0.685; one-factor model: 0.290 to 0.727), which gives some support for the two-factor structure over the one-factor alternative (see Brown 2006). However, the squared correlation between the second-order factors, EO and DC, in the two-factor model clearly exceeds the AVE-values of each factor, challenging the distinctness of the constructs. Furthermore, the factor correlation between entrepreneurial orientation and dynamic capabilities is high (0.856) and above the red flag warning level of 0.85; therefore, this points toward combining the factors.

A look at the discriminant validity between first- and second-order factors in the two-factor model reveals that the shared variance for DCOBS with the secondary factor of EO is higher than its average communality, and the situation is similar for EOPRO with DC. Moreover, DCOBS has a rather high correlation (0.777) with the EO factor, and EOPRO correlates quite strongly (0.755) with the DC factor. Problematic discriminant validity of these two first-order factors points towards a respecified factorial structure in which one of the two factors would either be removed or the secondary paths between EO and DCOBS and between EOPRO and DC would be estimated freely. It is notable that each of the two first-order factors (EOPRO and DCOBS) has the highest loading estimate on

their primary factor. When the most important variable in defining each construct has a high secondary loading on another factor, it raises concerns about the uniqueness of the constructs. Taken together, there are statistical arguments to support both the one-factor and the two-factor solution and, from the individual subdimensions, the most problematic seems to be DCOBS followed by EOPRO.

The conceptual justification is critical in making the final decision between the two models. From the three alternative types of overlap (complete, partial and proxy) discussed in the theory chapter, the partial overlap gains support. Most of the first-order factors are distinct from one another in the empirical analysis, indicating that EO and DC are not interchangeable. Moreover, it seems that neither EO nor DC is a global factor for which the other would be a proxy factor, since each has unique subdimensions that do not have high cross-loadings on the other secondary factor. However, there are two overlapping subdimensions. DCOBS has a high cross-loading on EO, and EOPRO overlaps with DC, as was shown earlier. The two subdimensions also correlate quite strongly with each other. The elimination of one or both of the factors would likely improve the validity of the measurement model, but respeficiation should be justified. There are no obvious methodological reasons that would explain the correlation due to, for example, immediate proximity of the two scales in the questionnaire design. Also, none of the single items seem to be responsible for the discriminant correlations.

Substantively, the DCOBS factor captures the sensing dimension of dynamic capabilities. Sensing as a capacity is related to the ability to form new ideas within the theoretical framework of opportunity search. Sensing as an action is related to how frequently a firm searches for new alternatives. The EOPRO factor, in turn, describes a firm's preference for initiative and search behavior speed. So, as actions the two factors could portray the same dimension of search, and it could be argued that they replace rather than complement each other; therefore, one of them would be enough in the model. However, the comparison of the theoretical argumentation behind the two concepts demonstrates that they emphasize the timing of search slightly differently. It is common to both of them that search is constant rather than periodic, but the proactiveness dimension of EO stresses that firms' change the environment rather than respond to it (see Lumpkin & Dess 1996), whereas the observation dimension of DC balances among the two aspects (see Alsos et al., 2008). Furthermore, central in proactiveness is that firms are leaders in the industry, but the observation dimension contains a possibility that a firm benchmarks itself against the best in the industry, making a firm potentially a follower rather than leader. Thus, the two dimensions are closely related (both as actions and resources) but not substitutes.

In summary, there are various criteria for deciding which of the competing factor structures (one vs. two factors) to accept. The goodness-of-fit statistics are nearly equally good for both models, the chi-square difference test supports two-

factor structure, but the model diagnostics and parameter estimates of the two-factor solution indicate problematic discriminant validity, giving support to either a respecified two-factor structure or a one-factor structure. The theoretical rationale, then, is the pivotal criterion. It was previously argued that EO and DC , from an evolutionary perspective, would comprise a one-factor structure when the property type of both constructs is interpreted and measured as a mixture of search resources and actions towards altering the firm's base of ordinary resources. The one-factor model would then reflect the firm's search routine. The one-factor solution is chosen over the two-factor solution after considering the substantive rationale together with the empirical evidence, and none of the EO or DC dimensions are eliminated.[50]

The respecified full measurement model (see Table 16) with the joined factor for EO and DC (EODC), competitive intensity (COMP), technological dynamism (TECH), firms' growth (GROWTH) and profitability (PROFIT) are presented next. The full measurement model combines the separate models to test the overall validity of the solution. The respecified model contains 37 observed variables, 11 first-order factors and one second-order factor. The model is over-identified with 611 degrees of freedom. The model qualifies either the general or adjusted guidelines for good fit to the data (see Hu & Bentler 1999; Hair et al., 2010).

[50] A two-factor model was estimated without DCOBS to check the validity of the chosen approach, which the test statistics indicated as a potentially more problematic of the two. The omission improved model fit significantly. The convergent validity of the DC factor is slightly lower in the respecified model, but the discriminant validity between EO and DC is now higher. The EOPRO factor correlates again with the DC but much less than before. Taken together, the respecification improves construct validity for EO and DC, but they are still quite closely related. Ideally, the evidence for discriminant validity should be slightly stronger; nonetheless, the modification gives better grounds for analyzing the structural relationships than the original model. The results are essentially the same after conducting the respecified estimations of the five competing models. The covariation model still fits the data marginally better than the EO-mediator model. The telltale signs of multicollinearity are also still visible when the parameter estimates are compared across the models. This is not surprising, since the removed DCOBS was the primary first-order factor that correlated strongly with the primary first-order factor of EO and with which other first-order factors of DC correlated. Elimination of the primary factor resulted in a situation in which the remaining first-order factors of DC correlate with EOPRO as the primary factor of EO. The conclusion is that the two factors are embedded in a more profound way and ought to be combined without eliminating any of the factors.

Table 16 The respecified full measurement model

Construct	*Item*	*Std loading estimate*			*Construct validity*						
EOINN	EOINN2	.809***									
	EOINN3	.763***		CR	1.	2.	3.	4.	5.	6.	7.
EOPRO	EOPRO1	.804***	1.EOINN	.764	*.618*						
	EOPRO2	.556***	2.EOPRO	.766	.267	*.528*					
	EOPRO3	.793***	3.EORIS	.759	.134	.220	*.613*				
EORIS	EORIS1	.722***	4.DCOBS	.782	.314	.516	.258	*.479*			
	EORIS2	.839***	5.DCACQ	.833	.139	.228	.114	.268	*.556*		
DCOBS	DCOBS1	.753***	6.DCREN	.872	.203	.334	.167	.392	.174	*.632*	
	DCOBS2	.715***	7. DCREC	.883	.102	.167	.084	.196	.087	.127	*.717*
	DCOBS5	.758***	8. EODC	.856	.403	.663	.332	.778	.345	.504	.253
	DCOBS3	.512***	9. COMP	.761	.004	.006	.003	.007	.003	.005	.002
DCACQ	DCACQ5	.747***	10. TECH	.845	.070	.116	.058	.135	.060	.088	.044
	DCACQ6	.748***	11. GROWTH	.886	.110	.181	.091	.213	.094	.138	.069
	DCACQ7	.724***	12. PROFIT	.880	.034	.056	.028	.066	.029	.043	.022
	DCACQ8	.762***									
DCREN	DCREN1	.768***			8.	9.	10.	11.	12.		
	DCREN2	.844***	8. EODC		*.468*						
	DCREN3	.721***	9. COMP		.009	*.516*					
	DCREN4	.840***	10. TECH		.175	.022	*.524*				
DCREC	DCREC1	.915***	11. GROWTH		.272	.007	.014	*.663*			
	DCREC2	.850***	12. PROFIT		.085	.001	.000	.319	*.714*		
	DCREC3	.768***									
EODC	EOINN	.635***									
	EOPRO	.814***			Off-diagonal: squared correlations						
	EORIS	.576***			Along diagonal (italic): AVE-values						
	DCOBS	.882***									
	DCACQ	.587***									
	DCREN	.710***									
	DCREC	.503***	Chi-square	1110.837							
COMP	COMP1	.771***	Degrees	611							
	COMP2	.648***	of freedom								
	COMP3	.731***	P-Value	<.001							
TECH	TECH1	.671***	CFI	.945							
	TECH2	.755***	TLI	.940							
	TECH3	.858***	RMSEA	.036							
	TECH4	.645***	(CI 90%)	(.032-.040)							
	TECH5	.669***	SRMS	.060							
GROWTH	GROWTH1	.714***									
	GROWTH2	.861***									
	GROWTH3	.763***									
	GROWTH4	.904***									
PROFIT	PROFIT1	.655***									
	PROFIT4	.910***									
	PROFIT5	.940***									

MLR Estimator; EOINN: innovation, EOPRO: proactiveness, EORIS: risk-taking, DCOBS: observation, DCACQ: acquisition, DCREN: renewal, DCREC: reconfiguration, EODC: entrepreneurial orientation and dynamic capabilities (i.e. opportunity search); COMP: competitive intensity; TECH: technological dynamism; GROWTH: growth; PROFIT: profitability; Statistical significance: *p<.05, **p<.01, ***p<0.001; Number of observations: 495

The purpose of the evaluation of the full measurement model is to detect possible areas of misfit between constructs that were previously estimated individually. It means that the focus is on the fit between actions of the firm (EODC factor), environment (COMP and TECH factors) and performance (GROWTH and PROFIT factors). The comparison of convergent correlation (AVE-values) and discriminant correlation (squared latent factor correlations) indicate good discriminant among the five constructs. The correlations between first-order factors

range from -0.014 to 0.718, suggesting that there are no severe discriminant validity issues in the model. The only minor observation in the model related to the fit between the corresponding five factors is the cross-loading of the item EOINN3 on TECH factor (M.I. = 22.057). Common to the item and the factor is that they are both associated with innovation. However, the EOINN3 measures firm-level changes in products and services, whereas TECH reflects industry-level technological changes, so there is no strong substantive rationale for freeing the corresponding path between the two variables. The evaluation of the model indicated also some other minor areas of localized misfit that have already been noted and discussed in individual measurement model evaluation.

Consequently, it can be concluded that the fit of the model is acceptable, and it is possible to proceed to structural modelling and comparison of competing models of external fit. However, before moving to estimate the models of external fit, the effect of the combined EODC factor on performance factors was estimated singly. EODC has a statistically significant, positive and nontrivial association with both GROWTH (β=0.523, $p<0.001$) and PROFIT (β=0.295, $p<0.001$) as the conceptual model specified. The model accounts for 8.7% of the variance in the PROFIT factor and 27.4% in the GROWTH factor. The results remain unchanged after controlling for the effects of age, size and sector of the firms (EODC→GROWTH, β=0.513, $p<0.001$; EODC→PROFIT, β=0.304, $p<0.001$).

In summary, there are two theoretical interpretations for the partial overlap between entrepreneurial orientation and dynamic capabilities for the covariation model of internal fit. Based on the evolutionary approach, EO represents search preferences and DC search abilities, but the two are, in practice, embedded in the same search behavior. The same can be expressed also so that EO in itself is a mixture of preferences and actions, whereas DC is intrinsically a combination of abilities and actions; together, they are embedded in the search routine of a firm. Additionally, they possibly capture partly different types of search behavior so that the operationalization of EO represents disruptive search and DC ambidexterity. Then the constructs would not only portray partly different characteristics of disruptive search (EO a mixture of preferences and actions and DC of abilities and actions), but DC would also depict accumulative search. Now, the joined EODC construct would represent simultaneous ambidexterity of the firm, and this search has a positive influence on both firm growth and profitability.

5.3 Comparison of the models of external fit

This chapter analyzes dependence relationships between opportunity search (EODC factor), market environment (COMP and TECH) and firm performance

(GROWTH and PROFIT). Four competing structural models are statistically specified, estimated and compared to examine their relative fit to the data.

The first model represents the independent effects of opportunity search and market environment on firm performance and consists of EODC, COMP and TECH as exogenous factors and PROFIT and GROWTH as endogenous factors. The relationship between the market environment variables and the opportunity search variable is fixed to zero. All the bivariate associations that are not of substantive interest in the study are specified to be correlational, that is, covariance is allowed among both market environment and performance variables. The model is recursive and overidentified with 613 degrees of freedom. The estimated model has an acceptable fit on the data (see Table 17). Several statistically significant parameter estimates are at the predicted direction and are nontrivial in size, giving some support to the model. EODC affects positively both on GROWTH and PROFIT, but the association is stronger with the GROWTH factor. COMP has a small, negative, direct effect on GROWTH, and TECH's influence on PROFIT is similar. The parameter estimates remain practically unchanged after controlling for the effects of firm age, size and sector, supporting the results' robustness (see Appendix 13).

Table 17 Estimation of the alternative models of external fit

Paths	***Independence*** Beta (b)	***Mediation*** Beta (b)	***Moderation***[1] Beta (b)	***Matching*** Beta (b)
EODC→GROWTH	.546 (.687)***	.578 (.719)***	(.720***)	.590 (.739)***
EODC→PROFIT	.340 (.401)***	.363 (.423)***	(.426***)	.359 (.423)***
COMP→GROWTH	-.117 (-.127)*	-.123 (-.132)*	(-.132*)	-.140 (-.143)*
COMP→PROFIT	-.042 (-.043)	-.046 (-.046)	(-.049)	-.057 (-.054)
TECH→GROWTH	-.055 (-.063)	-.104 (-.116)	(-.115)	-.106 (-.119)†
TECH→PROFIT	-.126 (-.136)*	-.159 (-.166)*	(-.164*)	-.160 (-.168)*
COMP↔EODC / COMP→EODC[2]	fixed (0)	.033 (.029)	(.098)	.082 (.088)
TECH↔EODC / TECH→EODC[2]	fixed (0)	.413 (.370)***	(.414***)	.417 (.412)***
COMP→EODC→GROWTH		.019 (.021)		
CI 95%[3]		-.053-.092 (-.058-.100)		
COMP→EODC→PROFIT		.012 (.012)		
CI 95%		-.033-.058 (-.034-.059)		
TECH→EODC→GROWTH		.238 (.266)***		
CI 95%		.148-.329 (.161-.372)		
TECH→EODC→PROFIT		.150 (.157)***		
CI 95%		.079-.220 (.084-.230)		
[COMP*EODC]→GROWTH			(-.016)	
[COMP*EODC]→PROFIT			(-.048)	
[TECH*EODC]→GROWTH			(-.010)	
[TECH*EODC]→PROFIT			(-.039)	
[COMP-EODC]→GROWTH				.037 (.059)
[COMP-EODC]→PROFIT				.023 (.034)
[TECH-EODC]→GROWTH				.095 (.174)†
[TECH-EODC]→PROFIT				-.053 (-.090)
$\chi 2$	1067.883	1010.837		1136.951
df	613	611		675
p-value	<.001	<.001		<.001
CFI	.938	.945		.938
TLI	.932	.940		.932
RMSEA	.039	.036		.037
CI 90%	.035-.043	.032-.040		.033-.041
SRMR	.092	.060		.059
Free parameters (nfree)	127	129	133	139
Log likelihood (logl)	-29353.428	-29320.350	-29319.653	-30272.551
Observations (n)	495	495	495	495

Estimator: MLR; Statistical significance: † marginal (p<.1), *p<.05, **p<.01, ***p<0.001

[1]Chi-Square test, fit indices and std. estimates not available for latent variable interaction models (see Klein 2011)

[2]Independence, moderation and matching model: COMP↔EODC, TECH↔EODC; Mediation model: COMP→EODC, TECH→EODC

[3]Bootstrapped (500 times) 95% confidence interval, ML-estimator

The second model represents mediation and consists of market environment as an antecedent, opportunity search as a mediator and firm performance as an outcome. More precisely, the EODC factor mediates the relationship between the preceding factors COMP and TECH and the succeeding factors GROWTH and PROFIT. It is possible that the predictor affects the outcome through mechanisms other than those explicitly specified in the model (see Hayes 2013), for which reason the direct paths from market environment factors to performance

factors are also estimated freely. The market environment factors are allowed to correlate freely, as are the performance factors. The model is recursive and overidentified (611 degrees of freedom). The estimated mediation model has an acceptable fit on the data (see Table 17). Multiple statistically significant and nontrivial parameter estimates provide some support for the conceptual model. The model explains 11.0% of the variance in the PROFIT factor, 17.6% of the variance in the EODC factor and 30.0% of the variance in the GROWTH factor. EODC mediates the relationship between TECH and both performance factors. Specifically, TECH has a positive effect on EODC which, in turn, affects positively on both GROWTH and PROFIT. The indirect effect is stronger and fully mediated on GROWTH. Furthermore, the direct effect of TECH on PROFIT is statistically significant and negative. The direct and indirect effects are of opposite signs, indicating inconsistent mediation (i.e., suppression). The COMP factor does not have a mediated effect via EODC on either GROWTH or PROFIT. Specifically, the path between COMP and EODC is not statistically significant. COMP has a significant, negative, direct effect on GROWTH and no effect on PROFIT. Controlling for the effects of firm age, size and sector caused negligible changes to the parameter estimates, which enhances the results' robustness (see Appendix 14).

The third model portrays moderating effects. The structural model is specified to include GROWTH and PROFIT as endogenous factors, which are influenced by EODC as an exogenous variable. The COMP and TECH factors are specified as moderator variables, which are assumed to change the effect of EODC on GROWTH and PROFIT. The model is recursive and overidentified. The moderation effects of COMP and TECH were estimated first separately and then simultaneously. Models containing either fixed (to zero) or freely estimated interaction terms were compared with the chi-square difference test. Adding interaction terms did not improve the model fit. The parameter estimates of the interaction terms were also not statistically significant (see Table 17). Finally, the control variables were included in the model together with the independent variable, the moderator variables and the interaction terms. The parameter estimates remained unchanged, enhancing the results' robustness (see Appendix 15). Put together, little empirical evidence exists to support the moderation effects model of the relationship between opportunity search (EODC), market environment (COMP and TECH) and firm performance (GROWTH and PROFIT) variables.

The fourth model specifies a match between opportunity search and market environment. The direct effect of EODC on GROWTH and PROFIT are estimated freely in the same way as the previous model. Two matching effect variables, [EODC-COMP] and [EODC-TECH], are also specified to have a direct effect on both performance factors. The matching effect variables represent a deviation score and are calculated as an absolute difference between the values of each

market environment and performance variable (see Venkatraman 1989). The variables indicate a relative lack of fit so that the greater the value, the poorer the fit. The model is recursive and overidentified with 675 degrees of freedom. The model was estimated in steps. The null model was estimated by fixing the deviations score ([EODC-COMP] and [EODC-TECH]) paths to zero. The paths were freed one by one in the consecutive steps, and the models were compared with the likelihood ratio test. The results show that the full model with freely estimated matching effects fits the data statistically significantly better than the null model with fixed paths (see Appendix 16). The parameter estimate of [EODC-TECH] on GROWTH is statistically significant (see Table 17). It suggests that the lack of match between EODC and TECH has positive association with GROWTH, although the association is small, bordering on being trivial (see Cohen 1992). Other estimates for matching effects are not statistically significant. The model explains 11.3% of the variance in the PROFIT factor and 31.4% of the variance in the GROWTH factor. The estimates remain unchanged after controlling for age, size and sector in the model. The conclusion is that matching effects receive a little support, but the one significant effect is different from what was specified in the conceptual model, since a mismatch between TECH and EODC seems to slightly increase GROWTH.

Differences in the goodness-of-fit statistics give a rough idea about how models rank against one another, but the formal comparison is conducted using Akaike Information Criterion (AIC), since the models contain a partly different set of exogenous variables. The AIC value is smallest for the mediation effects model, suggesting it is superior to the others (see Table 18). The second best alternative is the moderation effects model, but it receives somewhat less support (ΔAIC=6.607). The expected information loss is even higher for the last two models. The calculation of Akaike weights (see Burnham & Anderson 2004; Wagenmakers & Farrell 2004) shows that the probability for the mediation effects model being superior to the others is over 96% or, stated differently, the ratio of Akaike weights shows that the mediation model is approximately 27.2 times more likely to be the best model in comparison to the moderation model.

Table 18 Comparison of alternative models of external fit

	Independence	*Mediation*	*Moderation*	*Matching*
$\chi 2$	1067.883	1010.837		1136.951
df	613	611		675
P-value	<.001	<.001		<.001
CFI	.938	.945		.938
TLI	.932	.940		.932
RMSEA (CI 90%)	.039	.036		.037
CI	.035-.043	.032-.040		.033-.041
SRMR	.092	.060		.059
Log likelihood (logl)	-29353.428	-29320.350	-29319.653	-30272.551
Free parameters (nfree)	127	129	133	139
AIC-value	58960.857	58898.700	58905.307	60823.101
ΔAIC[1]	62.157	0	6.607	1924.401
Akaike weights[2]	<.0001	.9645	.0355	<.0001
Observations (n)	495	495	495	495

MLR-estimator;

Chi-Square test and fit indices not available for latent variable interaction models (see Klein 2011)

[1]The rescaled AIC values calculated by subtracting the minimum AIC from each AIC value (see Burnham & Anderson 2002; 2004)

[2]Normalized model likelihoods (see Burnham & Anderson 2004)

Next, multimodel inference was conducted to assess the relative importance of variables in all the candidate models. For this, the sum of Akaike weights was calculated for each variable across all the models containing that variable (see Burnham and Anderson 2004). The most important variables with equally high weights are EODC, COMP and TECH, which are present in every estimated model, when this approach is applied to the estimated four models. Next are the two moderator variables, followed by the two variables of matching effects. Effect sizes give further information about the importance of individual variables across different models. Natural averages of standardized parameter estimates of all the models were calculated (see Burnham and Anderson 2002) for both direct and indirect effects on GROWTH and PROFIT (see Table 19). EODC is the most important variable with the highest averaged beta coefficients. TECH is second in importance, with statistically significant direct and indirect effects. COMP becomes third with a statistically significant direct effect. The smallest statistically significant coefficient is for the [EODC-TECH] variable. The estimates for the other variables are very small and statistically nonsignificant.

Table 19 Importance of the variables across the alternative models of external fit (EO and DC as actions)

	Independent[1]	*Mediation*	*Moderation*	*Matching*	*Sum of Akaike weights*	*Averaged Beta*[2] *(GROWTH)*	*Averaged Beta (PROFIT)*
EODC	1	1	1	1	1	.578***	.363***
COMP (direct)	1	1	1	1	1	-.123*	-.046
COMP (indirect)	0	1	0	0	0.9645	.019	.012
TECH (direct)	1	1	1	1	1	-.104	-.159*
TECH (indirect)	0	1	0	0	0.9645	.238***	.150***
[EODC*COMP]	0	0	1	0	.0355	(-.016)	(-.048)
[EODC*TECH]	0	0	1	0	.0355	(-.010)	(-.039)
[EODC-COMP]	0	0	0	1	<.0001	.037	.023
[EODC-TECH]	0	0	0	1	<.0001	.095†	-.053
Akaike weights	<.0001	0.9645	0.0355	<.0001	1	-	-

[1]1=variable or path present in the model, 0= variable or path excluded from the model;
[2]Natural average of std. coefficients (see Burnham & Anderson 2002); Std. coefficients not available for moderation model (unstandardized coefficients in parenthesis);
Statistical significance: †marginal (p<.1), *p<.05, **p<.01, ***p<0.001

The results of the alternative models can now be drawn together. With the lack of evidence for the moderation effects, the EODC type of ambidextrous search is interpreted to have an equally positive effect on firm performance in conditions of both high and low market dynamism and when competition in the market is highly intense or less intensive. Regarding the unspecified matching effect of technological dynamism and EODC search on firm growth, a possible substantive interpretation is that firms with high EODC lead technological change in the market environment. They do not simply adapt to external conditions by matching the level of search but do more in an attempt to alter those conditions in the long run. Related to this, one possible explanation for the nearly nonexistent matching effects could be the chosen calculation method, which cannot differentiate between two types of imbalance; that is, the level of search can be higher or lower than the level of dynamism or hostility in the environment. If these two different imbalances had the same sized but opposing effects on firm performance, they would then cancel each other in the data, showing practically no total association with performance. The results of the estimated mediation model can be summarized following Zhao and colleagues' (2010) typology. Accordingly, there is a competitive mediation between TECH and PROFIT, indirect-only mediation between TECH and GROWTH, direct-only nonmediation between COMP and GROWTH and no-effect nonmediation between COMP and PROFIT. Substantively interpreted, firms respond to technological dynamism to some degree through opportunity search and are rewarded with increased growth and profitability. Furthermore, there are possibly other mechanisms (mediators not part of the model) that explain the negative direct effect of technological dyna-

mism on profitability. One such mechanism could be another type of search behavior than the one EODC describes. For example, a firm could try to adapt through optimizing or positioning or, perhaps, decide not to search at all, but this would negatively impact performance.

Firms also do not seem to adjust to competitive intensity through the kind of opportunity search that EODC captures. However, it is notable that the operationalized EODC factor does not contain the subdimension of competitive aggressiveness; thus, the results suggest that firms do not adapt to hostile competition by creating additional value. For example, the possible response through market power and monopoly-seeking remains unclear, but it could possibly explain the negative effect on growth. Finally, it is noteworthy that, while EODC carries some of the effects of the market environment (TECH) on firm performance, a majority of variance in EODC is not explained by the environment. Firms with high levels of EODC are slightly more common in environments with high TECH, but they exist also in low TECH environments; similarly, firms with low EODC occur in high TECH environments. A substantive interpretation is that search patterns are fixed for many firms. In other words, some firms respond to technological dynamism (TECH) in market environment through an EODC type of ambidextrous search, whereas others are committed to this search in any case, irrespective of the market conditions.

6 CONCLUSIONS

This study's conclusions include answers to the research questions, theoretical contributions and takeaways for future research. These topics are discussed next.

6.1 Answering the research questions

The study's objective was to examine the role of the entrepreneurial orientation (EO) and dynamic capabilities (DC) constructs in firm performance. The first research question concerned the different ways that exist for a firm's purposeful renewal to improve its performance. A review of previous research revealed four ways, identified as searches, for firms to change their present operations: optimizing, positioning, disruption and accumulation. Each search type was examined through internal and external conditions, behavior and fit between these elements. External and internal conditions were examined, on the one hand, as something that can enable or limit search and, on the other hand, as something that may be affected by search. The circumstances of the operating environment were categorized as munificence, dynamism and complexity. Internal circumstances consisted of preferences and abilities of search, ordinary resources and performance consequences. Search behavior was about when, where, how and what firms try to change or, stated differently, about timing, direction, forms and outcomes of search.

Optimizing search is episodic, carefully planned (possibly emergent), and directed to external conditions; it changes the amount of the given output resulting in zero economic rent. Firms that use it have a low preference for challenge, curiosity, uncertainty, initiative and experimentation but are willing to behave opportunistically. These firms have simple abilities for ideation, assessment and introduction of alternative operations. External and internal conditions support the search when the market environment is munificent, static and simple and when firm-controlled ordinary resources are homogeneous and mobile.

In positioning search, firms periodically seek new alternatives, plan carefully, direct search to external and internal conditions and reallocate firm-controlled resources among known uses, resulting in either Richardian or monopoly rent or loss. These firms have a moderately low preference for challenge, curiosity, uncertainty and initiative and are willing to act deliberately and opportunistically. Positioning search requires somewhat simple abilities. Circumstances favor this

type of search when there are low levels of munificence, dynamism and complexity in the market, and the ordinary resources of firms are heterogeneous and immobile.

In disruptive search, firms commit to seeking new alternatives periodically or continuously and may follow a planned or emergent form of search. This type of search is directed to external and internal conditions, and its outcome is an untried, new resource combination resulting in Schumpeterian rent or loss. These firms have a high preference for challenge, uncertainty and initiative, and firms may differ in their attitudes towards curiosity, opportunism and deliberation. These firms need complex abilities related to ideation, assessment and introduction of alternative combinations of resources. External and internal conditions favor disruptive search when the market environment is lean or highly munificent, highly dynamic and highly complex and the firms possess ordinary resources that are possibly heterogeneous and possibly immobile.

Accumulative search describes a situation in which firms try to form new alternatives occasionally or continuously, plan or probe, direct search to external and internal conditions and form unnoticed combinations of resources, resulting in Kirznerian rent or loss. Such firms have a moderately high preference for challenge, uncertainty and initiative and may have varying attitudes towards curiosity, opportunism and deliberation. These firms possess somewhat complex abilities for conducting search. External and internal circumstances are supportive of search when there are low or high levels of munificence, fairly high dynamism and fairly high complexity in the market, and firms' ordinary resources are possibly heterogeneous and possibly immobile.

The second research question was to discover what alternative roles EO and DC possibly have in firm performance from the perspective of firm renewal. EO has two property types, an attitude or an action, which were interpreted to equal either search preferences or search behavior, respectively. DC can, in turn, be identified as abilities or actions. The two property types were, correspondingly, considered as matching with either search abilities or search behavior. Of the four different types of search, disruptive search is where both constructs have their roots; however, they can be positioned with any of the four searches, depending on the specific definition. If a firm that does not search for new operations is taken as a reference point, then entrepreneurial orientation and dynamic capabilities could most simply be interpreted as attributes of any firm that performs search. When defined as reflective constructs, the levels of EO or DC would determine their position among the four types of search, so that a high level would point towards disruptive search and a low level towards optimizing search. No EO or DC would indicate that a firm does not try to change its operations at all. As formative constructs, the level of a single subdimension would

determine their position, for example, a high level of aggressiveness would alone place EO equally well with positioning search as with disruptive search.

The study identifies five alternative forms of internal fit between EO and DC in firm renewal, depending on whether they are interpreted as actions or resources of search. Based on an evolutionary approach, EO and DC were specified to covary and form together a search routine in which resources and actions are intertwined and inseparable. Four more models were specified that build on the neoclassical approach of separate abilities, preferences and actions: independent effects, EO as a mediating mechanism, DC as a mediator, and DC as moderator between EO and firm performance. Moreover, several competing relationships between EO, DC and the market environment were determined. Based on the logic of one best behavior, search and environment were specified to have independent effects on firm performance. Two other models were built on evolutionary approaches, according to which firms are either highly inert (environment as a moderator) or highly responsive (environment as an antecedent) relative to external circumstances. The fourth model specified fit as a match between environment and search. The premise is that it does not matter whether the level of search is low or high as long as it is in balance with the external environment.

The third research question looked at what empirical support the possible alternative roles of entrepreneurial orientation and dynamic capabilities in firm performance receive. The covariation between EO and DC received the strongest confirmation from the internal fit models, which means that EO and DC are not independent constructs but could be combined to represent a search routine concept. A more detailed examination indicated that EO and DC are neither interchangeable nor is one a proxy to the other, but they capture unique dimensions of search. Two of the subdimensions, proactiveness of EO and observation of DC, were considered to be closely related yet separate dimensions. Overall, EO was interpreted to describe a combination of preferences and actions and DC a mixture of abilities and actions that were intertwined in a firm's search routine. The operationalizations of the constructs additionally depict partly different types of search behavior. EO portrays disruptive search and DC also accumulative search; in combination, they capture a nuanced picture of a firm's search routine as simultaneous ambidexterity. The combined construct of EO and DC as a search routine had a positive and significant association with both firm growth and profitability.

The conceptual model of external fit in which firms adapt to market circumstances through search as a mediating mechanism received the strongest support out of the four conceptual models of external fit. Market dynamism especially had a positive indirect effect on firm growth and profitability. No evidence was provided for the potential indirect effects of the intensity of competition on firm performance. Furthermore, both dynamism and hostility had a small, negative,

direct effect on performance, suggesting that there may be other explanatory mechanisms not specified in the model, for example, other types of search or a decision not to search at all but rather maintain the current operations unaltered. The positive effects of the combined measure of EO and DC as a search routine also did not depend on the level of technological dynamism or intensity of competition. Moreover, the investigated matching effects revealed one very small association according to which imbalance might have positive consequences in terms of firm performance. This suggests that the relationship between search and the market environment may be more complex than what the model specified. Firms with high levels of EO and DC possibly lead the change in the environment, for which reason some level of imbalance might be necessary to reach performance benefits. However, being too far ahead or lagging too far behind could result in difficulties.

6.2 Theoretical contributions

Search is a central concept in firm renewal (Nelson & Winter 1982a). The concept makes it possible to systematically examine and compare alternative ways of firm renewal. The study contributes to the examination of firm performance by arguing that the existing research on purposeful renewal can be categorized into four types of opportunity search. Optimizing search describes a firm's effort to change only the amount of its output, and positioning search describes an effort to utilize its given resources more efficiently to provide the given goods. Accumulative search portrays a firm's attempt to introduce unnoticed combinations of resources, and disruptive search portrays an attempt to introduce untried resource combinations. Each search type involves specific internal and external conditions, actions and consequences and fit between these elements.

The resource-based view (e.g., Wernerfelt 1984) highlights the importance of firm-controlled resources in successful firm performance. This study contributes to the discussion by adopting an evolutionary interpretation of the resource-based view (RBV). The study classifies a firm's resources into two categories, ordinary and search. Ordinary resources are actual inputs in the current operations of a firm or possible inputs in its future operations, whereas search resources are inputs in the change activities of the firm. Search resources can be further divided into preferences and abilities that together influence when, where, how and what kind of alternatives a firm uses to form to its present actions. Barney (1991) has suggested that firms' resources can be analyzed based on their value, rarity, inimitability and nonsubstitutability (VRIN) and that resources ought to meet one or more of these so-called VRIN-qualities to advance the firm's performance. This

study argues that a firm needs to possess either VRIN search resources or VRIN ordinary resources or both to possibly improve its performance.

In optimizing search, a firm needs valuable search and valuable ordinary resources to stay at par with competition and increase performance (accounting profit, not economic profit). Successful positioning search requires a firm's search resources to be valuable. Ordinary resources need to be at least valuable and rare to result in momentary positive results and also both difficult to imitate and substitute to achieve prolonged performance benefits. Success of both accumulative and disruptive search rests on search resources that are valuable and rare (temporary advantage), possibly also difficult to imitate and substitute (sustained advantage). A firm's ordinary resources, in turn, need not to have VRIN-qualities but can have any of them. New resource combinations are based on market-controlled ordinary resources when only a firm's search resources meet the VRIN-criteria and on firm-controlled ordinary resources when they have VRIN attributes. Moreover, this study suggests that the VRIN-qualities of resources could be applied not only to firm-controlled resources but also to market-controlled resources. The rationale in efficient optimizing and positioning search is that firms combine valuable, firm-controlled resources with valuable, market-controlled resources that are not rare, inimitable or nonsubstitutable. In disruptive and accumulative search, market-controlled resources can but need not have VRIN-qualities. A firm could identify, for example, a rare market-controlled resource that has some superior qualities, but the unaware owner asks the same price for it as others. The searching firm could acquire all the superior resources or make an exclusive partnership with the resource-owner to increase its performance.

The study expands the scope of two common concepts concerning what and how a firm searches. According to Baumol (1990), new resource combinations can be productive or unproductive and are tied to disruptive search through Schumpeterian entrepreneurship. Unproductive combinations are relevant in any of the four types of search, in light of this work. They relate to perfectly competitive rent-seeking in optimizing, fixed market power in positioning, unnoticed new ways of monopolizing in accumulative search and untried new means of monopolizing in disruptive search. Moreover, this study suggests that both planned and emergent forms of change are relevant in all the four search activities. Emergent change has commonly been associated in the previous research with disruptive (e.g., Sarasvathy 2001) and accumulative search (e.g., Kirzner 1997). This study widens the usage of emergent search to optimizing and positioning search. Firms with equally limited search resources may opt for probing instead of calculating among various alternatives.

This study contributes to strengthening the theory base for entrepreneurial orientation and dynamic capabilities. It adds to the scholarly research by suggesting

that EO and DC are not theories or empirical operationalizations but closely related constructs that can be positioned in the framework of search for alternative operations. Furthermore, the study takes a stance that there need not be a single, once-for-all definition for either EO or DC but that they can be defined and measured in various ways to suit the chosen research setting. This requires that a researcher be explicit about the selected conceptualization in terms of the property type, the entity, the common and the unique themes of subdimensions, the relationship between the subdimensions, and then operationalize it accordingly. Depending on how the property type of the construct is defined, EO and DC describe actions of search, or alternatively, EO represents search preferences and DC search abilities. If actions and resources are considered to be intertwined, EO and DC form together a search routine of the firm. An example of the importance of defining the property type can be taken from Lumpkin and Dess (1996), who differentiate entrepreneurial orientation from entry and interpret EO as a mixture of preferences and actions. However, it makes sense to separate EO from entry only when it is defined as preferences. When EO is interpreted as action, it describes entry as an act of entering the market.

The search for alternative operations is the theme common to both constructs. Entrepreneurial orientation and dynamic capabilities have traditionally been associated with disruptive search but could be defined to be related to any of the other three search types. Furthermore, EO and DC could be conceptualized to represent the same or different types of search, for example, one disruptive and the other accumulative. Relatedly, it is important to consider in a given research setting what it means to have no entrepreneurial orientation or no dynamic capabilities within the firm. It might indicate that a firm is not committed to one of the four types of search, for example, disruptive search, but it could follow some of the other three; alternatively, it might indicate that a firm does not search at all, at least not purposefully. Entrepreneurial orientation best captures the different search preferences when it is interpreted to have at least five, preferably six, unique themes (see the six types of search preferences), which supports Lumpkin and Dess's (1996) view on the construct's subdimensions. Dynamic capabilities with three unique themes describe well a firm's search abilities, confirming Teece's (2007) inspection of the construct's dimensions.

The specific content of each subdimension and their relationship determines whether the construct represents one or multiple types of search. For example, Alsos and others (2008) define the subdimensions of DC so they represent disruptive search and accumulative search. However, the decision about the way they are tied together also determines the search type. Reflective dimensions would portray DC as simultaneous ambidexterity in the aforementioned example, but formative association would mean that the construct is intended to capture firms that engage in either disruptive or accumulative search or both. Similarly, it

is essential to carefully define each EO subdimension. For example, if competitive aggressiveness is identified as opportunism, it could be related to any of the four search behaviors as a formative attribute. Conversely, aggressiveness could be defined as imitation, and other incremental changes and EO as a construct would then capture, depending on the other dimensions, either accumulative search, disruptive search or both. Likewise, the way in which the proactiveness dimension is set out can have a crucial impact on the whole construct. It could be related to the level of initiative and to being the first to introduce new combinations, thus pointing towards disruptive search. Alternatively, it could be specified to refer to curiosity and the timing of search, thereafter. This relates the dimension potentially to any of the four types of search, recalling that low curiosity can be associated with any of the four searches. These examples also demonstrate the dangers of double-barreled subdimensions. If a single subdimension, such as competitive aggressiveness, is defined at the same time as opportunism and imitation, the consequences might be confusing.

The process of variation, selection and retention is one topic of evolutionary approach that has not yet been fully discussed. Evolution occurs internally within firms and externally in the market environment (Aldrich & Ruef 2006). Search behavior as described in this study is a purposeful mechanism of evolution within firms. Entrepreneurial orientation and dynamic capabilities then describe the processes of variation, selection and retention within the firm. Search preferences (EO) and search abilities (DC) determine which kind of alternative, ordinary operations a firm attempts to form, which ones it chooses and which ones it repeats. For example, search rules that favor challenge, uncertainty and curiosity, together with highly complex search abilities, could result in a large variety of new ideas, selection of the most radical ones and continuous repetition of the search.

This study contributes in two different ways to the discussion about fit in search for new operations. First, existing research recognizes orthodox and evolutionary forms of fit as two alternatives for capturing the relationship between search preferences, search abilities and search actions (e.g., Nelson & Winter 1982a). Internal fit among EO and DC was tested empirically, indicating that the relationship between the two was such that, at least with the chosen operationalizations, they were intertwined to the same search routine that had a positive association with firm performance. This supports the evolutionary fit approach between the resources and actions of search. Second, the evolutionary approach contains two alternative views, according to which firms are highly adaptive to or highly inert to external conditions (e.g., Barnett & Carroll 1995). This study identified these two views as tight and loose fit, so that tight fit describes a situation in which firm-controlled resources and the market environment are causes of variation; loose fit presents them as selective forces. The empirical testing of external fit focused on competitive intensity and technological dynamism. The re-

sults support tight fit, in which the environment is a possible cause of variation in firms' operations (and vice versa). However, at the same time circumstances in the environment accounted for only a part of the level of search behavior in firms. This could be due to some missing measures of external conditions, but it also leaves room for the interpretation that some firms are inert to external changes. Furthermore, the empirical findings did not provide confirmation of the evolutionary assumption of the environment as a selective force, so the successfulness of search would depend on the external circumstances. The results instead indicated that the joined measure of EO and DC enhanced firm performance irrespective of the conditions. An explanation for this could be that the measure reflected ambidextrous search through which firms can potentially prosper in various conditions by balancing between disruptive and accumulative search.

Moreover, this study contributes to the discussion about inert and adaptive firms by suggesting that both kinds of firms could exist in the market simultaneously at any given time, at least temporarily, depending on the firms' second-order (and higher) search resources and actions. Search is a hierarchical concept (Nelson & Winter 1982a), and this study's focus has, until now, been mostly on the first-order search of changing the ordinary operations of the firm. The second-order search is targeted at changing the way the firm searches for alternatives to its everyday operations. What was said before about how first-order search preferences and abilities determine the evolution of firms' ordinary operations can be applied to the relationship between second-order and first-order search. Higher order search preferences and abilities determine the purposeful variation, selection and retention of the lower order search. Highly adaptive firms have, arguably, such second-order search resources (preferences and abilities) that they can alter their first-order search, whereas boundedly adaptive (inert) firms have a shortage of these learning-to-learn resources. Loose and tight fit have so far been presented in this work as two alternatives forms, but now it is possible to consider them at the same time by examining different levels of search (see Figure 4[51]).

[51] It is notable that both first- and second-order search could be modeled in an orthodox way so that there are separate constructs for search abilities, preferences and action or in an evolutionary way as a search routine, but the figure captures search as a routine.

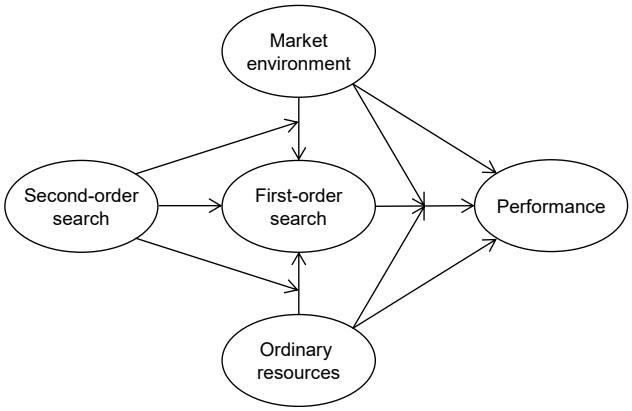

Figure 4 Hierarchical search and firm performance

Second-order search directly influences the first-order search in the model combining loose and tight fit. For example, a firm could have a second-order preference to constantly try new research and development (R&D) practices. The market environment and ordinary resources are antecedents to the first-order search, but their influence is moderated by the second-order search. The market environment and ordinary resources also moderate the relationship between the first-order search and firm performance. So, firms align their first-order search with the market environment and ordinary resources on the condition that they have second-order search resources that make them willing to and able to respond to and interact with the external conditions, otherwise they stay (longer) with their past search practices. The market environment then acts as a selective force and favors those firms that have successfully adapted their search behavior or that have been inert to changing their search but are lucky enough to have a search routine that happens to be beneficial in that particular environment. An intriguing question here is that entrepreneurial orientation and dynamic capabilities could be interpreted as hierarchical constructs. They have been treated so far as first-level search resources or actions, but it seems quite plausible that EO as a construct could be used to describe higher-order search preferences and DC higher-order search abilities. Entrepreneurial orientation would then represent a firm's preference and dynamic capabilities its ability to renew its current search resources and actions.

6.3 Suggestions for future research

Suggestions for future research stem from the theoretical, the methodological and the empirical choices that have been made throughout this study, forming both its limits and its findings. The evolutionary approach to organizational renewal and

the resource-based view were adopted in this work as theoretical lenses for examining firm performance and the role of entrepreneurial orientation and dynamic capabilities in it. The choice of another approach, for example, life cycle or dialectics (see e.g., Van de Ven & Poole 1995), would greatly enrich the research. Furthermore, within the evolutionary approach, this work has focused on firm renewal through purposeful search, so in the future it would be relevant to also investigate blind search and their interconnectedness. Search for new operations is a process that can be defined in different ways when studying changes in firms. Here, the process has referred to a category of concepts and their relationships, including preferences, abilities and actions of search, the market environment, firm-controlled ordinary resources and firm performance. Alternatively, search could be interpreted, for example, as a sequence of events depicting how organizational entities change over time that would provide new insights to the phenomenon (see e.g., Van de Ven 1992).

The study's unit of analysis has been a firm, and its focus has been on how search may influence firm performance. Organizational routines are another common subject of study in evolutionary analysis (see Aldrich & Ruef 2006). Search as a routine has also been central in this research, but the assumption has been that there is a dominant search routine within the firm at any given time. If the search routine was the major entity of analysis, the attention would be, for example, on the various search routines embodied in individuals and groups within the firm and on the processes that affect variation, selection and retention of these search routines inside the firm. This would be a viable approach in the future for studying, for example, the evolution of a mix of entrepreneurial orientation and dynamic capabilities held independently by a firm's individual members, teams or subunits.

This study has recognized the hierarchical nature of search (see Nelson & Winter 1982a) and, occasionally, the second-order search was mentioned, but the focal point has been on the first-order search to form new alternatives to the firm's present operations. Future research with more emphasis on higher-order search would reveal, for example, the mechanisms through which entrepreneurial orientation and dynamic capabilities come to exist in a firm and possibly change over time. The study drew on scholarly literature to identify various types of search but did not try to empirically test them all. It would be valuable in the future to examine whether these four types and their possible combinations actually exist in a population of firms and to assess their impact on performance in various internal and external contexts.

The study used a sample survey as a data collection method. This provides estimates about the average effects of search, especially entrepreneurial orientation and dynamic capabilities, on firm performance at the population level. However, it lacks the details and rich description of search as a firm-level phenomenon that

could inform the population level estimation. This calls for other methods in future research. The study utilized cross-sectional data, for which reason the theorized causal relationships could receive, strictly speaking, only associative confirmation. However, this does not change the fact that the statistical relations are also correlational in longitudinal research designs. The causality of the relationships always needs theoretical argumentation, as this study has done. Having said this, data collection at multiple points of time in future research could be utilized to reduce the risk of common method bias and to test the robustness of this study's results. It would also be possible using a longitudinal research design to assess the stability of the level of entrepreneurial orientation and dynamic capabilities over time, which could not be estimated here.

Different operationalizations of the EO and DC constructs in studies to come would be essential to verify, deepen or challenge this work's empirical findings. Entrepreneurial orientation was measured with a commonly used scale that contains only three dimensions; therefore, at least two theoretically relevant attributes were missing from the empirical testing. Dynamic capabilities, in turn, were measured with a scale that was in a developmental stage. The assessment of the convergent validity provided support for the instrument, but further testing is required to assess other types of validity, such as concurrent validity. Also, the DC-scale simultaneously measured two different types of search (ambidexterity), which is only one conceptual interpretation of the construct. Therefore, the development and use of other DC measures that capture only one type of search would be justified. Furthermore, the relationships between the subdimensions and the corresponding latent constructs of EO and DC were interpreted to be reflective in this research setting. However, formative interpretation would also be theoretically justifiable and would add to our understanding about the two constructs and their relationship.

The market environment was operationalized in this study so that it covered one aspect of munificence (competition) and one aspect of dynamism (technological) and not complexity. This shows that the attributes of the market environment could be measured more comprehensively in the coming studies. Ordinary resources were also not taken into the empirical analysis, although they were theorized to have an important role in a firm's search for new alternatives. Including this in the future research would be a step forward from here. Firm performance was measured here with subjective scales, so the findings' robustness could be tested with objective financial statements, either self-reported or from secondary sources. Moreover, all the relationships between the tested constructs were assumed to be linear, which could result in a loss of some information. The theory chapters discussed the possibility that high levels of entrepreneurial orientation or dynamic capabilities are not a guarantee of better performance but that a firm could, for example, engage too heavily in entrepreneurial orientation with poten-

tially adverse effects. This implies that there is possibly a "sweet spot" area of EO, for example, that would make it most effective, so staying below or above this spot would be less effective. A linear relationship would then be only an approximation, while curve estimation would provide more accurate information about the relationship.

Sample selection is an area in which different choices in future research would test the external validity of this study's empirical findings in other contexts. Sampling could include large firms (besides SMEs), various sectors (besides the three in this study), different countries (besides Finland) and different periods of economic cycle (besides recession). This study also provides suggestions for conducting the actual data collection phase in the future research. Each research setting is probably unique in one way or the other. The questionnaire, for example, may not contain original scales or items, as was the situation here, but it may still have some other unique elements, such as an atypical way of mixing items across scales or using an uncommon combination of scales and survey media, for which reason it is often advisable to conduct a proper pilot study to test the validity of the measures.

More research is also required to verify and better understand some of the empirical findings. The study could not differentiate the scales of EO and DC from each other in the sense that they loaded on the same factor that was a theoretically viable result. The operationalizations of both measures were a mixture of actions and characteristics; this provided confirmation of the conceptualized covariation model in which entrepreneurial orientation and dynamic capabilities are embedded in the same search routine. However, the constructs could be operationalized differently in the future, so that EO would be portrayed strictly as search preferences and DC as search abilities. It would then be valuable to test if the modeled orthodox relationships of tight fit (mediation) and loose fit (moderation) between entrepreneurial orientation and dynamic capabilities received support.

The market environment is, in theory, an important selective force in firms' growth and survival, but no moderating effects of the environment on the relationship between search and performance of firms were found. This could be due to the way the constructs were defined or operationalized, for example, ambidextrous search, or lack of some measures of external conditions. The market environment is also a possible cause of variation, when some firms actively adapt to external changes by searching alternatives to current operations and possibly gain performance benefits by so doing. The study's results partly supported the existence of search as a positive mediator between market dynamism and profitability, but dynamism simultaneously had a negative, direct effect on profitability, suggesting that there are possibly some other mediating mechanisms that need further elaboration in the future. Environmental hostility also had no association

with search, but it had a negative effect on firm growth, which is another area that would benefit from studies that define and measure search differently. Moreover, the unexpected positive impact of a mismatch between search and environmental dynamism was conjectured to be due to the fact that leading firms not only adapt to external conditions but also actively change them. However, further research is called for to examine this more closely.

Overall, the empirical results suggest that a fruitful future direction might be to go beyond a strict division between firms and the market environment and to examine how firms search new alternatives as members of a business ecosystem. Such an approach would make it possible to study, for example, the role of entrepreneurial orientation and dynamic capabilities in the performance of an ecosystem leader or in the performance of an entire ecosystem.

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APPENDICES

Appendix 1. Firm performance: variables and descriptive statistics

FIRM PERFORMANCE Response scale: 1 to 7; 1=Strongly disagree and 7=Strongly agree				
GROWTH				
Variable	**Item**	**N**	**Mean**	**SD**
GROWTH1	The firm has achieved rapid growth. (Zou et al. 1998; Kropp et al. 2006)	493	3.3	1.6
GROWTH2	Our sales grow faster than our competitors (Dess&Robinson 1984; Venkatraman 1989)	473	3.8	1.7
GROWTH3	Employment growth in our company is faster than among our competitors (Madsen 2007)	479	3.0	1.6
GROWTH4	Our market share grows faster than that of our competitors (Allen & Helms 2006; Venkatraman 1989)	478	3.7	1.6
PROFITABILITY				
PROFIT1	The firm is very profitable (Zou et al. 1998; Kropp et al. 2006)	491	4.4	1.7
PROFIT2	Our operating income increases faster (Allen & Helms 2006)	469	3.7	1.6
PROFIT3	Our company's assets and equity grow more rapidly (Allen & Helms 2006)	465	3.7	1.6
PROFIT4	Compared to competitors our return on investment is better (Venkatraman 1989)	444	4.0	1.7
PROFIT5	Compared to competitors our net profit is better (Venkatraman 1989)	451	4.1	1.7

Appendix 2. Entrepreneurial orientation: variables and descriptive statistics

ENTREPRENEURIAL ORIENTATION (Items from Covin & Slevin 1989 if not indicated otherwise) Response scale: 1 to 7; 1=Strongly disagree and 7=Strongly agree				
Variable	**Item**	**N**	**Mean**	**SD**
EOINN1	In general, the top managers of my firm favor a strong emphasis on R&D, technological leadership, and innovations	493	4.0	1.6
EOINN2	Our firm has introduced very many new lines of products or services	490	3.7	1.8
EOINN3	Changes in our product or service lines have usually been quite dramatic	489	3.2	1.7
EOPRO1	In general, the top managers of my firm have a strong tendency to be ahead of other competitors in introducing novel ideas or products (Lumpkin & Dess 2001)	494	5.1	1.4
EOPRO2	In dealing with its competitors, my firm typically initiates actions which competitors then respond to	483	4.1	1.6
EOPRO3	In dealing with its competitors, my firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.	491	4.1	1.7
EOPRO4	In dealing with its competitors, my firm typically seeks to avoid competitive clashes (reverse coded in the analysis)	491	3.8	1.7
EORIS1	In general, the top managers of my firm have a strong proclivity for high-risk projects with chances of very high returns compared to projects with normal and certain rates of return	490	3.4	1.6
EORIS2	In general, the top managers of my firm believe that owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives	492	3.7	1.6
EORIS3	When confronted with decision-making situations involving uncertainty, my firm typically adopts a cautious, 'wait-and-see' posture in order to minimize probability of making costly decisions as compared with a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities (reverse coded in the analysis)	491	3.6	1.5

Appendix 3. Dynamic capabilities: variables and descriptive statistics

DYNAMIC CAPABILITIES
Items from Alsos et al. 2008
Response scale: 1 to 7; 1=Strongly disagree and 7=Strongly agree

Variable	Item	N	Mean	SD
DCOBS1	We systematically search for new business concepts through observation of processes in the environment	493	4.4	1.5
DCOBS2	We systematically bring together creative and knowledgeable persons within the firm to identify new business opportunities	488	4.2	1.5
DCOBS3	We systematically benchmark the firm with the best in the industry	491	4.6	1.5
DCOBS4	We systematically identify which resources the firm can benefit from	492	4.9	1.2
DCOBS5	In our firm resources are systematically transferred to the development of new business activities	493	4.2	1.3
DCACQ1	Compared to our competitors, we cooperate more closely with our customers about innovation and R&D	481	4.2	1.5
DCACQ2	Compared to our competitors, we cooperate more closely with our suppliers about innovation and R&D	477	4.1	1.4
DCACQ3	Compared to our competitors, we search more actively for new partners for competence development	483	4.1	1.3
DCACQ4	Compared to our competitors, we cooperate more closely to universities and research institutes	469	3.1	1.5
DCACQ5	Firm networks are used as knowledge resources	493	4.8	1.4
DCACQ6	The firm exploits the personal network of the manager	493	5.4	1.4
DCACQ7	Employees' networks are important information sources for the firm	489	5.0	1.5
DCACQ8	Firm networks are used to influence actors in the environment	490	4.8	1.4
DCREN1	We seek to increase R&D investments	488	3.9	1.5
DCREN2	Firm has specific plans for R&D activity	489	4.0	1.8
DCREN3	Our management is involved in R&D processes	490	4.9	1.9
DCREN4	We are developing routines for firm R&D	486	4.1	1.7
DCREN5	Employees contribute with new product/service ideas to a larger extent than those of our competitors	471	4.3	1.4
DCREN6	Employees are more willing to adopt into new ways of working than those of our competitors	462	4.5	1.3
DCREN7	Employees are left room to exploit new opportunities as long as it does not affect current activities	485	5.3	1.2
DCREN8	Employees and managers are strongly encouraged to promote new visions, goals and ideas	489	5.4	1.3
DCREC1	The firm emphasizes to increase the level of competence among employees	491	5.7	1.2
DCREC2	The firm allocates resources to increase employees' competence	491	5.3	1.2
DCREC3	Employees are strongly stimulated to learn from their experiences	492	5.8	1.0
DCREC4	The firm has routines for systematization of employees' experiences	491	4.3	1.4
DCREC5	We know to which level firm resources can be reduced without negatively affecting our reputation	485	4.6	1.6
DCREC6	We continuously work to take out efficiency gains in the organization	492	5.6	1.2
DCREC7	We have developed routines to reconfigure our resources in new ways	489	4.7	1.4

Appendix 4. Market environment: variables and descriptive statistics

MARKET ENVIRONMENT Response scale: 1 to 7; 1=Strongly disagree and 7=Strongly agree				
COMPETITIVE INTENSITY				
Variable	**Item**	**N**	**Mean**	**SD**
COMP1	Competition in our industry is cutthroat (Jaworski & Kohli 1993)	494	5.6	1.4
COMP2	Market activities of your key competitors are very aggressive (Jaworski & Kohli 1993)	493	4.4	1.6
COMP3	Price competition is a hallmark characteristic (Jaworski & Kohli 1993)	494	5.2	1.7
COMP4	Our competitors are relatively weak compared to us (Jaworski & Kohli 1993) (reverse coded in the analysis)	494	4.6	1.7
TECHNOLOGICAL DYNAMISM				
TECH1	In our field of business the knowledge and know-how go quickly out of date (Jantunen 2005)	492	3.3	1.6
TECH2	Production and office technologies that we use change rapidly (Jaworski & Kohli 1993)	493	3.8	1.7
TECH3	Production/service technology developments in our industry are radical (Jaworski & Kohli 1993)	490	3.7	1.8
TECH4	In our field it is very difficult to predict of which technology will be the next standard for doing business (Autio et al. 2007)	490	3.5	1.6
TECH5	Technological changes provide big business opportunities in our industry. (Jaworski & Kohli 1993)	492	4.2	1.7

Appendix 5. Control variables: descriptive statistics

CONTROL VARIABLES (self-reported, objective measures)				
Variable	**Item**	**N**	**Mean**	**SD**
AGE	Age of the firm in years	494	29.2	29.4
SIZE	Number of employees in the firm	495	31.2	45.1
FOOD	Food industry (NACE Rev. 2: 10–11)	118	-	-
MEDIA	Media sector (NACE 18, 58–61)	232	-	-
MARINE	Marine cluster: shipbuilding (e.g. NACE 301, 3315), sea transport (e.g. NACE 501, 502) and cargo handling (NACE 5224) and their subcontracting sectors (furnishing, maintenance etc.)	145	-	-

Appendix 6. Covariation model of internal fit

Paths	**Model 1** Substantive variables Beta coefficient (b)	**Model 2** Control variables Beta coefficient (b)	**Model 3** Full model Beta coefficient (b)
EO→GROWTH	.868 (1.002)***		.872 (1.008)***
DC→GROWTH	-.310 (-.368)		-.337 (-.401)
EO→PROFIT	.306 (.331)		.289 (.314)
DC→PROFIT	.002 (.003)		.024 (.027)
EO↔DC	.861 (.873)***		.861 (.874)***
AGE→GROWTH		-.054 (-.002)	-.009 (.000)
SIZE→GROWTH		.228 (.006)***	.143 (.004)**
AGE→PROFIT		.101 (.004)†	.128 (.005)*
SIZE→PROFIT		.029 (.001)	.026 (-.001)
Sector (ref. MARINE):			
FOOD→GROWTH		-.001 (-.004)	.031 (.086)
MEDIA→GROWTH		.031 (.073)	.041 (.096)
FOOD→PROFIT		-.150 (-.391)**	-.132 (-.344)*
MEDIA→PROFIT		-.143 (-.318)*	-.165 (-.366)**
$\chi 2$	616.181	81.548	832.588
df	363	33	463
p-value	<.001	<.001	<.001
Scaling correction factor	1.197	1.120	1.149
CFI	.956	.971	.940
TLI	.951	.957	.933
RMSEA	.038	.055	.040
CI 90%	.032-.043	.040-.070	.036-.049
SRMR	.056	.030	.058
Free parameters	101	30	117
Log likelihood	-22472.676	-10754.840	-27845.237
n (observations)	495	493[1]	494[2]

Estimator: robust maximum likelihood (MLR); Statistical significance; † marginal (p<.1), *p<.05, **p<.01, ***p<.001

[1,2] Observations excluded from the analysis due to missing values (on a control or a dependent variable)

Appendix 7. Independence model of internal fit

Paths	**Model 1** Substantive variables Beta coefficient (b)	**Model 2** Control variables Beta coefficient (b)	**Model 3** Full model Beta coefficient (b)
EO→GROWTH	.545 (.551)***		.541 (.546)***
DC→GROWTH	.153 (.199)*		.138 (.181)*
EO→PROFIT	.162 (.155)†		.168 (.162)†
DC→PROFIT	.201 (.250)*		.209 (.261)**
EO↔DC	fixed (0)		fixed (0)
AGE→GROWTH		-.054 (-.002)	-.001 (.000)
SIZE→GROWTH		.228 (.006)***	.128 (.003)**
AGE→PROFIT		.101 (.004)†	.128 (.005)*
SIZE→PROFIT		.029 (.001)	-.031 (-.001)
Sector (ref. MARINE):			
FOOD→GROWTH		-.001 (-.004)	.008 (.022)
MEDIA→GROWTH		.031 (.073)	-.017 (-.039)
FOOD→PROFIT		-.150 (-.391)**	-.137 (-.352)**
MEDIA→PROFIT		-.143 (-.318)*	-.192 (-.421)***
$\chi 2$	805.199	81.548	1027.114
df	364	33	464
p-value	<.001	<.001	<.001
Scaling correction factor	1.197	1.120	1.149
CFI	.924	.971	.909
TLI	.915	.957	.898
RMSEA	.049	.055	.050
CI 90%	.045-.054	.040-.070	.045-.054
SRMR	.137	.030	.125
Free parameters	100	30	116
Log likelihood	-22585.809	-10754.840	-27957.036
n (observations)	495	493[1]	494[2]

Estimator: MLR; Statistical significance; † marginal (p<.1), *p<.05, **p<.01, ***p<0.001

[1,2] Observations excluded from the analysis due to missing values (on a control or a dependent variable)

Appendix 8. Mediation (EO-mediator) model of internal fit

Paths	**Model 1** Substantive variables Beta coefficient (b)	**Model 2** Control variables Beta coefficient (b)	**Model 3** Full model Beta coefficient (b)
EO→GROWTH	.567 (.651)***		.555 (.642)***
DC→GROWTH	fixed (0)		fixed (0)
EO→PROFIT	.312 (.336)***		.317 (.344)***
DC→PROFIT	fixed (0)		fixed (0)
DC→EO	.839 (.870)***		.834 (.859)***
Indirect effects			
DC→EO→GROWTH	.476 (.566)***.		.463 (.551)***
CI 95%	.392-.560 (.432-.700)		.381-.545 (.420-.682)
DC→EO→PROFIT	.262 (.292)***		.264 (.295)***
CI 95%	.162-.362 (.176-.409)		.163-.365 (.178-.413)
AGE→GROWTH		-.054 (-.002)	-.014 (-.001)
SIZE→GROWTH		.228 (.006)***	.135 (.004)**
AGE→PROFIT		.101 (.004)†	.125 (.005)*
SIZE→PROFIT		.029 (.001)	-.025 (-.001)
Sector (ref. MARINE):			
FOOD→GROWTH		-.001 (-.004)	.030 (.082)
MEDIA→GROWTH		.031 (.073)	-.024 (-.056)
FOOD→PROFIT		-.150 (-.391)**	-.133 (-.345)*
MEDIA→PROFIT		-.143 (-.318)*	-.175 (-.388)**
$\chi 2$	619.789	81.548	841.544
df	365	33	469
p-value	<.001	<.001	<.001
Scaling correction factor	1.197	1.120	1.148
CFI	.956	.971	.940
TLI	.951	.957	.933
RMSEA	.038	.055	.040
CI 90%	.032-.043	.040-.070	.036-.044
SRMR	.056	.030	.058
Free parameters	99	30	111
Log likelihood	-22474.797	-10754.840	-27850.162
n (observations)	495	493[1]	494[2]

Estimator: MLR; Statistical significance: † marginal (p<.1), *p<.05, **p<.01, ***p<0.001;
Bootstrapped (500 iterations; ML estimator) 95% confidence intervals;
[1,2] Observations excluded from the analysis due to missing values (on a control or a dependent variable)

Appendix 9. Mediation (DC-mediator) model of internal fit

Paths	**Model 1** Substantive variables Beta coefficient (b)	**Model 2** Control variables Beta coefficient (b)	**Model 3** Full model Beta coefficient (b)
EO→GROWTH	fixed (0)		fixed (0)
DC→GROWTH	.508 (.613)***		.497 (.602)***
EO→PROFIT	fixed (0)		fixed (0)
DC→PROFIT	.295 (.334)***		.302 (.344)***
EO→DC	.896 (.876)***		.907 (.904)***
Indirect effects			
EO→DC→GROWTH	.455 (.537)***.		.451 (.544)***
CI 95%	.350-.561 (.378-.695)		.346-.556 (.379-.708)
EO→DC→PROFIT	.264 (.293)***		.274 (.311)***
CI 95%	.162-.366 (.171-.414)		.168-.381 (.178-.445)
AGE→GROWTH		-.054 (-.002)	-.017 (-.001)
SIZE→GROWTH		.228 (.006)***	.135 (.004)**
AGE→PROFIT		.101 (.004)†	.124 (.005)*
SIZE→PROFIT		.029 (.001)	-.028 (-.001)
Sector (ref. MARINE):			
FOOD→GROWTH		-.001 (-.004)	.026 (.071)
MEDIA→GROWTH		.031 (.073)	-.036 (-.085)
FOOD→PROFIT		-.150 (-.391)**	-.134 (-.348)*
MEDIA→PROFIT		-.143 (-.318)*	-.184 (-.408)**
$\chi 2$	639.750	81.548	866.280
df	365	33	469
p-value	<.001	<.001	<.001
Scaling correction factor	1.197	1.120	1.149
CFI	.953	.971	.936
TLI	.947	.957	.929
RMSEA	.039	.055	.041
CI 90%	.034-.044	.040-.070	.037-.046
SRMR	.060	.030	.062
Free parameters	99	30	111
Log likelihood	-22486.890	-10754.840	-27864.809
n (observations)	495	493[1]	494[2]

Estimator: MLR; Statistical significance: † marginal (p<.1), *p<.05, **p<.01, ***p<0.001;
Bootstrapped (500 iterations; ML estimator) 95% confidence intervals;
[1,2] Observations (2 or 1, respectively) excluded due to missing values (on a control or a dependent variable)

Appendix 10. Moderation model of internal fit

Paths	**Model 1** Main effects Beta coefficient (b)	**Model 2** Interaction effects Beta coefficient (b)	**Model 3** Control variables Beta coefficient (b)	**Model 4** Full model Beta coefficient (b)
EO→GROWTH	(1.005)***	(1.020)***		(1.010)***
DC→GROWTH	(-.370)	(-.377)		(-.388)
EO→PROFIT	(.331)	(.320)		(.300)
DC→PROFIT	(.03)	(.010)		(.040)
EO↔DC	(.873)***	(.871)***		(.874)***
EO*DC→GROWTH	fixed (0)	(.042)		(.055)
EO*DC→PROFIT	fixed (0)	(-.049)		(-.019)
AGE→GROWTH			-.054 (-.002)	(-.001)
SIZE→GROWTH			.228 (.006)***	(.004)**
AGE→PROFIT			.101 (.004)†	(.005)*
SIZE→PROFIT			.029 (.001)	(.000)
Sector (ref.MARINE):				
FOOD→GROWTH			-.001 (-.004)	(.051)
MEDIA→GROWTH			.031 (.073)	(-.034)
FOOD→PROFIT			-.150 (-.391)**	(-.349)*
MEDIA→PROFIT			-.143 (-.318)*	(-.378)**
AIC	45147.352	45148.235		45046.286
Free parameters (nfree)	101	103		111
Log likelihood (logl)	-22472.676	-22471.117		-22412.143
Scaling correction factor	1.239	1.232		1.217
Model comparison				
-2Δlogl (adjusted)	null model	3.549		
Δnfree	null model	2		
p-value	null model	.170		
n (observations)	495	495	493[1]	494[2]

Estimator: MLR; Statistical significance; † marginal (p<.1), *p<.05, **p<.01, ***p<0.001

Tests of model fit and coefficients: Chi-Square test, fit indices and standardized estimates not available for latent variable interaction models (see Klein 2011);

Model comparison: Chi-square difference test using loglikelihood values for MLR estimator (see Muthén 2015)

[1,2] Observations (two or one, respectively) excluded due to missing values (on a control or a dependent variable)

Appendix 11. The two-factor measurement model of EO-DC relationship

Construct	Item	Stand. loading estimate	Fit statistics		Construct validity						
EOINN	EOINN2	.821***	Chi^2=345.796		CR	Discriminant validity					
	EOINN3	.751***	df=200			1.	2.	3.	4.	5.	6.
EOPRO	EOPRO1	.799***	p<.001	1.EOINN	.764	*.619*					
	EOPRO2	.557***	CFI=.962	2.EOPRO	.766	.331	*.528*				
	EOPRO3	.798***	TLI=.956	3.EORIS	.759	.146	.267	*.613*			
EORIS	EORIS1	.722***	RMSEA=.038	4.DCOBS	.783	.256	.469	.207	*.479*		
	EORIS2	.839***	(90 % C.I.	5.DCACQ	.833	.125	.228	.101	.329	*.556*	
DCOBS	DCOBS1	.753***	.031–.045)	6.DCREN	.872	.160	.293	.129	.423	.206	*.631*
	DCOBS2	.719***	SRMR=.055	7. DCREC	.883	.094	.171	.076	.248	.120	.154
	DCOBS5	.749***		8. EO	.756	.425	.778	.343	.604	.294	.377
	DCOBS3	.520***		9. DC	.801	.311	.570	.252	.823	.401	.514
DCACQ	DCACQ5	.747***									
	DCACQ6	.748***				7.	8.	9.			
	DCACQ7	.724***		7.DCREC		*.717*					
	DCACQ8	.762***		8.EO		.221	*.515*				
DCREN	DCREN1	.767***		9.DC		.301	.733	*.510*			
	DCREN2	.846***									
	DCREN3	.721***				Off-diagonal: squared correlations					
	DCREN4	.837***				Along diagonal (italic): AVE-values					
DCREC	DCREC1	.916***									
	DCREC2	.850***									
	DCREC3	.768***									
EO	EOINN	.652***									
	EOPRO	.882***									
	EORIS	.586***									
DC	DCOBS	.907***									
	DCACQ	.633***									
	DCREN	.717***									
	DCREC	.549***									

Estimator: MLR; EOINN: innovativeness, EOPRO: proactiveness, EORIS: risk-taking, DCOBS: observation, DCACQ: acquisition, DCREN: renewal, DCREC: reconfiguration, EO: entrepreneurial orientation, DC: dynamic capabilities; Statistical significance: *p<.05, **p<.01, ***p<.001; Number of observations: 495

Appendix 12. The one-factor measurement model of EO-DC relationship

Construct	Item	Std loading estimate	Fit statistics		Construct validity						
EOINN	EOINN2	.825***	Chi^2=362.874		CR	Discriminant validity					
	EOINN3	.748***	df=201			1.	2.	3.	4.	5.	6.
EOPRO	EOPRO1	.804***	p<.001	1.EOINN	.765	*.620*					
	EOPRO2	.558***	CFI=.958	2.EOPRO	.766	.233	*.528*				
	EOPRO3	.792***	TLI=.952	3.EORIS	.759	.110	.201	*.613*			
EORIS	EORIS1	.721***	RMSEA=.040	4.DCOBS	.783	.288	.529	.248	*.479*		
	EORIS2	.840***	(90% CI	5.DCACQ	.833	.129	.236	.111	.293	*.556*	
DCOBS	DCOBS1	.754***	.034–.047)	6.DCREN	.872	.179	.327	.154	.404	.181	*.632*
	DCOBS2	.715***	SRMR=.060	7. DCREC	.883	.098	.179	.084	.222	.099	.137
	DCOBS5	.756***		8. EODC	.855	.356	.653	.307	.810	.361	.501
	DCOBS3	.514***									
DCACQ	DCACQ5	.747***									
	DCACQ6	.748***				7.	8.				
	DCACQ7	.724***		7.DCREC		*.716*					
	DCACQ8	.762***		8.EODC		.274	*.466*				
DCREN	DCREN1	.767***									
	DCREN2	.847***				Off-diagonal: squared correlations					
	DCREN3	.721***				Along diagonal (italic): AVE-values					
	DCREN4	.837***									
DCREC	DCREC1	.917***									
	DCREC2	.848***									
	DCREC3	.767***									
EODC	EOINN	.597***									
	EOPRO	.808***									
	EORIS	.554***									
	DCOBS	.900***									
	DCACQ	.601***									
	DCREN	.708***									
	DCREC	.523***									

Estimator: MLR; EOINN: innovativeness, EOPRO: proactiveness, EORIS: risk-taking, DCOBS: observation, DCACQ: acquisition, DCREN: renewal, DCREC: reconfiguration, EO: entrepreneurial orientation, DC: dynamic capabilities; Statistical significance: *p<.05, **p<.01, ***p<.001; Number of observations: 495

Appendix 13. Results of independent effects model of external fit

	Model 1		**Model 2**		**Model 3**		**Model 4**	
Model	Growth	Profit	Growth	Profit	Growth	Profit	Growth	Profit
Main effects								
EODC	.523***	.295***	.546***	.340***			.523***	.339***
	(.650***)	(.344***)	(.687***)	(.401***)			(.662***)	(.403***)
COMP			-.117*	-.042			-.127**	-.056
			(-.127*)	(-.043)			(-.140*)	(-.058)
TECH			-.055	-.126*			-.015	-.116†
			(-.063)	(-.136*)			(-.017)	(-.127)
Controls								
AGE					(-.002)	(.004)	-.003	.134*
							(.000)	(.005*)
SIZE					(.006***)	(.001)	.119*	-.044
							(.003*)	(-.001)
Sector(ref.MARINE)								
FOOD					(-.004)	(-.391**)	.019	-.143**
							(.053)	(-.377**)
MEDIA					(.073)	(-.318*)	-.039	-.137*
							(-.093)	(-.308*)
Model fit indices								
χ2	649.165		1067.883		81.548		1328.404	
df	366		613		33		741	
p-value	<.001		<.001		<.001		<.001	
CFI	.951		.938		.971		.924	
TLI	.946		.932		.957		.917	
RMSEA	.040		.039		.055		.040	
CI 90%	.035-.044		.035-.043		.040-.070		.037-.044	
SRMR	.061		.092		.030		.088	
Log likelihood	-		-		-		-	
	22492.812		29353.428		10754.840		34656.663	
Free parameters	98		127		30		147	
n (observations)	495		495		493		494	

Estimator: MLR; Unstandardized path estimates in parenthesis; Significance levels: †marginal (p<.1), *p<.05, **p<.01, ***p<.001

Appendix 14. The results of the mediation model of external fit

Paths	**Model 1** Estimate	95% CI	**Model 2** Estimate	**Model 3** Estimate	95% CI
Independent to mediator					
COMP→EODC	.033 (.029)	(-.078-.136)		.039 (.034)	(-.080-.149)
TECH→EODC	.413 (.370)***	(.258-.482)		.400(.362)***)	(.251-.473)
Mediator to dependent					
EODC→GROWTH	.578 (.719)***	(.534-.905)		.551 (.682)***	(.508-.856)
EODC→PROFIT	.363 (.423)***	(.263-.584)		.358 (.420)***	(.254-.585)
Indirect effects					
COMP→EODC→GROWTH	.019	-.053-.092		.019	-.049-.092
	(.021)	(-.058-.100)		(.021)	(-.055-.102)
COMP→EODC→PROFIT	.012	-.033-.058		.012	-.033-.061
	(.012)	(-.034-.059)		(.012)	(-.035-.063)
TECH→EODC→GROWTH	.238***	.148-.329		.238***	.139-.302
	(.266***)	(.161-.372)		(.266***)	(.152-.342)
TECH→EODC→PROFIT	.150***	.079-.220		.150***	.075-.211
	(.157***)	(.084-.230)		(.157***)	(.081-.222)
Direct effects					
COMP→GROWTH	-.123 (-.132)*	(-.246-(-.018))		-.136(-.147)***	(-.264-(-.031))
COMP→PROFIT	-.046 (-.046)	(-.158-.065)		-.061 (-.063)	(-.177-.051)
TECH→GROWTH	-.104 (-.116)	(-.262-.029)		-.054 (-.061)	(-.232-.110)
TECH→PROFIT	-.159 (-.166)*	(-.303-(-.029))		-.144 (-.153)†	(-.306-.000)
Controls					
AGE→GROWTH			-.054 (-.002)	.002 (.000)	(-.004-.003)
AGE→PROFIT			.101 (.004)†	.137 (.005)*	(.001-.009)
SIZE→GROWTH			.228 (.006)***	.118 (.004)*	(.001-.006)
SIZE→PROFIT			.029 (.001)	-.045 (-.001)	(-.003-.002)
Sector (ref. MARINE):					
FOOD→GROWTH			-.001 (-.004)	.018 (.049)	(-.220-.319)
FOOD→PROFIT			-.150 (-.391)**	-.146 (-.380)**	(-.645-(-.114))
MEDIA→GROWTH			.031 (.073)	-.037 (-.100)	(-.376-.177)
MEDIA→PROFIT			-.143 (-.318)*	-.138 (-.314)*	(-.598-(-.030))
Model fit indices					
$\chi 2$	1010.837		81.548	1288.123	
df	611		33	743	
p-value	<.001		<.001	<.001	
CFI	.945		.971	.930	
TLI	.940		.957	.923	
RMSEA	.036		.055	.039	
CI 90%	.032-.040		.040-.070	.035-.042	
SRMR	.060		.030	.062	
Log likelihood	-29320.350		-10754.840	-34633.482	
Free parameters	129		30	145	
n (observations)	495		493	494	

Estimator: MLR (ML-estimator for bootstrapped 95% confidence intervals with 500 iterations; CI: upper and lower 2.5% of the values; see Muthén & Muthén 2012); Unstandardized estimates (coefficient b) in parenthesis; Significance levels: †marginal (p<.1), *p<.05, **p<.01, ***p<.001

Appendix 15. The results of the moderation effects model of external fit

	Multiple moderators				**Control variables**					
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**	
Model	Growth	Profit	Growth	Profit	Growth	Profit	Growth	Profit	Growth	Profit
Main effects										
EODC	(.721***)	(.424***)	(.720***)	(.426***)			.550*** (.690***)	.362*** (.425***)	(.680***)	(.419***)
COMP	(-.132*)	(-.046)	(-.132*)	(-.049)			-.132** (-.145*)	-.060 (-.061)	(-.146*)	(-.067)
TECH	(-.117)	(-.167*)	(-.115)	(-.164*)			-.061 (-.069)	-.149* (-.159†)	(-.062)	(-.142†)
Interactions										
[EODC*COMP]	fixed (0)	fixed (0)	(-.016)	(-.048)					(-.034)	(-.048)
[EODC*TECH]	fixed (0)	fixed (0)	(-.010)	(-.039)					(-.002)	(-.022)
Controls										
AGE					-.054 (-.002)	.101† (.004†)	-.002 (-.000)	.137* (.005*)	(-.001)	(.005*)
SIZE					.228*** (.006***)	.029 (.001)	.118* (.003*)	-.045 (-.001)	(.004**)	(-.001)
Sector (ref.MARINE):										
FOOD					-.001 (-.004)	-.150** (-.391**)	.018 (.050)	-.146** (-.379**)	(.055	(-.367**)
MEDIA					.031 (.073)	-.143* (-.318*)	-.037 (-.088)	-.138* (-.306*)	(-.091)	(-.336*)
Model fit indices										
$\chi 2$					81.548		1271.692			
df					33		739			
p-value					<.001		<.001			
CFI					.971		.931			
TLI					.957		.924			
RMSEA					.055		.038			
CI 90%					.040-.070		.035-.042			
SRMR					.030		.060			
Log likelihood	-29320.351		-29319.653		-10754.840		-34624.629		-29249.149	
Scaling correction factor	1.205		1.207							
Free parameters	129		133		30		149		141	
Model comparison										
-2ΔLog likelihood	(null model)		1.098							
ΔFree parameters	(null model)		4						8	
p-value	(null model)		.8946						<.001	
n (observations)	495		495		493		494		494	

Analysis type: random effects; Estimator: MLR; Significance level: † marginal (p<.1), *p<.05, **p<.01, ***p<.001; Goodness-of-fit statistics or standardized estimates (coefficient β) not available for latent variable interaction models (see Klein 2011); Likelihood ratio test for MLR estimator (see Muthén 2015)

Appendix 16. Results of matching effects model: opportunity search[1], market environment and firm performance

Model	**Model 1** Growth	Profit	**Model 2** Growth	Profit	**Model 3** Growth	Profit	**Model 4** Growth	Profit	**Model 5** Growth	Profit
Main effects										
EODC	.573***	.363***	.582***	.363***	.588***	.358***	.590***	.359***	.563***	.359***
	(.716***)	(.426***)	(.730***)	(.427***)	(.736***)	(.420***)	(.739***)	(.423***)	(.711***)	(.425***)
COMP	-.122*	-.050	-.152**	-.050	-.127*	-.049	-.140*	-.057	-.150**	-.072
	(-.124*)	(-.048)	(-.155**)	(-.048)	(-.130*)	(-.047)	(-.143*)	(-.054)	(-.157**)	(-.070)
TECH	-.103	-.158*	-.111†	-.158*	-.102	-.158*	-.106†	-.160*	-.064	-.151*
	(-.115)	(-.166*)	(-.124†)	(-.165*)	(-.114)	(-.165*)	(-.119†)	(-.168*)	(-.072)	(-.161†)
Matching effects										
[EODC-COMP]	fixed (0)	fixed (0)	.082†	-.002	fixed (0)	fixed (0)	.037	.023	.041	.034
			(.131†)	(-.003)			(.059)	(.034)	(.066)	(.052)
[EODC-TECH]	fixed (0)	fixed (0)	fixed (0)	fixed (0)	.111*	-.043	.095†	-.053	.090†	-.048
					(.202*)	(-.074)	(.174†)	(-.090)	(.166†)	(-.082)
Controls										
AGE									.009	.136*
									(.000)	(.005*)
SIZE									.110*	-.044
									(.003*)	(-.001)
Sector(ref.MARINE)										
FOOD									.017	-.145**
									(.046)	(-.376**)
MEDIA									-.041	-.139*
									(-.097)	(-.308*)
Model fit indices										
$\chi 2$	1149.129		1144.818		1137.975		1136.951		1397.505	
df	679		677		677		675		803	
p-value	<.001		<.001		<.001		<.001		<.001	
CFI	.937		.937		.938		.938		.925	
TLI	.932		.932		.933		.932		.917	
RMSEA	.037		.037		.037		.037		.039	
CI 90%	.034-.041		.034-.041		.033-.041		.033-.041		.035-.042	
SRMR	.059		.059		.059		.059		.059	
Log likelihood	-30279.019		-30276.900		-30272.822		-30272.551		-35573.898	
Scaling corr. factor	1.219		1.215		1.217		1.213		1.187	
Free parameters	135		137		137		139		159	
Model comparison										
-2ΔLog likelihood	(null model)		4.485		11.455		12.802			
ΔFree parameters	(null model)		2		2		4			
p-value	(null model)		.1062		.0033		.0123			
n (observations)	495		495		495		495		494	

[1] One LV reflects EO and DC.

Analysis type: general; Estimator: MLR; Significance levels: †marginal (p<.1), *p<.05, **p<.01, ***p<.001; Unstandardized estimates (coefficient b) in parenthesis; Likelihood ratio test for MLR estimator (see Muthén 2015)

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