# Strategic orientation and innovation performance at Dutch manufacturing SME's:

## The overrated role of Market Orientation and Entrepreneurial Orientation

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## Preface

This thesis started with a vacancy on the website of Van der Meer & Van Tilburg. They wanted to research whether or not the insights of an article of Hamel & Prahalad could be beneficial for them as a company and for their clients, especially with regard to innovation output. The article, published in 1993, proposed that strategy must be stretched with ambition to stay ahead of competitors and resources must be leveraged to obtain enough capital to pursue the new strategic direction.

From the start this was a difficult to research subject. Researching articles before and after 1993 with regard to strategy and its effect on innovation performance provided no clear literature stream discussing “stretch” and “leverage”. Therefore, the focus of the thesis was on elements of strategic orientations that influence the innovation output. Although many orientations are proposed in the literature, four general orientations are recognized. One of the four is resource orientation. This strategic orientation builds on the basic theory of the Resource Based View. Many (recent) articles do not incorporate the RBV anymore when researching innovation performance. This process took several months and more than 150 articles before I gained these insights. It was clear that this thesis would take longer than anticipated because luck was not on my side from the beginning. After writing the theoretical framework, the quantitative part had to be executed. I selected a professional online tool that could send invitations for an online survey, collect the data and generate reports. After sending the first email, I received a disappointing result of 75 responses. When accessing the data, the online tool had not properly stored the data of all responses. Finding, programming and sending a new invitation and an apology to the old ones to fill in the missing gaps took 4 extra weeks of time. The new online tool also had a programming error. When programmed for sending the reminder it send 8 invitations to every contact. This induced a lot of negative reactions and no cooperation for this study. The new invitation, the old one and a reminder provided 113 responses of which only 100 where usable for this study. Anticipated were around 387 responses. A quite disappointing result for all the efforts put in and the amount of setbacks. Because more responses where anticipated, a cluster analysis was not possible. Too small clusters and no significant patterns resulted in excluding the entire cluster analysis, its practical preparations and the composed text for the thesis. Further, the analysis of the data was executed on the first and second order level of the constructs of interest used for this study. However, using first-order constructs provided no extra and even contradictory results. Therefore all calculations on the first order level are left out the study although a lot of effort was put into them. The last setback was created when multicollinearity was discovered when adding a dummy variable to the data to test for curvilinear effects with a polynomial model. Researching this phenomenon took also extra time. In December the report was almost finished. Because the results are interesting and could be published, it was decided to include a first draft of a paper in this thesis. However, personal issues, applying for a job and an opportunity to start with a traineeship on the very short term resulted in a decreased motivation to work on the thesis.

Besides all this, I am grateful that I got the opportunity to have an internship at Van der Meer & Van Tilburg, who supported me and provided me with a lot of freedom for executing this thesis. I want to thank Gosse for his guidance and patience, Arjan for his motivational speeches, Marloes for her pleasant company as a roommate and Ade for taking care of me and inviting me into her home. I really enjoyed the Friday get-togethers. I wish all the members of Van der Meer & Van Tilburg the best for the future and I hope that my research provided some insights that are to be used in future projects. Last but not least I want to thank Kasia and Jeroen for their guidance from the university. I do not know if I will pursue with writing an article because I am very busy at the moment with my new job, but I keep it in mind. Hopefully I delivered a thesis that is worth discussing without the article.

Roy Reulink, April 2012

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## Managerial summary

This study researched differences in strategic orientations at small and medium sized enterprises in the Netherlands and the effect of strategic orientations on innovation performance. Research on strategic orientations and its effect on innovation performance provide four general orientations: resource orientation (RO), market orientation (MO), entrepreneurial orientation (EO) and learning orientation (LO).

Data is collected using questionnaires to identify strategic orientation characteristics and innovation performance at manufacturing SME's in the Netherlands. After excluding companies with less than 10 or more than 250 fulltime employees and companies younger than three years, exactly 100 "clean" cases remained. Regression analysis provides evidence that the four strategic orientations are best represented in a moderating model where MO and RO lead to innovation performance and EO and LO are moderating this relationship. The results show that RO leads to radical innovation where it develops a unique resource base and searches the environment for channels to exploit. Developing, accumulating and deploying a unique resource base will enable a company to provide (potential) customers with a qualitative, total new and valuable product based on their latent needs (not on their current needs). Uniqueness of the resource base, dynamism effects of unique resources on the organization and synergy effects of the resources are maximizing the potential to create competitive advantage. MO leads to incremental innovations where it gathers information about customer needs, competitors and transfers this information throughout the organization to fully exploit it. Based on this information, existing products are improved on the short term to stay ahead of competitors. The conclusion of the theoretical framework argued that always a combination (balance) of RO and MO exists for both radical and incremental innovation. However, the regression analysis indicates that no combination of balance exists. RO only leads to radical innovation and MO only leads to incremental innovation.

For developing radical innovations, moderator entrepreneurial orientation has no effect on the resource orientation relationship with radical innovation performance. EO refers to the behavioral processes essential for entering new or established markets with new or existing goods or services, particularly in dynamic competitive environments. Entrepreneurial organizations are better able to match their internal organization by changing and shaping the environment and allocate resources to exploit uncertain business opportunities. The three dimensions of EO are: risk taking, proactiveness, and autonomy. The effect of EO on MO and incremental innovations is on the other hand remarkable. Where MO leads to incremental innovations when EO is low, no relation exists when EO is high. With regard to moderator LO, the results show that companies with low LO are most likely to develop incremental innovations through MO. High LO, tantamount to generative (or double loop) learning, is most beneficial for the development of radical innovations through RO. LO refers to the ability of an organization to develop new knowledge or insights that have the potential of influencing (strategic) behavior. LO has two dimensions: commitment to learning and shared vision. Two learning modes can be recognized; Adaptive learning (single loop) refers to detect and correct errors within the boundaries of the organization where generative learning (double loop) refers to detecting and correcting errors and questioning the boundaries of the organizations implying that organizational members are willing to question long-held assumptions about its mission, customers, markets, products or technologies (out-of-the-box thinking).

One must recognize that the development of radical and incremental innovations cannot be implemented within the same processes. The challenge, for smaller SME's in particular, is to manage both processes sequentially or simultaneously. This requires different internal characteristics, strategic orientations and external environment. SME's must therefore have dynamic capabilities (the ability to integrate, build, and reconfigure internal and external competencies to address rapidly-changing environments). It represents organizational and strategic routines by which

organizations identify and deploy new resource combinations (bundles) as markets emerge, collide, split, evolve, and die and market opportunities shift. Managers should be able to sense and shape opportunities and threats, seize market opportunities and maintain competitiveness by reconfiguring, obtaining, protecting and bundling the company resources

Unsuccessful companies could have problems aligning their internal organization with the strategy and the external environment when internal or external conditions change. Ideally, separate business units must be set up, but at SME's the ability to create separate business units is not always possible. Therefore, managers and CEO's of SME's must consider ambidexterity in their product development processes and day-to-day routines. Simultaneously or sequentially managing the two contradictory processes requires companies to be ambidextrous. This study provides evidence that ambidexterity is needed at SME's also, not only at larger companies. However, SME's with fewer resources than large multinationals are mostly not able to incorporate two different alignments within their organization at the same time. Therefore, managers or employees themselves need to be ambidextrous, the organizational structure must support clear and qualitative communication about goals, vision and mission for both exploitative and explorative activities. The opportunity to exercise social contacts, recognition and teambuilding facilitate the needed culture. Furthermore, ambidextrous individuals have to transfer knowledge top down and horizontal throughout the organization and need decision making authority to act effectively.

With regard to financing the development of radical innovations with turnover from existing products, resource leveraging is important to consider. Resources can be "leveraged" to reduce the gap between market opportunities and existing resources. Resource leveraging is an alternative for downsizing in disengaging resources for new strategic objectives. Resource leveraging seeks to get the most out of the existing resources by concentrating them more effectively on key strategic goals; by accumulating them more efficiently, by complementing one kind of resource with another to create higher order value; by conserving resources wherever possible; and by recovering them from the marketplace in het shortest possible time. Reflecting on the article of Hamel & Prahalad (1993) about "Strategy as stretch and leverage", the following can be concluded. Focus on internal capabilities and resources (RO) and organizational learning (LO) lead to the development of radical innovations with an inside-out approach. However, its success does not depend on the degree of LO, but it does contribute to the success. The results show that with LO the radical innovation performance is slightly higher. Vision and commitment (to learning) give an additional boost that maybe provides companies with more lucrative new opportunities. One would expect that with "ambition" also entrepreneurial elements (EO) are visible like proactiveness and risk taking. The results of this study do not support this expectation. This does however fits the theory of strategic intent. With shared intent, companies must set a long term plan but also control for incremental step in between. These incremental adjustments reduce the degree of risk and proactiveness.

This study finds that resource orientation is important for developing radical innovations, market orientation is only important for developing incremental innovations, the role of entrepreneurial behavior is highly overrated for radical innovation development and even hampers the development of incremental innovations and organizational learning contributes to the development of radical innovations, but also hampers the development of incremental innovations. Reflecting on the present literature on strategic orientations and their effect on innovation performance one can only conclude that the role of market orientation and entrepreneurial orientation is highly overrated and researchers must separate incremental and radical innovation performance to see these dynamics. Research must not continue to invent concepts around market orientation and entrepreneurial behavior to explain radical innovation development (for example "proactive MO"), but should focus on building further on and testing the focus on resources and internal capabilities as the driver of developing new products, new services, new methods of production, new markets, new sources of supply and new ways of organizing.

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# 1. Introduction

This first chapter will provide an explanation on the general purpose of the thesis, which is focused on the relation between strategic orientation and innovation performance at established small and medium sized enterprises (hereafter, established SME's). The thesis is written for Van der Meer & Van Tilburg. The aim of this thesis is to gain insights in the effect of strategic orientations on innovation performance at established SME's in the Netherlands. This first section discusses the background literature, research goal, question, framework and strategy.

## 1.1 Background information

This thesis starts with the initial question of Van der Meer & van Tilburg what SME's can learn from the article of Hamel & Prahalad (1993) about "strategy as stretch and leverage. This article is about "strategic intent" as opposite to "strategic planning". Strategic planning primarily focuses on today's problems and attaining a strategic fit between resources and aspirations. For achieving sustained competitive advantage, companies must create an internal alignment between organizational features (goals, values, resources, capabilities, structure and systems) and create a fit between the internal organizational and its external environment (Chen & Liang, 2011; Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). This alignment is called "strategic fit". Strategy consists of three elements: the concept of fit (the alignment between the companies' internal organization and its environment), the allocation of resources among competing opportunities and a long-term commitment.

Hamel & Prahalad argued that building on a strong resource base and pursuing market opportunities that comply with the companies' resources, is not wrong, but it neglects the approach of "stretch" in which a gap is created between resources and ambitions. This strategic intent is future-oriented and outside the range of planning. It creates a misfit between resources and current opportunities. Hamel & Prahalad argue that without ambition, long term commitment and vision (stretch) companies are not able to defeat competitors. This concept bridges the gap between strategy as a grand plan thought by great minds and strategy as no more than a pattern in a stream of incremental decisions. Since top management has a clear view of the goal line and clears the path meter by meter, strategy as stretch is both designed and incremental. An organization has to learn to concentrate, accumulate, complement conserve and recover resources if it is to achieve its stretch goals. In the long run, a strategic intent can be converted into market dominance only by creating new markets and developing radical innovations. Leadership cannot be planned for, but neither can it happen without a grand and a well-considered aspiration (Hamel & Prahalad, 1993). Hamel & Prahalad argue that strategic intent creates a gap between an organization's existing resources and competencies and its aspirations. This causes the "stretch" concept to take over. The greater the stretch, the better the company is able to gear itself for the future. However, this theory is applied to large multinational companies. The question is whether this theory is also applicable for SME's in the Netherlands. Furthermore, SME's do not often have strategic planners, a management team or clear long term strategy. To find out whether companies applying stretch strategies are more successful at developing radical innovation than companies that apply a fit strategy, the focus must be on organizational characteristics with regard to strategy. These characteristics are well researched as "strategic orientations". This literature stream provides concepts and evidence for different strategic orientations that have different effects on incremental and radical innovation development.

In the article of Hamel & Prahalad some characteristics can be recognized. Long term commitment to a vision (stretch ambition) requires a company to take risk and be proactive. Also a focus on resource leveraging is needed for stretch and organizational learning for a company to develop radical innovations out of a unique resource base. Initial research of this thesis provides four general strategic orientations which cover most of the research about strategic orientations and also should

provide the insights required to assess the theory of Hamel & Prahalad. Every SME has a different way of looking at the environment and linking their organization with the environment. The focus of this thesis will be on the four strategic orientations and their effect on innovation performance.

New product development (and thus innovation) is of high importance for SME's if they want to survive and grow (Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). With regard to innovation outcomes, the distinction must be made between product innovation and process innovation. Products innovations are improved of total new products that incorporate a new technology which enhances the customer value, while process innovations refer to improvements or total new ways of organizing, developing and manufacturing of products. Widely accepted is also the distinction between radical and incremental innovation. Radical innovations are innovations that embody a new technology that results in a new market infrastructure. Incremental innovations are products that provide new features, benefits, or improvements to the existing technology in the existing market (Garcia & Calantone, 2002, p. 123). Differences in strategic orientation of an organization lead to different results of innovation. Companies have different strategies with regard to how they create value for customers and attain competitive advantage over rivals. Within the management literature quite extensive research is devoted to strategic orientation of an organization and its effect on innovation performance and organizational performance. The majority of the studies investigated the direct link between a specific orientation and performance. Most researched orientations are market orientation, resource based view, resource orientation, entrepreneurial orientation and learning orientation (Grinstein, 2008; Paladino, 2007; Hakala, 2010). However, most of these studies concentrated on the role of one or two particular orientations and only a few studies investigated the interactions between strategic orientations. Yet, there is no study providing empirical data incorporating all four strategic orientations in one analysis. There is also no unified understanding of which strategic orientation leads to which innovation output, how the strategic orientations interact with each other and which other moderating/mediating variables affect the strategic orientation-innovation performance relationship (Hakala, 2010).

Recent data collected under Small and medium sized enterprises (SME's)[1] in the Netherlands provide some interesting data. A study from 2010 shows that: 65% improved internal processes in the last three years, 36% of the Dutch SME's actively performs research and development, 53% has employees dedicated to innovation, 46% introduced new products or services to the market that were new to the organization in the last three years, and 27% introduced new products or services to the market that were entirely new to the market in the last three years (Innovatie in het MKB, 2010). With regard to the strategy of these companies, 67% is focused on developing new products, services or processes, 97% is focused on providing excellent service to customers and 88% is focused on cost-optimization (Innovatie in het MKB, 2010). Top managers/owners of SME's in The Netherlands recognize themselves mostly as managers. They tend to focus on efficient and effective managing of day-to-day business and offering excellent service to customers instead of focusing on renewal of their business (Bruins, 2006). Further, 57% of SME's companies have a written strategy or business plan. Above studies imply that strategies of most Dutch SME's are mostly focused on improving internal processes and on customer induced product improvements, and less on the development of new products/services.

## 1.2 Research goal

Although this thesis started with the article of Hamel & Prahalad (1993), testing whether or not strategic intent is recognized at SME's should not be the main goals of this study. To be able to categorize strategies at SME's, differentiated by their influence on innovation, researching strategic orientations at SME's bears more practical implications with regard to characterisics of SME's that

[1] *Data from SMEs in the Netherlands with 10 or more employees*

*are* successful at developing radical innovations again characteristics of SME's that *are not*. Therefore the goal of this thesis is to gain insights in the relationship between strategic orientation and its effect on innovation performance. Based on the preceding information, the following questions arise: What general strategic orientations are there? What is their effect on innovation performance? How do these strategic orientations interact with each other? Which strategic orientations lead to which types of innovation? In sum it boils down to one central question: *To what extent do differences in (configurations of) strategic orientation explain the differences in innovation performance at manufacturing SME's in the Netherlands?*

Strategy refers to the intended path that gives the outlines for decisions and activities of an organization and is focused on the alignment of the organizations business system and its business environment, in such a way that the business system has an additional value to the business environment resulting in (sustained) superior business performance in a particular business. To achieve superior performance, organizations must take strategic orientations into account when developing strategies (Slater, Olson, & Hult, 2006). Strategic orientation refers to the "*broad outlines for the organizations strategy while leaving the details of strategy content and strategy implementation to be completed*" (Slater, Olson, & Hult, 2006, p. 1224). Organizations have different strategic orientations that vary strongly with regard to internal and external conditions. Four dominant strategic orientations, resource orientation, market orientation, entrepreneurial orientation and learning orientation, are apparent in today's strategy literature (Paladino, 2007; Hakala, 2010). This study aims at researching the differences in strategic orientations at SME's and the effect on innovation performance. First, the four strategic orientations are explored in depth. How do they relate and how do they influence innovation performance according to the literature. Second, it is researched what their independent effect is on innovation performance at SME's in the Netherlands. Third, it is analyzed what patterns of strategic orientations are most successful when striving for different innovation outcomes. This study focuses on established small and medium sized enterprises (SME's)[2]. These are enterprises with fewer than 250 persons that exist for three of more years. However, Van der Meer en Van Tilburg is not interested in companies employing less than 10 employees. They want to exclude small service providers and one-man businesses. They also prefer to focus on product manufacturing companies and not on service providers. For this thesis SME's are studied that employ between 10 and 250 employees that are active in product development industries and exist for three of more years.

## 1.3 Research questions

Preceding sections result in the following research questions. The research questions are divided in central questions and sub-questions. Definitions are given for clarification.

### *Central question*

- To what extent do differences in (configurations of) strategic orientation explain the differences in innovation performance at established manufacturing SME's in the Netherlands?

### *Sub-questions*

1. Which strategic orientations are recognized in the literature, how are they related and how do they affect innovation performance?

[2] *"Enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro"* (European Commission, 2003)

2. What is the (independent or interdependent) effect of strategic orientations on innovation outcomes at established SME's in the Netherlands?
3. What patterns of strategic orientations are desired when striving for radical or incremental innovations at established SME's in the Netherlands?

### *Definitions*

- Strategy: an intended path that gives the outlines for decisions and activities of an organization and is focused on the alignment of the organizations business system and its business environment, in such a way that the business system has an additional value to the business environment resulting in (sustained) superior business performance in a particular business.
- Strategic orientation: "*broad outlines for the organizations strategy while leaving the details of strategy content and strategy implementation to be completed*" (Slater, Olson, & Hult, 2006, p. 1224).
- Innovation: "*the management of all the activities involved in the process of idea generation, technology development, manufacturing, and marketing of a new (or improved) product or manufacturing process or equipment*" (Trott, 2008, p. 15).
- Radical innovation: an innovation that that embodies a new technology that results in a new market infrastructure (Garcia & Calantone, 2002).
- Incremental innovation: an innovation that provides new features, benefits, or improvements to the existing technology in the existing market (Garcia & Calantone, 2002).
- Established Small and medium sized enterprises (SME's): *"enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro"* (European Commission, 2003, p. 5) Established in respect to this study refers to SME's existing over three years. Micro enterprises (companies with less than 10 employees) are excluded from this study.

## 1.4 Research framework

The literature suggests that for strategic orientations to be effective, companies must create an internal alignment between organizational features (goals, values, resources, capabilities, structure and systems) and create a fit between the internal organizational and its external environment (Chen & Liang, 2011; Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). This fit depends on the strategic orientation a company has. Managing day-to-day business and competing on costs and quality requires a different strategic orientation than searching for business opportunities and developing new products or services. Strategic orientation defines the broad outlines of a strategy for a company. Four dominant perspectives (market orientation, resource orientation, entrepreneurial orientation and learning orientation) are recognized in this literature stream. These orientations have different effects and implications for innovation outcomes of a company. Therefore, the theoretical framework starts with understanding innovation performance outcomes. The desired innovation outcomes of an organizations strategy are strongly affected by the strategic orientation of the organization (Paladino, 2007; Zhou, Yim, & Tse, 2005). Orientations differ in the way of theorizing how companies achieve sustained competitive advantage and match their resources to the business environment. Therefore, strategic orientations are discussed extensively in the second part of this thesis. The third part of this thesis discusses the interrelations between strategic orientation and how they affect innovation performance. Further, there is a difference between large and small organizations that must be taken into account when discussing strategy and innovation. This is discussed in the next section. In the conclusion, theoretical implications of strategic orientations, their interrelations, their effect on innovation performance and desired patterns for radical or incremental innovation outcomes, are discussed.

This framework will provide constructs and relations that are used to identify strategic orientation and innovation outcomes at established Dutch SME's. How the data is collected is discussed in the next section.

## 1.5 Research strategy

Composing the research framework (chapter 2) consists of selecting journal articles that discuss the main constructs and relations as discussed in the research framework. Articles are selected within influential journals on the relevance of abstracts and using the forward/backward referencing method. This will lead to a framework that consists of enough information to build constructs and identify relations for analysis and operationalization of the empirical parts of this study. After the research framework, the methodology of this thesis is discussed (chapter 3). This quantitative empirical research will collect data by online questionnaires to identify strategic orientation characteristics and innovation performance. The questionnaire is conducted among small and medium sized manufacturing companies and is composed of well tested and/or well-reasoned constructs. This will strengthen the reliability and validity of the results derived from the companies. The SME's will be questioned about their strategic orientations and innovation outcomes in the last three years and what variables affected these decisions. The subjects for the questionnaire are the CEO's or members of the management team. The results of the online questionnaire (chapter 4) will be analyzed with SPSS to determine what constructs and relations of the theory are recognized at the companies that participated in this study. With regression analysis is tested how each strategic orientation influences the others and the innovation performance of SME's. In the discussion and conclusion (chapter 5) the results are discussed by answering the research questions. Unexpected results are elaborated on, managerial and research implications are given and limitations of this study are formulized. This results in the following structure for this thesis (figure 1).

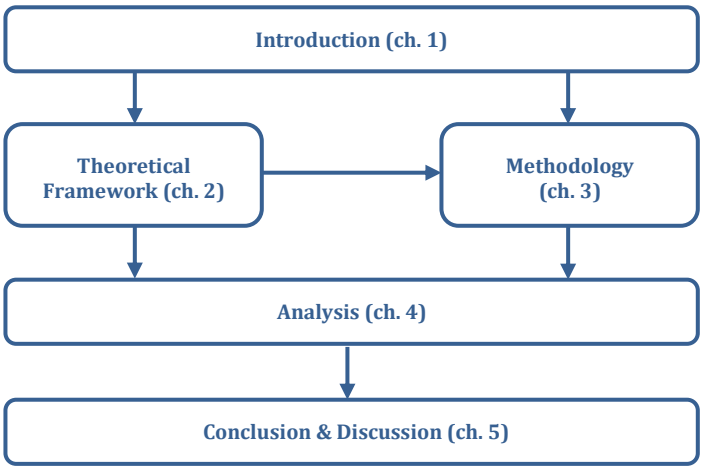


*Figure 1: Thesis research model*

# 2. Theoretical framework

This chapter will discuss the theoretical framework of this thesis. It starts with understanding innovation performance (section 2.1) which is already briefly discussed. The desired outcomes of an organizations strategy are strongly affected by the strategic orientation of the organization. Orientations differ in the way of theorizing how companies achieve sustained competitive advantage and match their resources to the business environment. Strategic orientations are discussed in section 2.2. The third part of this chapter discusses the interrelations between strategic orientation and how they affect innovation and new product development outcomes (2.3). Further, there is a difference between large and small organizations that must be taken into account when discussing strategy and innovation. This is discussed in section 2.4. This theoretical framework ends with an overall conclusion of the findings.

## 2.1 Innovation performance

New product development (and thus innovation) is of high importance for SME's if they want to survive and grow (Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). This chapter discusses the concept of innovation, which is used in this study as the dependent variable "innovation performance". **Innovation** and **invention** are closely related words with a subtle but important difference. An invention refers to the creation of new concepts or products that derived from individual's ideas or from scientific research. Innovation is an iterative process initiated by the perception of a new market and/or new service opportunity for a technology based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention (Garcia & Calantone, 2002). This study focusses on the innovation output of SME's in the Netherlands.

From the definition of innovation several different typologies can be identified that are related to each other. First, there is the difference between product and process innovations. Product innovations refer to now or improved products, while process innovations refer to innovations in the process which lead to the development and commercialization of products. Broadly taken process innovations incorporate new methods of production, new ways of organizing and new sources of supply (Johannessen, Olsen, & Lumpkin, 2001). The second distinction is between market based-innovations and technology-innovations. Market-based innovations refer to products that depart from existing, mainstream markets by involving new and different technologies and creating a set of fringe, and usually new, customer values for emerging markets. Technology-based innovations refer to products that adopt new and advanced technologies and improve customer benefits relative to existing product for customers in existing markets (Zhou, Yim, & Tse, 2005, p. 43; Benner & Tushman, 2003; Chandy & Tellis, 1998). The study of Zhou, Yim, & Tse (2005) found that both types of innovations are beneficial to organizational performance, but technology-based innovations have a greater impact on organizational performance than market-based innovation do. The third and most discussed distinction is between radical and incremental innovations which also address the distinction between market-innovation and technology-innovation. Radical innovations are innovations that embody a new technology that results in a new market infrastructure. They "*often do not address a recognized demand but instead create a demand previously unrecognized by the consumer. "This new demand cultivates new industries with new competitors, firms, distribution channels, and new marketing activities*" (Garcia & Calantone, 2002, p. 122). A radical innovation is recognized by the initiation of new (technological) knowledge and a new marketing S-curve[3]. They require organizational practices, technologies or knowledge that is not aligned with the organizational skills and capabilities (Narayanan, 2001). These radical innovations are based on a different set of engineering and scientific principles and often lead to new markets, potential

[3] *S-curve: S-shaped representation of a life cycle with four stages: introduction, growth, maturity and decline*

applications and even redefinition of an industry, forcing organizations to ask themselves a new set of questions, to draw on new technical and commercial skills, and to employ new problems solving approaches (Henderson & Clark, 2004). Incremental innovations can be defined as "products (or processes) that provide new features, benefits, or improvements to the existing technology in the existing market" (Garcia & Calantone, 2002, p. 123). These incremental innovations refer to (minor) changes to the existing products, processes or services, were it exploits the potential of the established design, and often reinforces the dominance of established organizations by reinforcing their capabilities (Henderson & Clark, 2004). Incremental innovations are not based on totally new knowledge; it does require considerable skill and ingenuity and has significant economic consequences over time.

Incremental innovation and radical innovation are for this study assessed by asking the questions: what is new, how new, and new to whom? Johannessen, Olsen, & Lumpkin (2001) found that innovation as newness represents a unidimensional construct, distinguished only by the degree of radicalness. Their constructs classify innovations into new-to-the-firm and new-to-the-industry and it addresses six areas of innovative activity: new products, new services, new methods of production, opening new markets, new sources of supply, and new ways of organizing. The choice for the construct of innovation performance derived from Johannessen, Olsen, & Lumpkin (2001) is further explained in paragraph 3.4.1.

## 2.2 Strategic orientations

Strategic orientation refers to the broad outlines for the organizations strategy while leaving the details of strategy content and strategy implementation to be completed (Slater, Olson, & Hult, 2006, p. 1224). Although many studies in the Management literature incorporated strategic orientation, the effect on innovation performance (and organizational performance) and the relationship between strategic orientations remains unclear. Some found positive connections between orientations and organizational performance. However, the majority of the studies only researched the direct relation between a specific orientation and performance discarding moderating and mediating variables that potentially affect the relation between orientation and performance. Further, studies generally concentrated on the role of a particular orientation, where only a limited number of studies did analyze the interactions between strategic orientations (Hakala, 2010). To understand the implications of strategic orientation, their interrelations and effect on innovation performance, the four dominant strategic orientations (resource orientation, market orientation, entrepreneurial orientation and learning orientation) that are apparent in today's strategy literature (Paladino, 2007; Hakala, 2010, ), are discussed in this section. These perspectives differ on how companies create superior competitive advantage and how they match resources with the environment.

Resource orientation is primarily internally oriented, in that its focus is on the development and deployment of a unique company resource base and using this resource base to exploit opportunities or neutralize treats in the business environment (Paladino, 2007). Market orientation is primarily externally focused. The satisfaction of market needs and creating superior value for customers relative to competitions is the most important. The company then aligns its internal organization accordingly (outside-in), while in the resource orientation external opportunities are exploited within the scope of the resource base (inside-out). Entrepreneurial orientation and Learning orientation are more behavioral orientations; however, they also discuss the process of matching resources with the environment. Entrepreneurial orientation refers to the ability of an organization to take risk and be proactive in entering new and unstable markets. Learning orientation refers to the ability of an organization to learn from errors and accumulating (new) knowledge that is needed for developing innovations.

### 2.2.1 Resource orientation

Understanding the resource orientation (RO) starts with understanding the resource-based-view (RBV). The RBV assumes that (bundles of) resources are heterogeneously distributed among companies and that most resources are not perfectly imitable or substitutable (Barney, 1991). For strategic resources to be the potential source of sustained competitive advantage, Barney (1991) suggests that company resources should meet certain criteria: **VRIN.** They must be **valuable** (such that is reduces costs or increases value to customers), **rare** (so competitors do not use the same resource which makes the value less valuable), difficult to **imitate** and **non-substitutable** (competitors cannot obtain resources they do not have and they cannot offer strategically equivalent resources) (Barney, 1991). Strategic resources refer to all the *"assets, capabilities, organizational processes, firm attributes, information, knowledge, etc., controlled by a firm that enable the firm to conceive of and implement strategies that are efficient and effective"* (Barney, 1991, p. 101). There is no generally accepted classification of company resources (Wit & Meyer, 2010), however, in the strategic literature, a few distinctions can be made (Grant, 2010; Crook, Ketchen, Combs, & Todd, 2008):

#### *Tangible resources*

- Physical (plant, equipment, machines, land)
- Financial (cash, securities)

#### *Intangible resources*

1. Technology (patents, copyrights, trade secrets)
2. Reputation (brands)
3. Relations
4. Culture

#### *Human resources*

- Skills/know-how
- Capacity for communication and collaboration
- Motivation

Resources differ from capabilities. Capabilities refer to the organizations ability to develop and supply the superior product/service offering. These value-adding activities (e.g. R&D, production, logistics, marketing, sales) are jointly referred to as the activity system (Wit & Meyer, 2010) or the value chain (Porter, 1985) of a company. Although there are more analytic frameworks to analyze this activity system of a company, the value chain from Porter is the most used model. It distinguishes primary value-adding capabilities (inbound logistics, operations, outbound logistics, marketing/sales and service) from supporting activities (procurement, technology development, human resource management and firm infrastructure). An important notion is that capabilities differ from industry to industry and that a unique capabilities allow companies to offer customers superior proposition. Doing things better, more efficient, more effective, cheaper etc. than rival firms is therefore a major component in gaining competitive advantage. A unique configuration of the capabilities will strengthen its source of competitive advantage and will often raise the barrier for rival companies to imitate the activity system (Wit & Meyer, 2010).

Leveraging strategic resources to create sustained competitive advantage will then turn into superior business performance (Barney, 1991). Crook, Ketchen, Combs, & Todd (2008) researched in their meta-analysis the relationship between strategic resources and performance. They found that although resources do not have a direct influence on company performance, significant benefits over competitors appear when possessing more strategic resources (p. 1150). The fact that strategic

resources do not have a direct influence on performance implicates that unique bundles of resources only explain performance to the extent that organizations are able to identify and capture the potential (economic) value they can create (p. 1142). They also confirmed that resources meeting the criteria of Barney (1991) are more strongly related to performance than resources that do not meet that criterion (p. 1151). Further, they disaggregated possible moderators of the strategic resources-performance relationship into smaller groupings according to the value chain classifications of Porter (1985): marketing, logistics, R&D, human resources, operations and firm infrastructure; and the resource groupings of Grant (2010): human, tangible and intangible. Results show that all classifications are significantly related to performance and that the effects of human and intangible resources are significantly larger than the effect for tangible resources (Crook, Ketchen, Combs, & Todd, 2008, p. 1149). They found no significant differences between manufacturing/service organizations, diversified/undiversified organizations and small/large organizations (p. 1152).

As mentioned, unique bundles of resources (VRIN) alone do not explain competitive advantage, because there is no direct influence on company performance. An appropriate organization (O) must be in place that can absorb and apply them, resulting in the **VRIN/O** criteria for the RBV. However, Kraaijenbrink, Spender, & Groen (2010) argue that the VRIN/O criteria are still not always necessary nor sufficient to explain competitive advantage. Further, the RBV does not sufficiently consider the synergy between resource bundles and does not sufficiently recognize the role of managerial capabilities with regard to sustained competitive advantage (pp. 355-356). Therefore, this thesis does not adopt VRIN or the VRIN/O as determinants for RBV, but adopts the "Resource Orientation" construct from Paladino (2007). The RO construct has three dimensions that measure the degree to which an organization practices a RBV and thus is oriented toward the development of valuable and unique resource bundles (Paladino, 2007, p. 536). The dimensions are: **synergy** (degree of resource sharing within the company to fully exploit the benefits), **dynamism** (degree of integration and deployment of resources to induce organizational learning) and **uniqueness** (the degree of difficultness for rivals to imitate the resource base). The RO implies companies have competitive advantage when a value creating strategy not simultaneously implemented by competitors is implemented. This competitive advantage is sustained when other companies are unable to duplicate this strategy and its benefits (Barney, 1991).

In summary, the RO objective is to create sustained competitive advantage by developing and deploying unique and costly-to-imitate (bundles of) resources for the purpose of exploiting environmental opportunities and neutralizing threats (Paladino, 2007) resulting in a unique (superior valuable) resource base that is immobile and heterogeneous (Barney, 1991). This offers companies to access unfolding market opportunities by fulfilling a latent demand of potential customers. Proponents of the RO argue that after setting long-term direction in building a strong resource base and activity system, opportunities in the market should be identified where the specific strengths of the resource base and activity system can be exploited. Even though the focus is on internal strength, within this perspective market positioning is extremely important because only a strong competitive position over rivals will result in above-average profitability (Wit & Meyer, 2010).

### 2.2.2 Market orientation

For organizations to achieve superior competitive advantage, organizations must provide customers with products and services with superior value in comparison with its competitors. Market orientation (MO) is defined as "*the organization culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers and, thus, continuous superior performance for the business*" (Narver & Slater, 1990, p. 21). It requires a company to continually adapt its business system to changing factors of the environment and new market opportunities.

Companies should also defend their market position to rival firms, and potential new entrants. This requires understanding of the industry the company operates in and its macro-environment.

Proponents of this perspective acknowledge the importance of resources and activities for cashing in on environmental opportunities. If a company does not have or cannot obtain the necessary resources to take advantage of opportunities, gaining competitive advantage is unrealizable. Companies must therefore keep the strengths and weaknesses of their business system in mind; however, it should not limit the potential of the opportunities. Market-oriented companies are often the first to realize that new resources and/or activities need to be developed and, therefore, are better positioned to build up a competitive advantage over its rivals (Wit & Meyer, 2010). When companies are not able to attain resources and/or activities themselves, it can use external sources. Options are, for example, strategic alliances, mergers or acquisitions (Hagedoorn & Duysters, 2002).

Rooted in extensive MO literature is the distinction between three behavioral components of the MO construct: customer orientation, competitor orientation and interfunctional coordination (Narver & Slater, 1990, Jaworski & Kohli, 1993). It is concerned with all the activities involved with gathering and understanding information about the **customers** and **competitors** in the target market and **disseminating this information** throughout the organization (Narver & Slater, 1990).

### *Customer orientation*

Reijonen & Komppula (2010) researched the adoption of MO at SME's. They found that small firms where mainly focused on customers (customer orientation). This is consistent with the research of Bruins (2006). Small companies tend to focus more on collecting, restoring, analyzing, sharing and responding to customer information than, for example, competitor or other market information (Reijonen & Komppula, 2010). Customer orientation is about the use of information, uncovering and learning about the latent customers' needs, leading to innovative new products or services. However, some studies argue that a focus on existing customers only serves the current expressed needs of customers and produce incremental innovations on the short term, but are incapable of serving radical innovative products on the long term. Customers cannot express their latent needs that are beyond their current consumption experiences (Grinstein, 2008), so companies must develop products and services that trigger the latent needs (future demand) of (potential) customers based on internal developed knowledge, competitor and/or market information. Customers are unlikely to wish for things they are not aware of (Hakala, 2010). A focus on existing customers is not successful when pursuing radical innovations that are supposed to change the status quo of the market.

Narver, Slater, & MacLachlan (2004) and Atuahene-Gima, Slater, & Olsen (2005) provide a useful distinction (proactive and responsive MO) that explains the contradicting views of customer orientation. "*The form of market orientation examined in all empirical studies to date is ''responsive market orientation,'' in which a business responds to the expressed needs of its target customers. By contrast, ''proactive market orientation'' refers to a business attempting to discover and satisfy customers' ''latent needs,'' or opportunities for satisfaction of which a customer is unaware*" (Narver, Slater, & MacLachlan, 2004, p. 343). It is argued that competitors also access the expressed needs of existing customers, resulting in little differentiated product and services, thus, aggressively competing on prize and quality. To gain competitive advantage by developing radical new products, organizations must go beyond expressed customer needs and tap into their latent needs. This requires a proactive MO (Narver, Slater, & MacLachlan, 2004).

### *Competitor orientation*

Competitor orientation refers to the continuously monitoring of competitors and seizing opportunities that by creating products and services that are differentiated from those of

competitors (Grinstein, 2008). Some scholars argue that a strong competitor orientation leads to the imitation of products and services of competitors. One could argue that these contradictions in scholars are both true, but it depends on the strategy of the organization. Competitor information can be used for creating differentiated products and services that are more innovative than those of competitors, this information can also be used in a strategy to react to the success of competitor products and services and learn (imitate) from them and create a slightly different (improved) one. With regard to the innovation output, Grinstein (2008) found that competitor orientation only has a positive effect when the organization also adopted some degree of customer orientation as well. This implies that when only monitoring the competitors, organizations run the risk of serving products that do not comply with the demand of (potential) customers.

#### *Interfunctional coordination*

The interfunctional component refers to all the organizations coordinated actions (e.g. the utilization of organizational resources) taken to create superior value for customers based on the information of competitors and customers (Narver & Slater, 1990). Information sharing and communication across all functions of the organizations, especially in the context of market information, has a positive effect on the development of new products. This behavioral component stresses the importance of structural characteristics of the organization when adopting the MO (Grinstein, 2008). A meta-analysis study of Kirca, Jayachandran, & Bearden (2005) resulted in three important antecedents for the implementation of MO: Top management emphasis, interdepartmental connectedness, and market-based reward systems for employees. Noteworthy is the fact that the authors did not find significant relationships between MO - centralization and MO – formalization. This implies that by ensuring top management emphasis, interdepartmental connectedness and market-based reward systems, MO can be effectively implemented even in organizations with centralized structures and high degrees of formalization (Kirca, Jayachandran, & Bearden, 2005).

Although the debates on the effects of customer and competitor orientation on innovation output continues, the majority of scholars agree that organizations should focus on all three components of MO to simultaneously exploit existing product innovations and explore new ones (Grinstein, 2008; Atuahene-Gima, 2005), therefore organizations must simultaneously implement proactive and responsive MO (Narver, Slater, & MacLachlan, 2004).

In summary, the MO objective is to create sustained competitive advantage by providing customers with products and services with superior value in comparison with its competitors. Companies must continually adapt to the changing environment and new market opportunities and align their internal organization accordingly to exploit, develop or obtain the necessary resources. If they cannot attain resources and/or activities themselves, they must use external sources like strategic alliances, mergers or acquisitions. MO companies must be aware of internal and external challenges when searching for market opportunities based on customer and competitor knowledge. An overreliance on customer input, however, can harm the discovery of new markets. These customers' needs most likely lead to incremental improvements at existing products or services, and less likely will trigger latent customer needs that often lead to new markets and radical innovations. Overreliance on competitors will also less likely lead to new markets and radical innovations. Furthermore, organizations that imitate rivals run the risk of serving products that do not comply with the demand of (potential) customers.

### 2.2.3 Learning orientation

Learning is concerned with how organizations deal with errors (Argyris & Schön, 1978). Organizational learning can be divided into two types of learning: single-loop or double-loop learning. Single-loop (or adaptive) learning occurs when errors are detected and corrected and the

organization continues with their present strategy, rules, procedures, goals and policies (Argyris & Schön, 1978). With other words, Adaptive or single-loop learning refers to learning within (un)recognized constraints that reflect the organizations assumptions about its internal organization and its environment. It is usually sequential, incremental and focused on opportunities within the scope of the organizations activities (Slater & Narver, 1995) and is quite effective for the development of core capabilities. Double-loop (or generative) learning occurs when the same organization, in addition to the detection and corrections of errors, also questions and modifies existing norms, procedures, policies and goals (Argyris & Schön, 1978). With other words, generative or double-loop learning is not constrained with organizational boundaries, but implies that organizational members are willing to question long-held assumptions about its mission, customers, markets, products or technologies. It is frame-breaking and leads to out-of-the-box thinking. Compared to adaptive learning, generative learning is more likely to induce radical innovations and the seizing of opportunities outside the scope of the organization (Slater & Narver, 1995). Sinkula, Baker, & Noordewiet (1997) essentially argue that generative learning, relative to adaptive learning, requires an organization to demonstrate a higher degree of commitment to learning, open-mindedness, and shared vision.

Learning orientation (LO) refers to the ability of an organization to develop new knowledge or insights that have the potential of influencing (strategic) behavior. It is "*the organizations propensity to create and use knowledge* (Sinkula, Baker, & Noordewiet, 1997) *in order to attain competitive advantage* (Calantone & Cavusgil, 2002)" (cited by Hakala, 2010, p. 4). Especially in dynamic markets, organizations must pursue the process of learning, changing behavior and improving performance faster than their competitors. Following Huber (1991), the organizational learning process has four stages: knowledge acquisition, information distribution and information interpretation and organizational memory. Knowledge acquisition is about the process by which information (knowledge) is obtained, information distribution is the process by which information from different sources is distributed (shared) within the company leading to new information or understanding. Information interpretation is concerned with the process by which shared information is given a commonly understood interpretation; organizational memory refers to the process of storing knowledge for future use (Huber, 1991). Although there is an extensive literature stream conceptualizing LO as the four processes, others argue that LO must not be conceptualized as a process, but as an organizations propensity to learn. Organizations do not all learn in the same way, and the four stages of learning differ per company. Therefore, this thesis argues that organizations must be seen as cognitive enterprises (Wang C. L., 2008) and that the three first-order-variables must be variables that represent the learning propensity are fundamental. This study therefore adopts: **commitment to learning, open-mindedness**, and **shared vision** (Sinkula, Baker, & Noordewiet, 1997). Commitment to learning refers to the extent to which an organization places value on learning and their ability to think, reason and value causes and effects of their actions (Wang C. L., 2008). Open- mindedness refers to the extent to which an organization proactively questions long-held routines, assumptions and beliefs (Sinkula, Baker, & Noordewiet, 1997). A shared vision refers to the extent to which an organization develops and holds a universally understood focus (Wang C. L., 2008). Open-minded organizational members that are committed to learn are motivated to learn, a shared vision guides them what to learn (Sinkula, Baker, & Noordewiet, 1997). If an organization tests positive on these three first-order-variables, this organization has incorporated organizational learning. The higher the degree of these first-order-variables, the more likely generative learning is incorporated.

Organizations need a culture and climate that maximizes organizational learning about creating superior customer value (Slater & Narver, 1995). The degree of organizational learning is higher when: "*more of the organizations components obtain this knowledge and recognize it as potentially useful … when more varied interpretations are developed* and … *when more organizational units develop uniform comprehensions of the various interpretations"* (Huber, 1991, p. 90). Learning

organizations have a shared vision that energizes organizational members to constantly acquire, process and spread knowledge throughout the organization about markets, customers, technologies, products or processes, and question long held assumptions and beliefs regarding their business.

In summary, learning orientation also deals with how resources and environment are connected with each other to achieve superior competitive advantage. It is a (more behavioral) orientation which allows organizations to learn from errors and improve their internal organization and its relationship with the environment. Adaptive learning refers to detect and correct errors within the boundaries of the organization where generative learning refers to detecting and correcting errors and questioning the boundaries of the organizations implying that organizational members are willing to question long-held assumptions about its mission, customers, markets, products or technologies (out-of-the-box thinking). Adaptive learning most likely leads to improvements of existing products, services and technologies in existing markets, where generative learning most likely leads to more radical innovations and seizing opportunities outside the scope of the organization. Organizations benefit when they are aware of the differences of these two modes and know how and when to apply the right mode. The higher the commitment to learning, open-mindedness and shared vision, the more able the organization is to implement generative learning. Not every company has a learning orientation. Reactors to the environment do not proactively learn and are more likely to be unsuccessful at developing innovations at all. They are usually imitators or they exit the market when changes occur.

#### *2.2.3.1 Exploration versus exploitation*

From an organizational learning perspective, companies must understand that adaptive and generative learning has different effects on innovation and organizational performance. This refers to the innovators dilemma, where companies must be aware of the paradox between the exploration of new possibilities and the exploitation of old certainties in organizational learning (March, 1991). These are two general modes of organizational learning, concerning organizations resources and capabilities that the organization uses to develop, and sustain competitive advantage. **Exploitation** is concerned with the *"use and refinement of existing knowledge, technologies and products"* (Greve, 2007, p. 945) for existing customers resulting in incremental innovations (Jansen, Van Den Bosch, & Volberda, 2006; Raisch & Birkinshaw, 2008). **Exploration** is concerned with the *"search for new knowledge, use of unfamiliar technologies, and creation of product with unknown demand"* (Greve, 2007, p. 945) for emerging customers or markets resulting in radical innovations (Jansen, Van Den Bosch, & Volberda, 2006; Raisch & Birkinshaw, 2008). O'Reilly & Tushman (2004) provide a useful table of the scope differences between exploitative business and exploratory business. This table is presented below. It is clear that both organizational learning modes require different processes, resources, capabilities etc.

| Alignment of: | Exploitative Business | Exploratory Business |
|---|---|---|
| **Strategic intent** | Cost, profit | Innovation, growth |
| **Critical tasks** | Operations, efficiency, incremental innovations | Adaptability, new products, breakthrough innovations |
| **Competences** | Operational | Entrepreneurial |
| **Structure** | Formal, mechanistic | Adaptive, loose |
| **Controls, rewards** | Margins, productivity | Milestones, growth |
| **Culture** | Efficiency, low risk, quality, Customers | Risk taking, speed, flexibility, experimentation |
| **Leadership role** | Authoritative, top down | Visionary, involved |

*Table 1: Exploration versus Exploitation. Derived from "O'Reilly & Tushman, The Ambidextrous Organization, 2004"*

Balancing these differences and tensions and making trade-offs requires managers to understand the differences. Knowledge of organizations is nested in procedures, norms, rules, and forms. This knowledge accumulates over time because individuals improve this knowledge. The individuals are also socialized to organizational beliefs and thus learn from the organization. Mutual learning implies that organizations run the risk of adjusting to an organizational code before the code can learn from them (March, 1991, p. 85). They risk organizational inertia and learning traps, which are discussed next.

#### *2.2.3.2 Organizational inertia*

Organizations focused on exploitative business activities must avoid **organizational inertia**, which reflects the inability to react fast to changing environments. They tend to focus on exploitative business activities and are rather rigid instead of flexible. Bureaucracy, formalization of processes and centralized control steer the organization further into refinement of existing activities, processes, products and offering value to customers. Exploration of new business opportunities requires reacting fast to the changing environment. Differences in organizational design offer some important tools in avoiding organizational inertia.

Organizations being mechanistic or organic and the amount of **centralization** and **formalization** are important considerations. Raisch & Birkinshaw (2008) argue that mechanistic structured organizations rely on standardization, centralization, bureaucracy and hierarchy in order to support efficiency, whereas organic structured organizations with high levels of decentralization and autonomy support flexibility. Centralization of decision making reflects the division of authority and the degree of concentration where formalization reflects the degree to which rules, procedures, instructions and communications are formalized or written down (Jansen, Van Den Bosch, & Volberda, 2006, p. 1663). Formalization has a positive effect on exploitative innovation, because rules and procedures are established to incrementally improve processes and outputs (Jansen, Van Den Bosch, & Volberda, 2006). Benner & Tushman (2003) argue that formalization hampers experimentation and deviation from existing knowledge because it is focused at reducing variance through incremental improvements. Although it is argued by some authors that formalization reduces non-routine problem solving of organizations and hampers individuals to seek innovative and new exploratory solutions, Jansen, Van Den Bosch, & Volberda (2006) did not find a significant negative effect of formalization on exploratory innovation. For centralization, the authors found a negative effect on exploratory innovation. High centralization hampers exploratory innovations because the quantity of new promising solutions to problems, which could lead to disruptive and radical innovations, due to narrow communication channels is lower than in organizations with lower levels of centralization. More layers of decision making in an organization and bureaucratic resistance reduce the chance of supporting new ideas which could lead to new products, technologies and customers. Jansen, Van Den Bosch, & Volberda (2006) did not find a significant positive effect of centralization on exploitative innovation.

Interesting is the finding of Kirca, Jayachandran & Bearden (2005) that there was no significant relationship between MO - centralization and between MO – formalization. This implies that MO can be pursued even in organizations with centralized structures and high degrees of formalization. This could be because the authors did not distinguish between customer and competitor orientation or because centralization and formalization are more directly connected with RO and EO.

#### *2.2.3.3 Failure trap/success trap*

Because of mutual organizational learning, organizations become better at things they do frequently and successfully, and become less competent at things they do infrequently and unsuccessfully

(Levinthal & March, 1993). Exploratory activities will likely yield poor results as compared with exploitative activities because the returns of exploration are less certain, potentially more risky, long-term and are more distant from the locus of action and adaption, while the returns of exploitation are more certain, less risky, short-term and more close to the firm (Levinthal & March, 1993). Companies therefore tend to favor exploitation over exploration; they put even more focus on exploitation and less on exploration, which will eventually lead to an inability to perform explorative activities. This is referred to as the "**success trap**". In the same line of reasoning, Ahuja & Lampert (2001) argue that, for larger companies, favoring familiar over novel technologies, mature over emerging technologies and search for solutions near existing solutions over the search for new pioneering solutions, hampers the ability of the company to create breakthrough innovations. This reluctance of companies to focus on new products, technologies and customers is partly the results of a companies fear to cannibalize the investments that were needed for the current products, technologies and customers (Chandy & Tellis, 1998; Tushman, Smith, Wood, Westerman, & O'Reilly, 2010).

Companies favoring exploration over exploitation activities also run the risk of getting stuck in one single cycle. Failing to develop new ideas and technologies pushes the organization to search and change more. Replacing them with other new ideas and technologies; resulting again in failing ideas and technologies. This is referred to as the "**failure trap**" (Levinthal & March, 1993).

#### *2.2.3.4 Managing adaptive and generative learning*

After introduction and rapid growth of products in new industries, maturing industries push organizations to compete on price and quality. This requires changes in the internal organization, for example with regard to formalization and centralization. It is clear that managing two total different organizational learning modes simultaneously within an organization is far more complex than managing one consistent learning mode. Top managers can resolve the paradox by engaging in only **one activity at a time** by externalizing either exploitative or explorative activities through outsourcing or by establishing alliances. Limited resources of SME's push them to focus on core competences for efficiency matters. They need to cooperate with external partners to compensate for other competences and resources. This is especially the case for companies occupied with new product development (in comparison with new service development), where SME's face specific resource problems (Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). Organizations could also **temporarily cycle sequentially** through periods of exploitation and periods of exploration (Raisch & Birkinshaw, 2008). For example, small and medium sized enterprises are evolving from organic (most importantly decentralized) to mechanistic (most importantly formalized) organizational structures when the market life cycle changes from introduction/rapid growth to a mature stage. Smaller organizations are more able (flexible) to switch between modes, especially from organic to mechanistic. For larger companies this is much more difficult due to the scale of the organization and its formalized complexity. Larger organizations, with a larger resource base, are more likely to simultaneously deal with the paradoxes, spatial separation and parallel structures address the trade-off. **Spatial separation** involves creating separate units that perform either exploratory or exploitative activities. **Parallel structures** involves primary and non-primary structures that together balance the routine and non-routine tasks allowing (inconsistent) competing demands for exploration and exploitation to be dealt with within a single business unit (Raisch & Birkinshaw, 2008).

De Visser, De Weerd-Nederhof, Faems, Song, Van Looy, & Visscher (2010) found in their study that organizations with a cross-functional structure for radical new product development perform significantly better in terms of breakthrough innovation output, than organization with a functional structure. Further, organizations with a functional structure for incremental new product

development perform significantly better in terms of incremental innovation performance than organization with a cross-functional structure (p. 295). The authors suggest separating exploration and exploitation through structural ambidexterity, where organizations make an explicit distinction between incremental and radical new product development processes and organize them in a different way. Ambidexterity can be defined as "*a firm's ability to operate complex organizational designs that provide for short-term efficiency and long-term innovation*" (Tushman & O'Reilly, 1996). This is also in line with March's (1991) view that exploitation and exploration leverage each other and Benner and Tushman's (2003) view that a company needs an 'ambidextrous'' structure in which business units that exploit current competencies are separated from business units that explore new competencies (Atuahene-Gima, Slater, & Olsen, 2005).

O'Reilly & Tushman (2008) argue that ambidexterity, the ability of a firm to simultaneously or sequentially explore and exploit, enables an organization to adapt over time. Ambidexterity is not only a matter of organizational structure, but refers to "*the routines and processes by which ambidextrous organizations mobilize, coordinate, and integrate dispersed contradictory efforts, and allocate, reallocate, combine, and recombine resources and assets across differentiated exploratory and exploitative units*" (Jansen, Tempelaar, van den Bosch, & Volberda, 2009, p. 797). Therefore, ambidexterity is a dynamic capability of an organization that enables them to continuously shift their management of exploration and exploitation activities over time, depending on the short and long term market needs (O'Reilly & Tushman, 2008; Jansen, Tempelaar, van den Bosch, & Volberda, 2009; Teece, 2007). Dynamic capabilities, introduced by Teece, Pisano, & Shuen (1997), refer to *"the ability to integrate, build, and reconfigure internal and external competencies to address rapidly-changing environments"* (p. 516). It represents organizational and strategic routines by which organizations identify and deploy new resource combinations (bundles) as markets emerge, collide, split, evolve, and die (Eisenhardt & Martin, 2000) and market opportunities shift. Resource combinations are especially difficult to imitate when they consist of tightly woven, synergistic activities (Collis & Montgomery, 1995). It must be stressed that long-term competitive advantage is achieved by these unique resource combinations and the ability of the organization to identify and capture this value, not by dynamic capabilities themselves or by possessing unique resources alone (Eisenhardt & Martin, 2000, Sirmon, Hitt, Ireland, & Gilbert, 2011). Therefore, this study defines a dynamic capability as the organization'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*" (Baretto, 2010, p. 271).

Managers should be able to sense and shape opportunities and threats, seize market opportunities and maintain competitiveness by reconfiguring, obtaining, protecting and bundling the company resources (Teece D. J., 2007, p. 1319). Sensing refers to the opportunity recognition ability of an organization and especially its top management. A possible explanation why SME's in the Netherlands are mostly not developing new products could be because the managers are not able to identify opportunities in the environment or because they are more sensitive to threats than to opportunities (O'Reilly & Tushman, 2008). Opportunity recognition refers to the process (ability) where a manager develops an initial idea, by linking knowledge, experience, skills, and other resources with perceived market needs, into a viable business opportunity. Managers should focus on identifying changes in technology, demographics, markets, and other pertinent environmental factors, while actively seeking to identify ways in which these trends and changes are linked or connected. They should search for emergent patterns. To identify new business opportunities, managers must engage in an active search for opportunities, alertness to them, and the collection of prior knowledge of an industry or market (Baron, 2006). Seizing refers to the managerial ability to communication a clear vision and strategy, a proper organizational alignment and the bundling and allocation of resources. Reconfiguring refers to the ability to reconfigure the organizational alignment and the resource base as a reaction to environmental changes (O'Reilly & Tushman, 2008). Both seizing and reconfiguring require a long-term commitment that is not affected by short-term

environmental changes. Dynamic capabilities address the issue that resources on itself are not the source of competitive advantage (Kraaijenbrink, Spender, & Groen, 2010). Dynamic capabilities enable an organization to exploit the unique resource base, making RO (RBV) not purely static but dynamic.

### 2.2.4 Entrepreneurial orientation

Entrepreneurial orientation (EO) is concerned with the entrepreneurial aspects of organizations strategies (Hakala, 2010). It reflects behavioral processes essential for entering new or established markets with new or existing goods or services (Lumpkin & Dess, 1996). It is concerned with the Many researchers followed the view of Miller (1983) that entrepreneurial organizations engage in product/market innovation, are concerned with risky ventures and are the first to come up with proactive innovations beating the competitors to the punch (p. 771). He therefore proposed three dimensions of EO: **innovativeness, risk taking, proactiveness**. Innovativeness refers to the ability of the organizations willingness to support and engage in new ideas, novelty, experimentation and creative processes that may possible result in new products, services or processes (Lumpkin & Dess, 2001). It does not reflect the innovation output. Risk taking refers to "*the degree to which managers are willing to make large and risky resource commitments … in the interest of obtaining high returns by seizing opportunities in the marketplace*" (Lumpkin & Dess, 2001, p. 144). Proactiveness refers to the ability of organizations to anticipate and act on future customer needs by seeking new business opportunities different from the present that may possibly lead to new market entry ahead of competitors while eliminating mature operations of the organizations (Lumpkin & Dess, 2001). Further research suggests that two other dimensions are also characterizing EO, namely **competitive aggressiveness** and **autonomy** (Lumpkin & Dess, 1996). In line with Miller's definition of the entrepreneurial firm, the competitive aggressiveness component (beating competitors to the punch) complements the EO construct because it differs from the proactiveness component. Competitive aggressiveness refers to the organizations ability to outperform rivals by directly and intensively challenging rivals by achieving new entry or improving market position (Lumpkin & Dess, 2001). Thus, proactiveness is concerned with meeting demand while competitive aggressiveness is concerned with competing for demand. Autonomy refers to the extent that individuals or team in an organization are able to be self-directed when perusing market opportunities from the initial idea to completion (Lumpkin & Dess, 2001).

Entrepreneurial organizations are better able to match their internal organization with the environment in dynamic competitive environments. They change and shape the environment and allocate resources to exploit uncertain business opportunities (Hakala, 2010). Kollman & Stockmann found that, with regard to the relation between EO and exploration versus exploitation activities and the degree of innovative outcomes, companies with a strong EO apparently will pursue innovation goals more effectively. Further, they provided proof that no contradictory organizational cultures are necessary to pursue exploratory and exploitative activities simultaneously when adopting a EO strategy. The five key dimensions of EO (Lumpkin & Dess, 1996, 2001; Kollman & Stockmann, 2010), vary independently suggesting that for an entrepreneurial approach to strategy making to be useful, it depends on organizational and environmental conditions (Lumpkin & Dess, 2001).

In sum, EO refers to the behavioral processes essential for entering new or established markets with new or existing goods or services, particularly in dynamic competitive environments. Entrepreneurial organizations are better able to match their internal organization by changing and shaping the environment and allocate resources to exploit uncertain business opportunities. The dimensions innovativeness, risk taking, proactiveness, competitive aggressiveness and autonomy induce organizations to make proactive investments in resources that potentially lead to radical or discontinuous innovations with greater revenue potential than incremental innovations.

## 2.3 Strategic orientations and innovation performance: connecting the dots

Strategic orientations are culture-based, organization-specific, complex capabilities that can lead to superior competitive advantages (Zhou, Yim, & Tse, 2005). SME's should know about and understand the implications, advantages and disadvantages of the different strategic orientations. This chapter discusses empirical findings on how strategic orientations relate to innovation performance and each other.

### 2.3.1 Balancing effects of resource orientation and market orientation

Recent studies of Paladino suggest that although both RO and MO require different organizational capabilities and resources, and have different impact on organizational performance (2007, 2008); they are complementary (2009). Both resource and market orientation have unique benefits and downsides. Both orientations take into account the internal organization and the environment. However, as discussed, RO is primarily internal focused where it develops a unique resource base and searches the environment for channels to exploit. RO is significantly and positively related to financial performance, innovation outcomes, product quality and new product success as moderators for the RO – overall organization performance relationship (Paladino, 2007). This implies that developing, accumulating and deploying a unique resource base will enable a company to provide (potential) customers with a qualitative, total new and valuable product. Understanding and learning from customers is a capability that these firms must develop to successfully market these products/services. The big difference with the market orientation perspective is that the market positioning of a resource oriented organization takes place within the context of the long-term resource based strategy, where its market positions leverages the existing resources base. They risk neglecting opportunities in the environment such as changing customer demand and competitive forces (Paladino, 2007) and they risk overinvesting in resources that will yield low returns (Collis & Montgomery, 1995). Interesting is the fact that RO directly influences financial performance. This could be through efficiency, internal improvements of the resource base and the capabilities of the company. Although RO does not directly influence customer value, it could be that it increases customer value after new product development introduction that will eventually lead to increased revenues. MO is about market intelligence of customers and competitors and directing this information throughout the organization. MO was significantly and positive related to product quality, innovation and customer value as mediators of the MO – overall organizational performance relationship. MO was also directly related to overall performance (Paladino, 2007). These results are generally consistent with past research and suggest that although both orientations lead to increased innovativeness and product quality (through different means); they affect overall performance of an organization in a different way. However, overreliance on MO can harm the discovery of new markets and developing radical innovations. Current customers' needs most likely lead to incremental improvements at existing products or services, and less likely will trigger latent customer needs that often lead to new markets and radical innovations. Further, overreliance on competitors will also less likely lead to new markets and radical innovations. Furthermore, organizations that imitate rivals run the risk of serving products that do not comply with the demand of (potential) customers. This suggests that "*managers seeking new product success should focus less on customer value and more on resource value; in contrast, those pursuing customer value should focus on market orientation*" (Paladino, 2007, p. 549). MO organizations also must be aware that they risks providing products and services that are ill-equipped to serve. In that case, business opportunities are pursued; internal resources are matched, quickly developed or acquired to exploit these opportunities, without a strong resource base to fully exploit the opportunity. Taken together, RO capabilities are required to reach the full potential of new business opportunities. RO complements MO by instilling efficiency in processes and incremental product innovations serving current customers and capabilities for new radical product and process development that potentially can lead to new markets. Product differentiation from rivals or cost advantages in production can be achieved by

developing and adapting new technologies (Hakala, 2010). This fits the rise of articles that argue that MO alone does not lead to radical innovations and that an additional focus explains internal developments that are needed to improve the resource base of the company serving latent customer needs. These articles introduce "*technology orientation*" (a.o. Hakala, 2010; Zhou, Yim, & Tse, 2005; Schindehutte, Morris, & Kocak, 2008), "*innovation orientation*" (a.o. Narver, Slater, & MacLachlan, 2004), "*product orientation*" (a.o. Grinstein, 2008), all boiling down to the same higher order principle; a strategic focus on resources, thus RO. Technology, innovation and product orientation can deliver step change; however this is easily replicated and is seldom a source of sustainable competitive advantage.

Paladino (2009) researched whether balancing RO and MO had an interdependent[4] or independent[5] impact on financial and innovation performance. The findings are presented in table 2. For organizations with high RO, interdependent impact on innovations is high. The low degree of MO provides the organization with a long-term external perspective without being driven by customer demand. It suggests that these organizations, besides developing, accumulating and deploying an unique (bundles of) resource(s) that provides (potential) customers with a valuable product, must develop the resources and capabilities that are needed to understand customer demands and deliver the promised value so that these resource bundles stay relevant to the market. For organizations with a high MO and a low degree of RO the results show the smallest impact on innovations while it has the second largest impact on financial performance. This suggests that MO significantly impacts financial performance through the enhancement of customer value. The smallest impact on innovations refers to the overreliance on customers and competitors which inhibits organizations to develop products that satisfy the latent needs of (potential) customers. Managers of these organizations must develop the capability to internally develop new unique bundles of resources (or combinations of) that lead to new business opportunities that are not constrained by the current demand of customers but are triggering latent needs of (potential) customers. High MO and high RO leads to the greatest (independent) impact on financial performance but less impact on innovations.

| Strategic orientation | Performance outcomes |
|---|---|
| **High market orientation – high resource orientation** | - Greatest independent impact on financial performance<br>- Third largest interdependent impact on innovations |
| **High market orientation – low resource orientation** | - Second largest independent impact on financial performance<br>- Smallest interdependent impact on innovations |
| **Low market orientation – high resource orientation** | - Third largest independent impact on financial performance<br>- Greatest interdependent impact on innovations |
| **Low market orientation – low resource orientation** | - Smallest independent impact on financial performance<br>- Second largest interdependent impact on innovations |

*Table 2: Market orientation and resource orientation performance outcomes (Paladino, 2009).*

The RO enhances organizational performance by improving the unique resource base the organization has to achieve innovations a financial success. The MO dimension enhances also financial performance by the enhancement of customer value. Interestingly, organizations with low degrees of MO and RO have the second largest impact on innovations. This suggests that these organizations are followers and react to developments in the market. They most likely imitate competitors until they have the resources to achieve innovations on their own (Paladino, 2009). Some studies argue that innovations (at least the radical ones) have great financial benefits on the long term. Although Paladino (2009) found that companies with a high RO and low MO has only the third largest impact on financial performance, long-term financial effects are not measured in this study due to the cross-sectional nature of the research. Therefore, this study argues that RO (with

[4] *Interdependent impact: impact that depends on the complementary effects of RO and MO*
[5] *Independent impact: impact that does not depend on complementary effects of RO and MO*

low MO) can be financial be more beneficial than MO (with a low RO). Balancing high MO and high RO simultaneously, the development of unique resource bundles while integrating customer and competitor focus has the greatest impact on performance. This study finds that RO and MO have independent effects on financial (overall) performance and have an interdependent effect on innovation performance. This suggest that they are complementary; the effect whether innovation outcomes are radical or incremental differs when the balance between RO and MO changes. With regard to the constructs of MO and RO there are also similarities that fit the assumption that they are complementary. Both spread knowledge (market or resource) across the company to reach its full potential and they both require learning (be it from markets or from resources). The balance depends on the product life cycle (Wong & Ellis, 2007). It suggests that for different business units, different balances of RO/MO are required if market-pull or technology-push is appropriate, requiring radical or incremental product/process innovations. Managers should make an appropriate trade-off (Atuahene-Gima, 2005) when allocating resources to RO or MO. Menguc & Auh (2006) confirm this by arguing that depending on the product life cycle organizations must be market driven or market driving. They should balance MO with RO (innovativeness in their research) and allocate resources accordingly to reach its full potential and prevent negative effects of overreliance on RO or MO to occur.

This finding of Paladino also addresses the distinction of proactive and responsive MO. Atuahene-Gima, Slater, & Olsen (2005) found evidence for a U-shaped relationship between responsive MO and new product development, suggesting that after a certain point the benefits increase. As the organization gains greater knowledge, it develops expertise in understanding the underlying features of its current markets and customers leading to new combinations and re-combinations of information and knowledge that enhance product development (incremental innovations). Further, the relationship between proactive MO and new product program performance is inverted U-shaped, implying that there are positive returns to MO. However, beyond a certain level it becomes detrimental to new product program performance, maybe because too many exploratory activities reduces the chances of building experience with a specific new knowledge base. The authors further found a negative effect of the interaction of responsive and proactive MO on new product program performance, suggesting that balancing high responsive MO with low proactive MO and vice versa is necessary to be beneficial to the company. Due to the fact that radical innovations require a strong resource base and customers are not able to express their latent needs, this study adopts that the customer orientation of MO is responsive leading to incremental innovations based on current customer needs and that RO leads to radical innovations where internal developments trigger latent customer needs.

Raisch & Birkinshaw (2008) found that when organizations pursuing MO in the short and long run, reflected by the two dimensions customer and competitor orientation, results in better financial performance when managers simultaneously allocate resources to exploit existing product innovation competencies as well as to developing new innovation capabilities (Raisch & Birkinshaw, 2008). It also fits innovation literature that suggests that for companies to attain a competitive advantage on the long term, companies must be able to have capabilities to manage (if necessary simultaneously) day-to-day business and tomorrows innovations. They should invest in resource base development which lead to new product development while investing in customer value by responding to current (and latent) customer needs (exploration and exploitation activities).

### 2.3.2 Moderating and mediating effects of learning and entrepreneurial behavior

EO refers to the behavioral processes essential for entering new or established markets with new or existing goods or services, particularly in dynamic competitive environments. Entrepreneurial organizations are better able to match their internal organization by changing and shaping the

environment and allocate resources to exploit uncertain business opportunities. Of the five dimensions of EO (risk taking, innovativeness, proactiveness, competitive aggressiveness, and autonomy) that stimulate exploratory innovation, only proactiveness and competitive aggressiveness facilitate exploitative innovation. Further, Kollman & Stockmann (2010) found that none of the EO dimensions facilitating exploratory innovation negatively influences exploitative innovation and those organizations with high levels of EO are more likely to achieve innovation goals. This suggests that for organizations that want to pursue explorative and explorative activities must strive for high levels of EO (Kollman & Stockmann, 2010, p. 153). Another study suggests that entrepreneurial components (entrepreneurship, risk taking, and freedom to experiment) have a negative effect on incremental innovations, suggesting that exploitative activities require a different culture (De Visser, De Weerd-Nederhof, Faems, Song, Van Looy, & Visscher, 2010). This study adopts the latter view, because this fits the model that adaptive and generative learning requires different processes. Entrepreneurial behavior can harm exploitative activities because risk taking and autonomy, for example, impede efficiency and formalization. EO should only be used with generative learning in a cross-functional structure while adaptive learning should be organized in a functional structure.

Empirical findings indicate that EO positively affects organizational performance (Baker & Sinkula, 1999, 2009). Recent studies also argue that EO complements MO. Because MO is about market planning driven by customer and competitor intelligence and EO is about the degree to which organizations growth objectives are driven by the identification and exploitation of untapped market opportunities, they complement each other at least in small firms. Entrepreneurial behavior complements MO by instilling an opportunistic culture that impacts the quality and quantity of organizations innovations (Baker & Sinkula, 2009; Atuahene-Gima, Slater, & Olsen, 2005) resulting in a better overall profitability. Schindehutte, Morris, & Kocak (2008) argued that this is better explained when distinguishing market-driven and market-driving behavior or responsive and proactive MO (Narver, Slater, & MacLachlan, 2004). Responsive MO (or Market-driven) refers to the behavior in which an organization responds to the expressed needs of its target customers, while proactive MO (or market-driving) refers to the behavior in which an organization attempts to discover, understand, and satisfy the latent needs of customers (Schindehutte, Morris, & Kocak, 2008). The latter requires an amount of entrepreneurial behavior (EO) to succeed at introducing new-to-the-market products and creating new markets. Responsive organizations do not require EO. This fits with MO critics that without entrepreneurial focus overreliance on customers lead to incremental innovations (Baker & Sinkula, 2009). Radical innovations are induced by a high degree of market and EO. Responsive and proactive organizations require both different organizational learning modes (Narver, Slater, & MacLachlan, 2004). This is in line with research of Zhou, Yim, & Tse (2005) who found that market orientation has a negative effect on market-based innovations. A market-oriented organization, with a focus of serving its existing customers, is less likely to invest sufficiently in pursuing opportunities in emerging markets. The authors argue that for pursuing that kind of opportunities, MO should be complemented with other organizational capabilities, such as EO.

There is also a relationship between EO and RO. Wiklund & Shepherd (2003) found that EO (measured with innovativeness, risk taking and proactiveness) moderates the relationship between unique (knowledge based) resources (RO) and company performance. It suggests that entrepreneurial processes provide organizations with the ability to utilize their resources to identify and respond to environmental cues earlier than competitors. This suggests that, just like MO, RO without EO results in an incremental innovation due to improvements on the resource base, while RO with EO results in more radical innovations and discovering new business opportunities and markets earlier than competitors. EO, in case of radical output requirements, facilitates entrepreneurial behavior for both RO and MO by mediating the RO/MO – innovation outcome relationship. EO moderates the RO/MO relationship with innovation performance, but has also a direct effect on innovation outcomes. This suggests an independent and interdependent effect with

other strategic orientations. Entrepreneurial behavior thus facilitates radical innovations through pursuing opportunities outside the boundaries of the organization and focusing on latent customer needs, independent of the degree of RO/MO.

LO which allows organizations to learn from errors and improve their internal organization and its relationship with the environment. Adaptive learning refers to detect and correct errors within the boundaries of the organization where generative learning refers to detecting and correcting errors and questioning the boundaries of the organizations implying that organizational members are willing to question long-held assumptions about its mission, customers, markets, products or technologies (out-of-the-box thinking). Learning is important for organizations to achieve the desired innovations. It requires the organizations to structure the internal organization to facilitate the appropriate learning mode. Organizations must incorporate learning into their organization. Adaptive learning is required within an organization when it reacts to customer and competitor changes. It facilitates incremental innovations (MO) or continually improves their capabilities through learning by doing (RO) on the short term. Generative learning is required when an organization searches for business opportunities outside the boundaries of the organization (MO) or to develop products/services internally that meet latent customer needs (RO), leading to radical or disruptive innovation and new markets on the long term. This is in line with the research of Zhou, Yim, & Tse (2005) who found that learning acts as a partial mediator between strategic orientations and technology-based innovations, suggesting that the effect of strategic orientations requires organizational learning for better innovation performance. They stress that learning is rooted in values and beliefs that bring about certain behaviors, which in turn affect organizational performance and have different technology-based innovations outcomes. The importance and connectedness of learning is also recognized when assessing the RO and MO constructs. Both require learning, be it from markets or from resources. Furthermore, Atuahene-Gima (2005) found that "interfunctional coordination" as one of the first-order-variables strengthenes the new product development capabilities (RO) – radical innovation outcome relationship. It suggests that knowledge sharing is connected with both RO and MO and requires different (learning) roles with different RO-MO configurations.

A study of Wang (2008) empirically found that LO mediates the EO-performance relationship. Entrepreneurial behavior requires generative learning as it faces uncertainty, it requires a long term shared vision and open mindedness as it searches for market opportunities outside the boundaries of the organization. Entrepreneurial organizations must foster generative learning in order to maximize the effect of EO on performance (Wang C. L., 2008). This relationship also works the other way around. Generative learning, as a mediator between RO/MO and innovation outcomes, is itself mediated by EO when searching for new markets and new radical products (Zhao, Li, Lee, & Chen, 2011). Entrepreneurial behavior strengthens the generative learning mode by inducing (among others) proactiveness and risk taking. LO also directly influences innovation performance positively. Jimenez-Jimenez & Sanz-Valle (2011) found, for example, that organizational learning and innovation positively affect organizational performance and that organizational learning affects innovation outcomes regardless of the of which strategy (resource or marketing oriented) their wish to pursue (Paladino, 2007; Hakala, 2010). This study adopts the view that LO is an independent and interdependent strategic orientation, just like RO, MO and EO. Different modes of learning are required when different innovation outcomes are desired. "*Regardless of which strategy they intend to pursue, firms will need to incorporate learning into their strategic planning and tactics, as this has a significant direct impact on market orientation as well as resource orientation*" (Paladino, 2007, p. 550). This view is strengthened by Hakala (2010) who suggests that that learning (be it from markets or technology or processes) turns recognized opportunities into actions and is the key enabler of organizational performance.

## 2.4 Variables affecting the strategic orientation–innovation performance relationship

For SME's, new product development is of high importance if they want to survive and grow (Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). They face the difficult task to innovate and minimize costs at the same time. SME size, age, environmental munificence, environmental uncertainty and competitive intensity are moderating variables that influence SME's relationship between strategic orientation and innovation performance.

### 2.4.1 SME size and age

According to Mazzarol, Reboud, & Volery (2010) **size** and **age** influence how small organizations manage commercialization of innovations. SME's, compared to larger established organizations, have advantages and disadvantages with regard to strategy that must be considered. SME's have greater financial constraints, more personnel bottlenecks in terms of too few or inadequately qualified personnel, and they often do not have other products to compensate for a lack of sales and profits. Larger organizations have stronger financial resources and more formalized new product development processes than SME's. Organizations and SME's in particular, have difficulties making tradeoffs between which (limited) resources to devote to exploration and which to exploitation. It is easier to specialize in only one of them (Greve, 2007; Pullen, de Weerd-Nederhof, Groen, Song, & Fisscher, 2009). Possibly, SME's innovation performance is lower at SME's than with larger organizations, because the lack of resources pushes them to favor cost-reducing practices over searching for new business opportunities. This could be an explanation why most Dutch SME's are mainly focused on current demand and thus engage in exploitative activities (Bruins, 2006). Managers constantly struggle with the allocation of resources to balance operating efficiently and having surplus resources to address unexpected threats and opportunities of the business environment (Daniel, Lohrke, Fornaciari, & Turner, 2004). These surplus resources are called "organizational slack" or "slack resources". These resources are influencing organizational performance because they affect the innovation output of an organization. Having surplus resources allows organizations to experiment with, for example, new technologies, which can lead to new product development. Organizations are more likely to engage in explorative activities in the presence of these slack resources. Slack resources can be divided into three categories: *available slack* (resources not yet absorbed in the organization), *recoverable slack* (resources that are absorbed in the organization and can only be recovered by downsizing or reorganization) and *potential slack* (resources that can be generated from the environment) by raising additional capital (Cheng & Kesner, 1997, p. 2). Hamel & Prahalad (1993) argue that organizations can create slack resources without downsizing or reorganizing. Potential slack can be gained by leveraging existing resources to the full extent. Older organizations possess the competencies to develop and commercialize innovations by themselves, while SME's are more likely to seek for sources of external financing and ways to engage in innovation by forming strategic alliances with customers, suppliers, knowledge institutions and other organizations in order to leverage the resources of others to compensate their own deficiencies (Mazzarol, Reboud, & Volery, 2010, p. 113). However, SME's are less bureaucratic, are more flexible to react to a changing environment and have greater incentives to be successful than large firms. This indicates that SME's are more prone to develop and use dynamic capabilities such as ambidexterity. The absence of slack resources generally prohibits organizations to proactively react to market opportunities or threats by engaging in exploring activities. This notion stresses the importance of active resource management of managers where they create and deploy slack resources matching the strategic orientation and organizational environment characteristics.

### 2.4.2 Environmental turbulence, munificence and competitive intensity

Besides size and age, there are also environmental factors moderating the strategic orientation – innovation outcomes relationship. Scholars are not conclusive which environmental factors moderate the strategic orientation – innovation performance relationship. Some find evidence for variables while others have to discard them (Kirca, Jayachandran, & Bearden, 2005). This study adopts a new view of strategic orientation patterns and therefore some variables are included that, in theory, can affect the relationship. The first one is environmental turbulence (a.o. Paladino, 2008; Calantone, Garcia, & Droge, 2003); also known as *environmental dynamism* (a.o. Jansen, Van Den Bosch, & Volberda, 2006; Kabadayi, Eyuboblu, & Thomas, 2007) or *environmental uncertainty* (a.o. Anderson & Tushman, 2001; Zhou, Yim, & Tse, 2005). Environmental turbulence refers to a hostile, dynamic and heterogeneous industry environment in which frequent and unpredictable technology and/or market changes occur implying risk and uncertainty for the innovation process at companies (Calantone, Garcia, & Droge, 2003). Environmental turbulence can be divided into two groups: technology and market turbulence (a.o. Paladino, 2008; Atuahene-Gima, Slater, & Olsen, 2005; Calantone, Garcia, & Droge, 2003). Market turbulence refers to "*the changes in composition of customers and their preferences and implies changing strategies in face of changing customer needs*" and technology turbulence refers to "*the rate of technological change*" (Paladino, 2008, p. 583).

In environments with high **market turbulence**, companies are required to make risky decisions (Calantone, Garcia, & Droge, 2003). Existing knowledge about the market becomes obsolete; customers cannot articulate their needs and rivals may completely revolutionize the industry standards by introducing new products (Droge, Calantone, & Harmancioglu, 2008). In low turbulence environments, the needs of customers are predictable and actions of rivals are relatively straightforward. Here companies compete mostly on prize and quality by developing incremental innovations (market pull). Paladino (2008) found that when market turbulence is low, the MO - organizational performance relationship is strengthened. Organizations favor exploitative activities and allow their innovative and learning capabilities to decay; risking decreased financial performance and even market exit in the long run (Anderson & Tushman, 2001). This fits findings that in highly dynamic markets pursuing of exploitation innovations (high MO – low RO) negatively affect financial performance of an organization, while pursuing of exploration (high RO – low MO) innovations positively affect financial performance in highly dynamic markets (Jansen, Van Den Bosch, & Volberda, 2006). It is important for managers to create a shared intent and long term commitment among all employees when uncertainty is high, so they understand the importance of long-term exploration while short-term objectives are pushing the organization to exploitative activities.

Paladino (2008) also found that in times of high **technological turbulence** the resource orientation – organizational performance (through innovation outcomes) relationship is strengthened. As Zhou, Yim, & Tse (2005) argued, in times of technological turbulence when organizations compete for a new technical standard, focus should be on high RO – low MO, increasing the innovativeness of the organization. The financial benefits are than lower on the short term, but higher on the long term because these organizations have developed resource bundles that are more costly and difficult to imitate. Grinstein (2008) found that technology turbulence negatively affects the importance of MO because in these times research and development limits the role of MO in driving innovations. The relation between innovation and RO is stronger when technology turbulence is high (Paladino, 2008). When a discontinuous innovation shook the market, an era of great ferment emerges. Competitors are competing with exploratory activities till a dominant design emerges. Once a dominant design emerges, an era of incremental change starts where the technological turbulence is low (Anderson & Tushman, 2001). This implies that in eras of great ferment organizations are searching for dominant designs of disruptive innovations which require focus on and investment in the resource base of an organization. Eras of incremental change require the accumulation of market knowledge, customer/competitor focus and thus MO.

The degree of **competitive intensity** (a.o. Jaworski & Kohli, 1993; Jansen, Van Den Bosch, & Volberda, 2006; Paladino, 2008) is also an important moderator for the strategic orientation - innovation performance relationship. The higher the competitive intensity, the stronger the relationship between MO and innovation consequences is (Grinstein, 2008). In a market in which competition is high, customers have many alternatives to satisfy their needs (Jaworski & Kohli, 1993), and organizations must monitor and respond to customer needs closely to make sure that customers choose their products/services over rival products/services (Porter, 1985). Thus, the higher the competitive intensity, the more customer/competitor oriented (MO over RO) a company should be. In highly competitive environments, pursuing exploitative innovations improves the organizations performance by expanding existing resources and defending existing markets through increasing customer loyalty (Jansen, Van Den Bosch, & Volberda, 2006, p. 1671). When organizations pursue exploratory innovations in highly competitive environments, this does not (negatively) influence organizational performance, it however does decrease organizational slack and the innovations potentially generate above-normal returns. Long-term competitive rivalry induces competitors to endlessly improve existing products and the only way for organizations to achieve a better competitive advantage is to refrain from these decreasing margins by developing new products, processes or services for emerging markets and customers (exploratory activities). In the short-term exploratory activities could negatively affect organizational performance (Jansen, Van Den Bosch, & Volberda, 2006).

The last moderator added to this study is **environmental munificence** (a.o. Kabadayi, Eyuboblu, & Thomas, 2007; Anderson & Tushman, 2001; Baum & Wally, 2003). It refers to the extent that resources are available and accessible to organizations (Anderson & Tushman, 2001, p. 689). With other words, it refers to the environment's support for organizational growth (Baum & Wally, 2003). Controlling for the number of firms, whether resources are plentiful or scarce has different implications for organizations. Low munificence implies scarce resources; high munificence implies a large amount of resources. Highly munificent environments provide enough resources for innovation and differentiation (R&D, New product development) by building organizational slack resources (Baum & Wally, 2003). Organizations in high munificent environments are better able to develop the competencies necessary to pursue an exploration strategy, while in less munificent environments organizations must focus on improving efficiency and lowering their cost without adjusting the products (Bierly & Daly, 2007). Demand is important for environmental munificence. A decline in (customer) demand will decrease prices while costs rise for the least efficient producers, driving them out of the market (Anderson & Tushman, 2001). This is, for example, recognizable in mature markets where less customer demand leads to competing on efficiency and reduced margins.

## 2.5 Conclusion

All four strategic orientations have direct positive effects on innovation outcomes suggesting that they are independent but not mutual exclusive. An organization can incorporate some or all strategic orientations which have different positive effects on innovation performance. However, to achieve superior performance companies should consider the complementary effects of all strategic orientations together. In other words, they have an interdependent effect on innovation performance. Therefore, this study argues that certain (configurations of) relationships between strategic orientations may provide organizations whit sustained competitive advantage and that organizations that are able to balance the strategic orientations perform better (Hakala, 2010, p. 5) in achieving the desired innovation outcomes. This is in line with research of Hult, Hurley, & Knight (2004) who found that EO, LO, MO and innovativeness had direct effects on business performance, but different patterns where recognized. This study replaces innovativeness with RO because innovativeness easily could be the outcome variable. A more general (focus on developing and leveraging resources) approach addition to the model. How RO and MO should be balanced depends

on the product life cycle. In growth and mature markets companies compete on prize, quality and improvements in customer value by incremental process and product innovations. The companies react on expressed customer needs by learning from current markets and current customers. In times new markets or declining markets, companies must focus on internal developments by building a new or stronger resource base. This most likely leads to radical innovations where latent customer needs are served. Once a new radical innovation becomes the new industry standard, the strategic orientation focus shifts to improving this new standard or to compete to it. Because of the uncertainty whether or not customers will buy the new products, radical innovation requires a high degree EO. Further, because these innovations are born from new and unfamiliar knowledge bases, a high degree of LO is required also. Radical process innovations can change a market as well leading to new markets or new superior products. It must be stressed that RO and MO (learning from markets or resources) to be successful, LO is always required. Companies that do not learn are not able to implement RO and MO. Low degree of LO (adaptive learning) is therefore more likely to lead to incremental innovations and high degree of learning (generative learning) is more likely to lead to radical innovations. In sum, strategic orientations have both independent and interdependent effects on innovation performance. Specific configurations of (degrees of) strategic orientations are most likely to lead to an optimal result when striving for radical or incremental innovations. Although the findings of this theoretical part are not contradictory, some results are based on only one or a few studies. Furthermore, none of the existing studies examined the four strategic orientations as four independent and interdependent orientations that depending on the configuration, internal characteristics and environmental characteristics, lead to sustained competitive advantage through innovation outcomes. This study sees strategic orientations not as sequences or alternatives, but as complementary configurations and argues that certain relationships between strategic orientations may provide organizations whit sustained competitive advantage and that organizations that are able to balance the strategic orientations perform better (Hakala, 2010, p. 5). These configurations depend on the industry life cycle and internal characteristics and differ for each company or business unit.

As discussed in previous chapters, the role of EO and LO is not universally agreed on. Some evidence points to their mediating role, where others find evidence for moderating roles. This study argues that EO and LO are, just like MO and RO, independent strategic orientations. Entrepreneurial behavior and organizational learning are areas of interest induced by CEO's or members of the management team. It is theoretically difficult to justify that in mediating effects, the degree of EO and LO is the product of a combination of RO and MO. As an alternative model, it is more plausible that the degree of EO and LO is affecting the RO and MO relationship with performance, thus suggesting a moderator role.

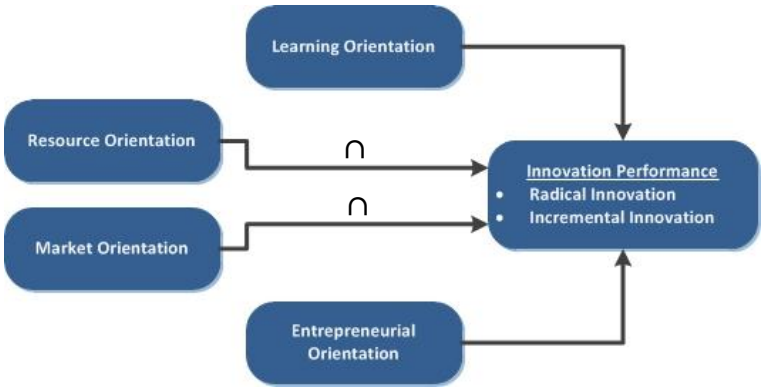


*Figure 2: Model 1: Direct effects of Strategic orientations on Innovation performance*

These assumptions results in two models to be tested: a direct model with all four orientations as independent/interdependent variables (figure 2) and a moderating model where EO and LO moderate the RO relation with innovation performance and the MO relationship with performance (figure 3). The effect of radical innovation performance and incremental innovation performance on organizational performance is an addition to both preceding models. This is graphically presented in figure 4.

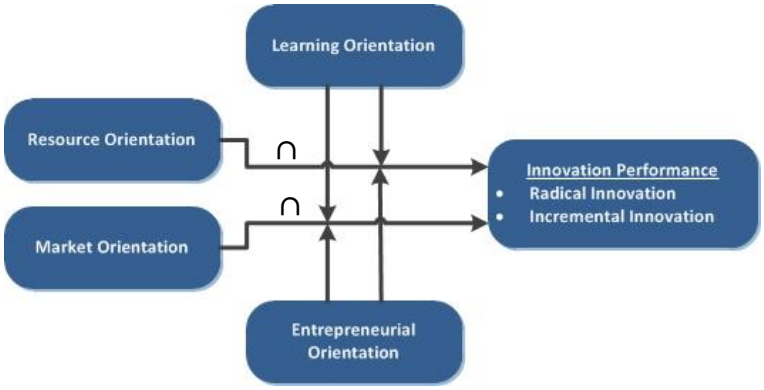


*Figure 3: Model 2: Moderating effects of LO and EO on RO/MO and Innovation performance*

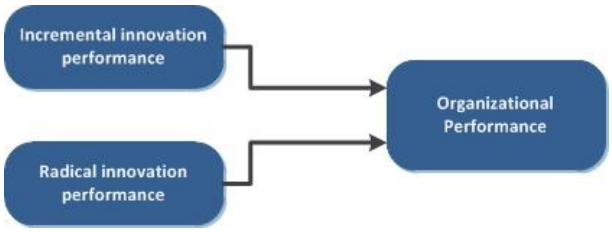


*Figure 4: Model 3: Direct effects of Innovation performance on Organizational performance*

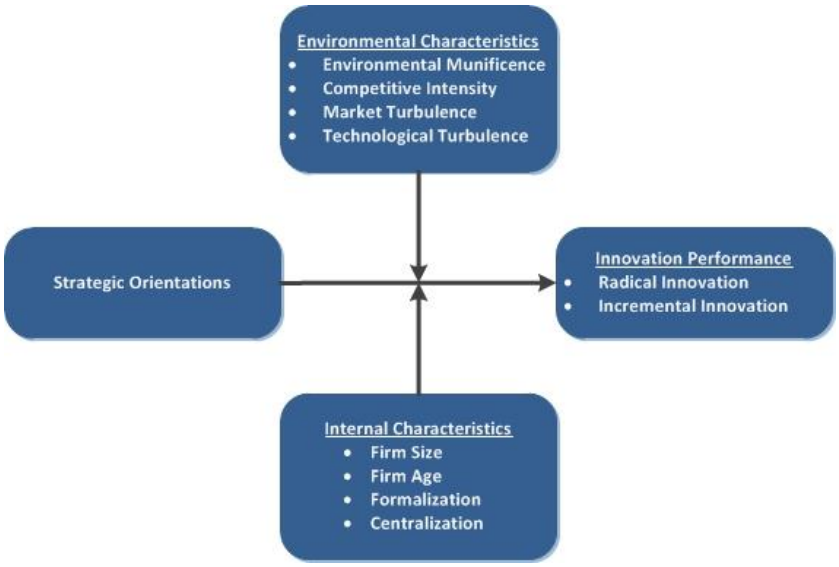


*Figure 5: Model 4: Effects of covariates on Innovation performance*

Companies must create an internal alignment between organizational features (goals, values, resources, capabilities, structure and systems) and create a fit between the internal organization and its external environment. The success of the configuration of strategic orientations on innovation performance is therefore moderated by several internal and environmental variables. These variables are firm size, firm age, environmental munificence, market turbulence, technological turbulence, competitive intensity, formalization and centralization. These are added to the equation when a decision is made between the direct and moderating model (figure 5).

# 3. Methodology

The objective of the methodological part is to discover patterns at SME's that explain differences in innovation performance at SME's in the Netherlands. This chapter elaborates on the statistical methods used, how the data is gathered, processed and analyzed. For this thesis, the main objective is to confirm or discard whether there are patterns of strategic orientations that lead to different innovation outcomes. The constructs and relations are discussed in the theoretical framework and the only way to test them is to execute a quantitative study by an online questionnaire. If statistically acceptable, the results are then used to formulate conclusions, limitations, managerial - and research implications.

## 3.1 Quantitative research design

This chapter discusses the details of the quantitative research design. It discusses the steps and the implications for reliability and validity when generalizing the results. The sampling procedure, sampling criteria, data collection and analysis of the data set will be discussed next.

### 3.1.1 Sampling and selection criteria

This quantitative empirical research will collect data by questionnaires to identify strategic orientation characteristics and innovation performance. There are approximately 863.840 SME's in the Netherlands, of which 9% have more than 10 employees and fit the SME profile, resulting in 77.746 SME's.

The following selection criterion is used to select companies for the sample used for collecting data:

- *Selection criterion 1:*

  The company must fit the SME description by employing fewer than 250 persons and having an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro. To exclude self-employed professionals and small service companies, this thesis selects manufacturing companies that have at least ten employees.

- *Selection criterion 2:*

  The target population consists of all the established manufacturing SME's in the Netherlands. Selected are manufacturers companies. The branch codes are included in appendix 1. The whole population complying with the branch codes and above selection criteria consists of 9.069 companies[6].

- *Selection criterion 3:*

  The company must be economically active and must been established for three or more years in one or more markets.

### 3.1.2 Access to cases

Access to one of the biggest email dataset of the Netherlands provided, after checking for doubles, 6.265 email addresses. Of these, 4.651 included the name of the CEO. The others only with a corporate email address. All 6.265 companies received an email (in Dutch) asking whether the CEO of that company wants to fill out the online questionnaire. Expected is a response rate of 5% resulting

[6] *Source: Chamber of Commerce of the Netherlands*

in 313 filled out questionnaires. Statistically, a sample of 369 or more companies would be ideal to have a confidence level of 95% and a confidence interval of 5% (Shadish, Cook, & Campbell, 2002). More than 150 companies are needed to make statistical calculations.

Because it was not possible to select email addresses from the dataset between 10 and 250 persons (the program had an interval of 200 – 500 FTE), a control question is added to the online questionnaire that requires the respondent to give the actual number of fulltime employees. In the same line of reasoning, another question is added to control for the age of the company. With this question, companies which do not exist longer than three years can be excluded from the sample.

The subjects for the questionnaire are the CEO's or members of the management team of the companies, because they are the only persons (at least in small companies) that are concerned with the strategy of the company. And particular in cases where there is no formalized strategy, CEO's are the persons that decide the direction of the company.

To increase the response rate, the following steps are taken into account for the invitation:

1. Sending the email on Tuesdays or Wednesdays around noon
2. Personal message about researchers profile and purpose of study
3. Mention of benefits for both sides
4. Mention number of questions and time required
5. Clear privacy statement of use of data
6. Send reminders
7. Write a short and attractive subject and invitation
8. Offering of results

The invitation email (in Dutch) for the sample with and the sample without the name of the CEO is attached in appendix 2. A reminder is send after 2 weeks to give people that were on holidays or were busy before another reminder to fill out the questionnaire. In return for their cooperation, the results of the study are offered.

### 3.1.3 Online questionnaire

For this study, data is collected by an online questionnaire with statements about strategic orientations and innovation output. The questionnaire, conducted online, is developed to classify the company on strategic characteristics and innovation outcomes. The constructs, first-order-variables and scales are derived from the literature and are well tested and/or frequently used. This strengthens the reliability and the validity of the classifications of the companies. The constructs for this questionnaire are operationalized in section 3.2. These constructs are translated in Dutch and placed in random order in the questionnaire to prevent the respondent to see a pattern. The questions and the guiding text (in Dutch) are included in appendix 4.

To increase the response rate, the following steps are taken into account for the online questionnaire:

1. No extensive instructions surrounding the questions
2. Again a privacy statement to reduce doubts about the intentions of the data collected
3. No longer than 15-25 minutes
4. Easy language, not too many open-ended questions and not too many words per question

### 3.1.4 Analysis

The data of the online questionnaires are imputed in SPSS for the optimization of the dataset. Confirmatory Factor Analysis is executed to test the validity and reliability of the constructs used in this study. Furthermore reliability of the scales is assessed using the Cronbach's Alpha coefficient (Cronbach, 1951). The next step is to select and validate the measurement model and identify relations and/or patterns between strategic orientations, innovation performance and the covariates using multiple regression analysis.

#### Step 1: Optimizing the dataset

To improve the possibilities for calculation and the reliability of the data, the reverse-coded scales (51EOAUX, 52EOINX, 53EOINX, 54EOINX, 57EOPRX, 58EOPRX, 59EOPRX, 60EOPRX, 61EORIX, 62EORIX, 63EORIX, 64EORIX, 75COTTX, 85COENX) are computed into variables that are in the same direction as all other scales (strongly disagree = 1 and strongly agree = 7). The respondents were asked which year their company was founded. This variable is computed into a new variable "company age" (1 = 0-14 years, 2 = 15-29 years, 3 = 30-44 years, 4 = 45-59 years, 5 = 60-74 years, 6 = 75-89 years, 7 = 90 years or older). Organizational size is also computed into a new categorical 7-point scale (1 = 10-29 FTE, 2 = 30-49 FTE, 3 = 50-69 FTE, 4 = 70-89 FTE, 5 = 90-109 FTE, 6 = 110-129 FTE, 7 = 130 or more FTE).

Factor analysis can be sensitive to univariate outliers, therefore removing or alternatively recoding the extreme values is necessary for the reliability of the factor analysis. Because all variables are categorized, no univatiate outliers are expected. Organizational size and age are checked for abnormalities in the distribution that influence the results on the 7-point scale. After optimizing the dataset, the distributions of all the first-order variables are checked on skewedness and kurtosis. The industry variable where the respondent marked its specific industry where they are active in is excluded from calculations. This prevents that this variable best explains the variance between strategic orientations and performance. This variable is only used to assess the external validity with regard to the generalizations of the results of this study.

#### Step 2: Scale purification

All multi-item scales of the constructs and its first-order-variables must have purified scales before starting the analysis of relations. The primary approach for scale purification, when a theoretical foundation drives survey development, is to rely on Confirmatory Factor Analysis (CFA) to ensure construct validity using the assessments of scale **unidimensionality**, scale **reliability**, **convergent validity** and **discriminant validity** (Anderson & Gerbing, 1982).

The innovation performance construct (divided in radical and incremental) is not represented by one overall construct. Incremental and radical innovation must be assessed separately throughout the analysis. The organizational performance construct is a newly developed scale and must be assessed on its internal fit. When the organizational performance construct proves to be invalid, the items of the construct are assessed separately. Thus, organizational performance, radical innovation performance, incremental innovation performance, the four strategic orientations and the covariates are subjected to scale purification.

##### *Unidimensionality*

A confirmatory factor analysis is performed to assess whether or not the constructs are valid and reliable and fit the overall model. The most commonly used approach is principal components analysis with the Varimax with Kaiser Normalization method, which attempts to minimize the number of variables that have high loadings on each factor.

The first step when performing factor analysis is to assess the suitability of the data for factor analysis. Inspection of the correlation matrix must find coefficients greater than .3. If few correlations above this level are found, then factor analysis may not be appropriate. Two statistical measures are also generated by SPSS to help assess the factorability of the data: Bartlett's test of sphericiry and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The Bartlett's test of sphericity should be significant ($p < .05$) for the factor analysis to be considered appropriate. The KMO index ranges from 0 to 1 with .6 suggested as the minimum value for a good factor analysis (Hair, Black, Babin, & Anderson, 2010). The second step is to determine how many underlying factors there are in the dataset. One of the most commonly used techniques is known as Kaiser's criterion or the eigenvalue rule. Using this rule, only factors with an eigenvalue of 1.0 or more are retained in this study. The eigenvalue of a factor represents the amount of the total variance explained by that factor (Hair, Black, Babin, & Anderson, 2010).

### *Reliability*

After excluding the items for unidimensionality the reliability of the first-order-variables must be assessed. This inter-item consistency is operationalized using Cronbach's Alpha coefficient. Typically, coefficients of .7 or higher are considered adequate (Nunnally, 1978; Cronbach, 1951). For items with smaller loadings than .7, the items with the lowest corrected item-to-total correlation should be removed until the reliability coefficient reached or exceeded the threshold value of .7. Reliability between .6 and .7 can be acceptable in cases that other indicators of a model's construct validity are good.

### *Convergent validity*

Convergent validity assesses the degree to which two measures of the same latent variable are correlated. The measures that are indicators of a specific latent variable (construct) should share a high proportion of variance together. Factor loadings (standardized estimates) of .5 and higher are considered practically significant (Hair, Black, Babin, & Anderson, 2010) as they load on one factor. Items with factor loading under .5 are excluded from this study. Ideally, factor loadings are above .7 because a factor loading of .7 equal's 50% variance extracted of that item while the other 50% is error variance (Hair, Black, Babin, & Anderson, 2010). As loadings fall below .7, they can still be considered significant, but more of the variance in the measure is error variance than explained variance.

### *Discriminant validity*

Discriminant validity is the degree to which two conceptually similar concepts are unique enough to be distinguished from other constructs. This is measured by including all first-order variables in a dependent, independent and covariates factor analysis. When one factor theoretically assigned to a first-order variable is loading higher on another first-order variable, discriminant validity is not assured. These items are excluded from analysis. Discriminant validity is tested in two times steps. The first discriminant validity test is executed for all first-order variables within the strategic orientations and innovation performance, the second is executed for all covariates. Including all first-order variables at once produces an unworkable and inconvenient overview.

## Step 3: Model testing

Testing a model is executed with the computation of a bivariate correlation table and linear regression analysis. Correlation quantifies the strength of the linear relationship between a pair of variables, whereas regression expresses the strength and direction of the relationship in the form of an equation. The appropriate way of testing the effect of moderating variables is to create a split same for each moderating variable. The median of the full sample is calculated and serves as the cutoff value between a "low" and "high" sample. A regression analysis with the independent

variables (RO and MO) and the dependent variables (radical OR incremental innovation) is executed for each split-sample. Model 1 and 2 are tested and the most appropriate one is used for further analysis. When not all strategic orientations are significant in model 1, one or more orientation could be moderating variables.

#### Step 4: Model analysis

When the final model is selected, the effects of LO and EO on the relationship between RO/MO and innovation performance are further explored by testing the model for (inverted) U-shaped (curvilinear) effects. Each regression analysis is executed twice; the first time without squared terms and a second time with the squared terms of RO and MO. These squared variables are included in the analysis to check for a curvilinear relationship with innovation performance by identifying long-term effects. The squared term represents a second inflection point. Adding these "polynomial" terms creates multicollinearity which makes statistical significance testing of the polynomial terms inappropriate. Multicollinearity is a problem in polynomial regression (with terms of second and higher order) where $x$ and $x^2$ tend to be highly correlated. Instead of assessing the significance of each variable, the change in $R^2$ (variance explained by dependent variables) values must be assessed from the equation model with linear terms to the $R^2$ for the equation with the polynomial terms. The focus is on significant incremental improvement of the model, not the significance of individual variables. Common practice is to start with the original variables and then sequentially add higher-order polynomials until no significant improvement in $R^2$ is achieved (Hair, Black, Babin, & Anderson, 2010). Adding an extra polynomial variable always increases the $R^2$, therefore the focus should be on the adjusted-$R^2$ which represents the variance explained by the dependent variable corrected by the number of independent variables and the number of cases. A positive quadratic term indicates a U-shaped curve, whereas a negative coefficient indicates an inverted U-shaped curve.

Furthermore, the covariates are included (model 4). Depending on the results of the correlation matrix, covariates that are not correlated with any of the variables are then excluded from further analysis. For each covariate a split-sample is created and separate regression analyses are executed to see which variables also influence the strategic orientation – performance relationship. The analysis of the final model is executed for both first-order and second-order variables. Underlying relations among strategic orientations, performance and covariates can be defined. Furthermore, model 3 (the direct effects of incremental innovation performance and radical innovation performance on organizational performance) is tested with a regression analysis.

### 3.1.5 Validity considerations

To assess the quality of the research, the validity and reliability must be considered. Although earlier research used validity along with reliability (Babbie, 2007), research on validity expanded and incorporated reliability considerations within its concepts. Validity refers "*to the approximate truth of an inference*" (Shadish, Cook, & Campbell, 2002, p. 34). In other words, it generally refers to the extent to which a concept, conclusion or measurement is well-founded and corresponds accurately to the real world. The framework of Shadish, Cook & Campbell (2002) provides four (statistical conclusion, internal, construct and extern) validity types. Although there are many threats and considerations applicable to reliability and validity, the most important ones are discussed in this section. **Statistical conclusion validity** refers to the validity of inferences about the correlation (covariation) between treatment and outcome, **internal validity** refers to the validity of inferences about whether observed covariation between A (the presumed treatment) and B (the presumed outcome) reflects a causal relationship from A to B as those variables were manipulated or measured, **construct validity** refers to the validity of inferences about the higher order constructs that represent sampling particulars and **external validity** refers to the validity of inferences about

| Validity | Considerations |
|---|---|
| Statistical Conclusion Validity | ➢ Including a lot of different branches incorporates a lot of diversity in competitive intensity, environmental munificence and environmental turbulence. One could argue that selecting a few industries that differ on these variables provides better data. However, this is quite subjective. Therefore, all branches are selected, analyzed and if necessary excluded from the research later. A control question is added to the online questionnaire which requires the respondent to specify the industry they are active in. This enables the researcher to exclude companies during analysis when error variance is high because of the heterogeneity of the sample.<br>➢ With a response of 361 companies of more, 5% confidence interval is ensured. Less companies require the confidence interval to be scaled down |
| Internal Validity | ➢ The moment of measurement has a time lag. Because of the cross-sectional nature of this study, outcome and input are measured at the same time. For this study it is assumed that a strategy (strategic orientation) is longer than three years adopted by the company leading to the results at that moment of measurement (innovation performance)<br>➢ Although the CEO's of SME's are the only persons, at least for smaller SME's, that can answer questions about strategy, innovation- and organizational performance, some weaknesses arise. There is a possibility that the CEO answers the questions more positively than employees would have. For example centralization that refers to the decision-making freedom of employees. Further, but in the same line of reasoning, they can overrate the radicalness of innovations in comparison with competitors. Also, they might not have all the market information that sales managers have with regard to the questions about competitors and customers.<br>➢ Somewhat alike, there could also be a self-report bias because the motivation of the CEO to participate in the study can somewhat affect the results. E.g. they are more likely to participate when company results are positive.<br>➢ With regard to Likert-scales; respondent that have weak opinions or are ambivalent tend to select the midpoint of a scale. A midpoint is useful for respondents to select when they could not agree whether they agree or not. Midpoint selection is also affected by the number of response options around it. Respondents are less likely to take the midpoint as the number of other options increases, suggesting that midpoint rates will normally be greater on a 5-point scale than on a 7-point scale. For this study the 7-point scale with a midpoint is selected because that is most reliable. It increases the dispersion of the data distribution. |
| Construct Validity | ➢ The order or "natural" grouping of questions is relevant for this study. Previous questions may bias later questions. To prevent the respondent from rushing through the most important questions, innovation performance and strategic orientation questions are placed at the top of the questionnaire. The control questions are placed after. Further, if all questions are stated positively, the respondent could answer all questions with high scores to attain a good result. To prevent this, some items of constructs are reverse coded to keep the respondents focus.<br>➢ Because only well-tested and well-reasoned scales and items are used for the constructs which provided a good internal fit in previous studies, the construct validity of this study is enhances. Further, the translations from English to Dutch are checked by two persons to prevent translation errors of the researcher.<br>➢ Reliability, unidimensionality, convergent validity and confirmatory validity are assessed with regard to inter-item consistency of the construct scales. Items that do not significantly explain the variance of the whole first-order-variable or the whole construct are excluded from the analysis to improve the overall construct validity. |
| External Validity | ➢ This study is executed at manufacturing SME's in the Netherlands. This implicates that the results are only generalizable to manufacturing SME's in the Netherlands. The results are thus not usable for service organizations and organizations in other countries |

*Table 3: Reliability and validity considerations with regard to the quantitative research design*

whether the cause-effect relationship holds over variation in persons, settings, treatment variables, and measurement variables (Shadish, Cook, & Campbell, 2002, p. 38). The reliability and validity considerations with regard to the quantitative research design are grouped in table 3.

## 3.2 Operationalization

The constructs for the online questionnaire are operationalized here. Collecting data at the companies is most reliable by using constructs, scales and first-order-variables that are used in the literature. These statements, assessed with a Likert-scale, are well tested or well-argued and will therefore most likely lead to reliable classifications of strategic orientation characteristics. Selected are those that represent the definitions of this thesis, are (if possible) used in multiple studies and provided a good fit in those studies. These constructs are all used for quantitative studies. The items of the first-order-variables are statements that used Likert-scales for assessment. The constructs are divided in the constructs of interest and some covariates that where discussed in paragraph 2.4.

### 3.2.1 Main constructs

The constructs used for strategic orientation are presented in the table 4. All items are measured on a seven-point Likert-scale. The items that are used are presented in appendix 5. The translated items and guide used for the online questionnaire are presented in appendix 4.

| | Definition | First-order Variable | # Items | Source |
|---|---|---|---|---|
| **Resource Orientation** | Resource orientation refers to the extent to which a firm engages in behaviors consistent with the Resource Based View (Paladino, 2008, p. 583). | - Uniqueness<br>- Synergy<br>- Dynamism | Items = 7<br>Items = 3<br>Items = 5 | Adopted from Paladino (2008) |
| **Market Orientation** | Market orientation refers to ''*the organizational culture that most effectively and efficiently creates the necessary behavior for the creation of superior value for buyers and thus, continuous superior performance for the business*'' (Narver and Slater, 1990, p. 21). | - Competitor Focus<br>- Customer Focus<br>- Interfunctional Coordination | Items = 4<br>Items = 6<br>Items = 5 | Adopted from Narver and Slater (1990) |
| **Learning Orientation** | Learning orientation refers to "*the organizations propensity to create and use knowledge in order to attain competitive advantage*" (Hakala, 2010, p. 4) | - Commitment to learning<br>- Open-mindedness<br>- Shared vision | Items = 4<br>Items = 4<br>Items = 3 | Adopted from Sinkula, Baker, & Noordewiet (1997) |
| **Entrepreneurial Orientation** | Entrepreneurial orientation refers to "*the processes, practices, and decision-making activities that lead to new entry*" (Lumpkin & Dess, 1996, p. 136) | - Autonomy<br>- Innovativeness<br>- Proactiveness<br>- Risk Taking<br>- Competitive Aggressiveness | Items = 4<br>Items = 5<br>Items = 4<br>Items = 4<br>Items = 1 | Adopted from Lumpkin, Cogliser, & Schneider (2009) |

*Table 4: Operationalisation of the strategic orientations*

Resource orientation, as discussed in section 2.2.1, is more than striving for a unique resource bundle. The VRIN/O criterion does not represent the RO of how the uniqueness of resources is exploited. Therefore this study does not adopt the VRIN/O criteria as the first-order variables, but adopts the variables of Paladino (2008): uniqueness, synergy and dynamism. These represent the definition of this thesis and fitted the total RO construct as discussed. Market orientation is a much

more operationalized construct. It is widely accepted, tested and validated. The original three dimension MO construct and its items (customer focus, competitor focus and interfunctional coordination) are therefore selected from Narver & Slater (1990), slightly modified by Paladino (2008).

The Learning orientation and entrepreneurial orientation where more difficult to select and obtain. EO is a widely accepted and tested construct, at least for four of the five dimensions. Proactiveness, competitor aggressiveness, innovativeness and risk taking items are all widely tested, modified and validated as first order variables (dimensions). Autonomy, however, is less researched in the strategy and innovation literature. There is no wide spread consensus of the importance of autonomy (as discussed in the Theoretical Framework chapter). The initial studies of Lumpkin & Dess (1996) that conceptualized autonomy as the fifth dimension and the empirical evidence of Kollman & Stockmann (2010) and Lumpkin, Cogliser, & Schneider (2009) were convincing enough to include autonomy in this study as the fifth dimension. In their study, Lumpkin, Cogliser, & Schneider proposed eight items and found four of them significantly representing the autonomy dimension and the overall EO construct. The other variables and items are also adopted from this study as the authors tested also these dimensions that were provided by Covin & Slevin (1989) and Lumpkin & Dess (2001).

The scale for LO was originally developed by Sinkula et al. (1997) and retested by Baker and Sinkula (1999) who found support for its validity and reliability. This resulted in three first-order factors (commitment to learning, open-mindedness, and shared vision). Although another literature stream suggests that the first-order factors should be the four processes of organizational learning, this thesis adopts the three variables that influence the propensity of an organization to learn. Organizations do not all learn in the same way and this thesis argues that organizations must be seen as cognitive enterprises (Wang C. L., 2008). These three variables are widely accepted and tested and therefore reliable to represent the LO construct. The different modes of learning (adaptive and generative) indicate that for a higher order generative learning to occur, an organization needs to challenge its existing boundaries, routines and believes. This indicates that generative learning, compared to adaptive learning, requires an organization to demonstrate a higher degree of commitment to learning, open-mindedness and shared vision (Wang, 2008, p. 639; Sinkula, Baker, & Noordewiet, 1997).

There are a lot of articles that use innovation performance as the dependent variable. However, there is no unified construct. It depends on the research what first-order-variables are used. Some articles use constructs to classify an individual innovation as radical, incremental, market-based, or technology based (Wang & Ahmed, 2004; Garcia & Calantone, 2002). However, this study does not want to classify one innovation, but the innovation output in the last three years. Therefore, the scales must be prepared for multiple innovations. Another possibility is measuring innovativeness as a single first-order multi item scale (Paladino, 2008; Mazzarol, Reboud, & Volery, 2010). However, this refers to the ability of the organization to engage in innovative behavior. It does not measure the (commercial) success of the innovation process and what type of innovation it induced. Others use only single output variables like ROI, ROA, sales, customer satisfaction etc (Ledwith & O'Dwyer, 2009; Ndofor, Sirmon, & He, 2011). Besides the short-sidedness limitation of these calculations, these measures do not contribute to the identification of types of innovations.

This study aims at identifying patterns between the variables. The question is about which composition of strategic orientations and covariates lead to different kinds of innovations. Therefore, a unidimensional construct is needed that distinguishes between product and process innovations, between radical and incremental innovations and between market and technology innovations. Also, one must bear in mind that most innovation performance constructs are derived from studies conducted among large companies where the respondents are able to answer complex questions. For this study, which is conducted among SME's, simple questions should be included. For example,

questions like "*in comparison with our competitors, our company has a lower success rate in new products and services launch*" or "*in comparison with our competitors, our company is faster in bringing new product and services to the market*" (Wang & Ahmed, 2004). CEO's of SME's mostly do not have insights in the processes at competitors, how quick they develop their products, their success rate etc. It requires market intelligence which is more common at large organizations. Therefore, the constructs and their scale items should include questions that can be answered without thorough competitor or customer information. Furthermore, questions about ROI and ROA which include calculations not common for smaller firms should be excluded too. Further, scales are excluded that measure "*innovativeness*"; the ability to develop and support new ideas. This study specifically measures the "*outcomes*" of innovation. After exploring more than 40 articles with innovation outcome/performance scales, only the scales used in the article of Johannessen, Olsen, & Lumpkin (2001) is useful. Drawing on prior research by Schumpeter and Kirzner, the authors developed a scale that addresses six areas of innovative activity: new products, new services, new methods of production, opening new markets, new sources of supply, and new ways of organizing. They found that innovation as newness represents a unidimensional construct, distinguished only by the degree of radicalness. Their constructs classify innovations into new-to-the-firm and new-to-the-industry. Factor analysis on data from two separate field studies provided a good fit for both first-order-variables. This construct does not use the concept "technology" which requires extensive elaboration when included in the questions. Instead of using technology, this construct uses "output" variables of new technologies; new methods of production and new sources of supply.

However, the construct of Johannessen, Olsen, & Lumpkin (2001) has some weaknesses. In the original scales (appendix 3), respondent must answer the questions with yes or no. Besides the limitations for statistical analysis, this also brings a bias. When a respondent cannot answer the question because the answer is somewhat in between, the scale is less usefull. Therefore, the answers in this study will be given on 7-point Likert-scales just like all the other constructs. Further, the original scales stated one question and then six areas to apply the questions to. This is quite confusing as both first-order-variables look alike and only differ on a few but critical words. Therefore the questions are transformed in propositions which cover the whole question in each item. Because of these transformations and the notion that "to … extent" as used in the guiding question has a subjective meaning in Dutch "*in … mate*", "*strongly agree – strongly disagree*" is applied to the 7-point Likert-scale. All these changes improve the readability and reduce the chance that CEO's are getting confused and give wrong answers. The new innovation performance construct is presented also in appendix 3.

| | First-order Variable | # Items | Source |
|---|---|---|---|
| **Innovation Performance** | - Radical innovation<br>- Incremental innovation | Items = 6<br>Items = 6 | Derived from Johannessen, Olsen, & Lumpkin (2001) |

*Table 5: Operationalisation of innovation performance*

Many studies in new product development and innovation management use organizational performance as a measurement of the success of innovations. ROA, ROI, sales/turnover, profitability, or market share are the most used measures (a.o. Ledwith & O'Dwyer, 2009; Wong & Ellis, 2007; Paladino, 2009). This study therefore uses profitability, sales and market share as a second dependent variable. If the construct of innovation performance proves not to be useful, improvements on these three variables indicate the commercial success of innovation performance. If the construct of innovation performance proves to be useful, the relation between innovation performance and organizational performance can be validated. Some authors use these measures in comparison to competitors. The items of their scales use propositions like "*How would you rate your firm's performance (sales, turnover, profit etc.) in comparison with your major market competitors*

*over the past three years?*" (Wong & Ellis, 2007, p. 151). These kinds of questions, however, have weaknesses. CEO's of SME's must be able to compare their profits with that of their major competitors. This is for smaller firms not likely. Furthermore, this measurement does not represent internal performance as a result from internal characteristics. Comparing with the major competitors, which most likely are bigger, have more resources and are more successful, always gives a skewed representation of the actual organizational performance. The three measurements are measures on a 7-point Likert-scale ranging from "strongly increasing" tot "strongly decreasing".

| | First-order Variable | # Items | Source |
|---|---|---|---|
| **Organizational Performance** | - Sales growth | Items = 1 | Derived from a.o. (Ledwith & O'Dwyer, 2009) |
| | - Profitability growth | Items = 1 | |
| | - Market share growth | Items = 1 | |

*Table 6: Operationalisation of organizational performance*

### 3.2.2 Covariates

The covariates used for the questionnaire are firm age, firm size, formalization, centralization, environmental munificence, competitive intensity and environmental turbulence. These constructs are operationalized in table 7. As discussed, the size and age of an organization have different implications for innovation performance. They are also added to the questions to verify that the companies have at least 10 employees and at the most 250 and that the companies are at least three years economically active. Also environmental characteristics moderate the strategic orientation – innovation performance relationship. The variables discussed in 2.4 are all added to this research as covariates.

Selected are constructs that represent the definition best and are well-tested and/or are used multiple times. The higher they score on the measurements, the higher the degree of that particular construct. All items were measured on a seven-point Likert-scale. The last control question is the industry they are in. As discussed, to have an optimal amount of responses, all industries are selected for this study. However, if certain industries must be excluded for the research to prevent industries explaining the differences in innovation performance, every response must have an industry code.

This study adopts also the covariates formalization and centralization the measurement of Jansen, Van Den Bosch, & Volberda (2006). Although the measurements of Jaworski & Kohli (1993) are more used in the literature, their questions are from an employee perspective with a negative attitude against their supervisors. Because this study questions CEO's other, more objective, scales are used. Jansen, Van Den Bosch, & Volberda (2006) tested these constructs and found a good fit. Formalization and centralization constructs are often used in strategy and innovation studies as control or independent variables. However, there is not a unified consensus on the moderating role with regard to the relationship between organization learning and innovation performance because empirical studies differ in results.

| | Definition | # items |
|---|---|---|
| **Market turbulence** | Market turbulence refers to "*the changes in composition of customers and their preferences and implies changing strategies in face of changing customer needs*" (Paladino, 2008, p. 583) | Items = 5<br><br>Adopted from Paladino (2008) |
| **Technology turbulence** | Technology turbulence refers to "*the rate of technological change*" (Jaworski & Kohli, 1993; Paladino, 2008, p. 583) | Items = 5<br><br>Adopted from Paladino (2008) |
| **Environmental munificence** | Environmental munificence refers to the "*environment's support for organizational growth*" (Baum & Wally, 2003, p. 1110) | Items = 5<br><br>Adopted from Baum & Wally (2003) |
| **Competitive intensity** | Competitive intensity refers to the degree of competition in an industry (Porter, 1985) assessed by "*the behavior, resources and ability of competitors to differentiate*'' (Jaworki and Kohli, 1993, p. 60). | Items = 5<br><br>Adopted from Jaworski & Kohli (1993) |
| **Formalization** | Formalization refers to the degree to which decision making is regulated by formal rules and procedures and relationships among channel members are governed by rules, procedures, and contracts (Jaworski & Kohli, 1993) | Items = 5<br><br>Adopted from Jansen, Van Den Bosch, & Volberda (2006) |
| **Centralization** | Centralization refers to the degree to which authority is concentrated within a particular member of the channel (Jaworski & Kohli, 1993) | Items = 5<br><br>Adopted from Jansen, Van Den Bosch, & Volberda (2006) |

*Table 7: Operationalization of the covariates*

# 4. Results of data collection

This chapter discusses the results of the quantitative part of this study. Of the 6.265 email addresses, 2.098 addresses bounced indicating that the dataset was rather old. The first email with the invitation to participate in the study produced a result of 75 completely filled in questionnaires. However, when accessing the online data, the data was incomplete. The online program did not store the data of 15 propositions. These respondents were asked to fill in the missing propositions again, but because the initial questionnaire took on average 30 minutes to fill in, only 46 questionnaires were completed. The second (reminder) email yielded 67 completely filled questionnaires resulting in 113 cases. After excluding companies with less than 10 or more than 250 fulltime employees and companies which were not three years or longer existing, exactly 100 "clean" cases remained. This is a response rate of only 2,4%.

## 4.1 Dataset optimization results

The age of companies, computed into seven categories, was distributed nicely over all categories and therefore did not need adjustments. With regard to the amount of fulltime employees the ordinal calculated scales revealed that 75% of the companies where assigned to the first two categories. Therefore, the original values are computed into new categories to provide a better distribution of companies over all seven categories. The new computation (1 = 10-24 FTE, 2 = 25-39 FTE, 3 = 40-54 FTE, 4 = 55-69 FTE, 5 = 70-84 FTE, 6 = 85-99 FTE, 7 = 100 or more FTE) revealed indeed a better distribution. 19 of the 23 branches are represented in the sample indicating high external validity.

## 4.2 Scale purification results

Unidimensionality, convergent validity, discriminant validity and reliability are assessed for all constructs. All constructs were retained for the analysis; however three first-order variables were deleted. The factor analysis results for the remaining variables are summarized in table 8. In total 22 items were deleted to provide satisfactory results on validity and reliability. The details are presented in appendix 5.

The strategic orientations are assessed on a second-order level individually for convergent validity and on first-order level together for discriminant validity. The conceptual **Resource Orientation** scale of Paladino (2008) loaded surprisingly well. All items for Uniqueness, Dynamism and Synergy were retained. **Market Orientation** (Narver & Slater, 1990) was considered valid and reliable after the deletion of 6 items. For all first-order variables (interfunctional coordination, customer orientation and competitor orientation), three items were retained after assessing the convergent and discriminant validity. Both constructs load strong and significant on all sub constructs. The RO scale of Paladino (2007) provides strong indications that the theory of Paladino that RO, based on the RBV, creates sustained competitive advantage by developing and deploying unique and costly-to-imitate (bundles of) resources for the purpose of exploiting environmental opportunities and neutralizing threats (Paladino, 2007) resulting in a unique (superior valuable) resource base that is immobile and heterogeneous (Barney, 1991). Market orientation is, as expected from the most researched strategic orientation, a strong and reliable construct for this study.

**Learning Orientation** (Sinkula, Baker, & Noordewiet, 1997) is represented by shared vision and commitment to learning. Open-mindedness was deleted because two items loaded not sufficiently. The third item loaded in a discriminant validity test on a first-order variable of a different strategic orientation. The complete scale was therefore excluded from the analysis. The LO scale is just like RO and MO a strong scale. Only the dimension open-mindedness did not survive the factor analysis for the LO construct. It could be that, just as with the EO construct, this dimension proves to be significant with a larger sample. Another possibility is that open-mindedness is not a prerequisite for

LO. Theoretically is that option difficult to explain when assessing high learning as generative learning where questioning the status quo is the most important dynamic. Open-mindedness seems to be intertwined with generative learning. **Entrepreneurial Orientation** (Lumpkin, Cogliser, & Schneider, 2009) is represented by Proactiveness, Autonomy and Risk taking. Innovativeness was deleted because two items loaded significantly on other first-order variables and three items did not load sufficiently at all. Competitive aggressiveness, consisting only one item, did not load sufficiently as a single component and was therefore deleted as well. EO autonomy, a new scale, seems to be a strong dimension of EO. Innovativeness and aggressiveness did not hold in the factor analysis. It could be argued that innovativeness is a product of strategic orientations and not an indicator. Aggressiveness could be beneficial for entrepreneurial behavior, but is maybe not a prerequisite. Companies could be entrepreneurial orientated without being aggressive against competitors.

| Second order variable | First order variable | Variance explained | KMO | Loadings | Reliability |
|---|---|---|---|---|---|
| Resource Orientation | | 72,67% | .865 | | |
| | Uniqueness | | | .766 - .836 | α= .926 |
| | Dynamism | | | .776 - .853 | α= .912 |
| | Synergy | | | .686 - .876 | α= .820 |
| Market Orientation | | 76,70% | .781 | | |
| | Customer Orientation | | | .832 - .906 | α= .873 |
| | Competitor Orientation | | | .789 - .837 | α= .808 |
| | Interfunctional Coordination | | | .839 - .857 | α= .836 |
| Entrepreneurial Orientation | | 65,50% | .686 | | |
| | Proactiveness | | | .683 - .866 | α= .739 |
| | Autonomy | | | .783 - .864 | α= .796 |
| | Risk taking | | | .570 - .763 | α= .713 |
| Learning Orientation | | 68,90% | .834 | | |
| | Shared Vision | | | .789 - .911 | α= .874 |
| | Commitment to Learning | | | .698 - .809 | α= .799 |
| Dependent Variables | | | | | |
| | Incremental Innovation Performance | | | .607 - .751 | α= .731 |
| | Radical Innovation Performance | | | .541 - .742 | α= .779 |
| | Organizational Performance | | | .852 - .906 | α= .909 |
| Covariates | | | | | |
| | Formalization | | | .650 - .812 | α= .799 |
| | Centralization | | | .768 - .895 | α= .891 |
| | Market Turbulence | | | .527 - .781 | α= .565 |
| | Technological Turbulence | | | .583 - .825 | α= .831 |
| | Environmental Munificence | | | .599 - .768 | α= .547 |
| | Competitive Intensity | | | .690 - .827 | α= .804 |

*Table 8: Factor loadings and reliability coefficients*

The dependent variables provided good results. The modified scales of Johannessen, Olsen, & Lumpkin (2001) seem to be valid and reliable despite of the adjustments in the phrasing of the questions. Only one item (ININ97) is deleted because it did not load >.50. **Incremental innovation performance** (factor loadings=) and **radical innovation performance** (factor loadings=) are therefore retained as separate constructs. **Organizational performance** loaded highly on all three items is therefore included in the study as the dependent variable in the innovation performance – organizational performance relationship.

The six selected covariates with multiple items are also retained for analysis. **Centralization**, **Technological turbulence**, **Competitive intensity** and **Formalization** loaded sufficiently on all five items. For both **Market turbulence** and **Environmental munificence** two items were deleted because

they loaded not sufficiently or loaded on other constructs. Although the reliability is <.60 indicating insufficient reliability, previous studies showed that these constructs and its items were reliable, suggesting that with a larger sample the results could be better. Construct validity is considered sufficient because the factor loadings are >.70 suggesting an error variance less than 50%. Reliability could not be further improved by removing additional items.

## 4.3 Model selection

Appendix 6 presents the tables with the correlation coefficients of the first-order and second-order variables. This coefficient tells what degree the relationship between two variables can be represented by a straight line where 1 represents a perfect linear relationship and 0 a non-linear relationship or no relationship at all. Correlation does not imply causation. The most important and striking results are discussed next. Results of the correlation analysis (appendix 6) indicates that MO, RO, LO and EO are strongly correlated. Especially LO-MO (,679) and EO-LO (,446). On the second-order level is incremental innovation correlated with both RO (,282) and MO (,294). Radical innovation is correlated with all four strategic orientations (RO=,564; MO=,323; EO=,332; LO=,332). EO and LO are not correlated with incremental innovation performance suggesting no moderating and direct relations with RO and MO. EO and LO are strongly correlated with radical innovation performance. This fits the theoretical expectations of this study that entrepreneurial behavior and organizational learning are linked to developing radical innovations.

*Table 9: Path Coefficients model 1 and model 3 – Full Sample Estimation*

| ***Description of paths*** | ***Model 1*** | | ***Model 3*** |
|---|---|---|---|
| | ***Incremental innovation*** | ***Radical innovation*** | ***Organizational Performance*** |
| Resource Orientation | ,192* | ,481*** | |
| Market Orientation | - | - | |
| Learning Orientation | - | - | |
| Entrepreneurial Orientation | - | - | |
| Incremental innovation | | | ,162ª |
| Radical innovation | | | ,296** |
| $R^2$ | ,127 | ,358 | ,145 |
| Δ $R^2$ | ,090 | ,331 | ,128 |

*$R^2$=variance explained by dependent variables; Δ $R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; *** P<.001; ** P<.01; * P<.05; - not significant; ª significant at ,105 but included for discussion*

Table 9 and 10 presents the regression coefficients of the second-order variables. These coefficients estimate the linear relationship between a dependent and one or more independent variables by assuming a causal relationship between them. For each regression analysis a critical of P<0.05 is required before assessing the individual regression coefficients. When $R^2$ or Δ $R^2$ is left blank, the model did not meet this requirement.

Model 1 clearly indicates that RO (,192) positively influences incremental innovation and RO (,481) positively influences radical innovation. MO, LO and EO do not seem to have direct effects on incremental and radical innovation at all. Assessing the results of model 2 globally provides enough evidence for the moderating roles of LO and EO. RO and MO have direct effects on innovation performance, effects of EO and LO are clearly recognizable and the variance explained by the dependent variables is acceptable. Model 1 is therefore rejected and model 2 is retained for further analysis.

*Table 10: Path Coefficients model 2 – Split Sample Estimation*

| Description of paths | Model 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,516*** | - | ,545*** | - | ,481*** | - | ,585*** |
| Market Orientation | ,340* | - | - | - | ,343* | - | - | - |
| $R^2$ | ,178 | ,343 | - | ,280 | ,195 | ,276 | - | ,288 |
| $\Delta R^2$ | ,144 | ,316 | - | ,251 | ,161 | ,245 | - | ,258 |

*$R^2$=variance explained by dependent variables; $\Delta R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off value EO = median = 4,40; Cut-off value LO = median = 5,44; *** P<.001; ** P<.01; * P<.05; - not significant*

## 4.4 Model analysis

The empirical study provides evidence that RO induces radical innovation and MO induces incremental innovation (table 10). RO leads to radical innovation where it develops a unique resource base and searches the environment for channels to exploit. Developing, accumulating and deploying a unique resource base will enable a company to provide (potential) customers with a qualitative, total new and valuable product based on their latent needs (not on their current needs). Uniqueness of the resource base, dynamism effects of unique resources on the organization and synergy effects of the resources are maximizing the potential to create competitive advantage. MO leads to incremental innovations where it gathers information about customer needs, competitors and transfers this information throughout the organization to fully exploit it. Based on this information, existing products are improved on the short term to stay ahead of competitors. The conclusion of the theoretical framework argued that always a combination (balance) of RO and MO exists for both radical and incremental innovation. However, the regression analysis indicates that no combination of balance exists. RO only leads to radical innovation and MO only leads to incremental innovation.

### *4.4.1 The effect of entrepreneurial orientation as moderator*

The moderating effect of entrepreneurial orientation provides some additional findings contradictory to the expectations of the theoretical framework. With regard to radical innovation performance, no significant difference between low and high entrepreneurial orientation appear. This indicates that for developing radical innovations, entrepreneurial orientation has no effect on the resource orientation relationship with radical innovation performance. Risk taking, proactiveness and autonomy are not as important as expected for the development of radical innovations. Although the path coefficient for RO when EO is high is slightly higher, it is concluded for now that entrepreneurial behavior does not lead to improved performance with regard to developing radical innovations and is therefore not a moderator for developing radical innovations. It is likely that resource orientation itself produces radical innovations by a strong focus on building a unique resource base. This resource base then produces the knowledge, creativity, uniqueness and synergy needed to develop radical innovations. It is possible that previous research found positive effects of EO when assessing the commercialization of radical innovations because is it more likely that EO affects the speed of introducting new products or services to the market. Taking risk and being proactiveness does not influence the degree of radicalness of an innovation, but increases the likelihood of introducing new products earlier to the customers than competitors do. The effect of EO in developing innovations should be assessed carefully whether it has an effect on the innovation itself or the commercialization of it.

The effect of EO on MO and incremental innovations is on the other hand remarkable. Where MO leads to incremental innovations when EO is low, no relation exists when EO is high. In other words; high entrepreneurial orientation wipes out the relationship between MO and incremental innovation performance. It seems that risk taking, proactiveness and autonomy cannot be combined with customer and competitor orientation and interfunctional coordination. Information about customers and competitors becomes obsolete when striving for incremental innovations with entrepreneurial behavior. This result is very plausible because risk taking is about taking actions without having all the information required about customers and/or competitors, being proactive with regard to competitor actions and autonomy of personnel. Being entrepreneurial makes indeed market orientation less important for the development of incremental innovations because it strives for supplying on the latent customer need. Different literature streams have proposed and tested theories to explain the development of innovations with MO. Market driven (or responsive) companies where supposed to react to changes in customer and competitor needs (in this study the normal operationalization of MO), but market driving (or proactive) companies use entrepreneurial behavior to supply on the latent needs of customers and try to enter new niches. Bluntly said, they argue that MO induces incremental innovations and MO+EO induces radical innovations. The results indicate that MO does not lead to the development of radical innovations and that EO even inhibits MO to contribute to the development of incremental innovation. Division of the MO construct in market driven (responsive) and market driving (proactive) is therefore not useful. It is possible that researchers using this distinction of MO produced these results because they only had one innovation construct. This study intentionally uses both incremental and radical as separate constructs and not one constructs arguing that a high innovation performance degree represents radical innovation performance and a low degree represents incremental innovation performance. Making use of the distinction between radical and incremental innovation performance allows us to deeper explore the influence of RO and MO and the true role of EO.

### *4.4.2 The effect of learning orientation as moderator*

This paragraph discusses learning orientation as the second moderating variable of the model. Results provide us some interesting dynamics. Companies with low LO are most likely to develop incremental innovations through MO. High LO, tantamount to generative (or double loop) learning, is most beneficial for the development of radical innovations through RO. This is line with the expectation of the theoretical framework. Generative learning is about detecting and correcting errors and questioning the boundaries of the organizations resulting in processes where organizational members are willing to question long-held assumptions about its mission, customers, markets, products or technologies and are stimulated to think out-of-the-box. A shared vision and commitment to continuous generative learning is a prerequisite to stimulate this behavior. Only with a shared vision about the bigger picture, commitment of employees to be creative and to continuously develop/educate themselves, generative learning is provoked to develop radical innovations.

Generative learning is however not beneficial for the development of incremental innovations. Although it does not have a negative effect, adding high LO to the equation and MO does not seem to matter anymore when striving for incremental innovations. For the development of incremental innovations, low LO, tantamount to adaptive (or single loop) learning, is most beneficial for incremental innovations. This is also in line with the expectations of the theoretical framework. Adaptive learning is most beneficial to detect and correct errors within the boundaries of the organization, doing the things they do better, cheaper, quicker etc. This study provides evidence that a shared vision about the bigger picture and commitment of employees to be creative and continuously develop/educate themselves has a no effect on routine, improvement and specialization activities for incremental innovations. Reflecting on the expectations that generative

learning should have a negative effect on incremental innovation performance and that adaptive learning should have a negative effect on radical innovation performance, the results of this study indicates no effect at all. This is an important finding, indicating that learning behavior (and also entrepreneurial behavior) can be present at the same time without creating negative effects on the innovation output. This is more manageable for companies than controlling for negative effects and changing the organization when striving for another form of innovation output.

### 4.4.3 U-shaped curvilinear effects

The next point of interest is whether or not a (inverted) curvilinear effect exists for MO and RO. Adding a squared term to the equation checks the presence of curvilinear effects. Assessing the significance of a polynomial or interaction term is accomplished by evaluating incremental $R^2$, not the significance of individual coefficients, due to high multicollinearity. RO when EO is high and MO when LO is low have inverted U-shape effects on innovation performance indicated by the significant increase of the variance explained by the dependent variables. Compared to the model without squared terms (table 10) this variance is increased from ,280 to ,337 for RO when EO is high and from ,195 to ,268 for MO when LO is low. Both significant improvements of the model at ,05.

*Table 11: Path Coefficients – Controlling for (inverted) U-shaped Effects*

| Description of paths | Model 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | - | - | ,1,999 | - | - | - | - |
| Resource Orientation² | - | - | - | -1,436 | - | - | - | - |
| Market Orientation | - | - | - | - | 2,066 | - | - | - |
| Market Orientation² | - | - | - | - | -1,741 | - | - | - |
| $R^2$ | - | - | - | ,337 | ,268 | - | - | - |
| Δ $R^2$ | - | - | - | ,296 | ,220 | - | - | - |
| Sign. change in $R^2$ (<,05) | - | - | - | ,045 | ,038 | - | - | - |
| VIF | - | - | - | >36 | >41 | - | - | - |

*$R^2$=variance explained by dependent variables; Δ $R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off value EO = median = 4,40; Cut-off value LO = median = 5,44; VIF=variance inflation factor (collinearity diagnostic)*

To assess the power of the unsquared and squared term, the multicollinear regression coefficients must be standardized (Hair, Black, Babin, & Anderson, 2010). Removing predictors from the model or increase the sample is not an option. MO and RO are each subtracted from its mean (calculated for each split sample) and then the deviations are used in the model by using $z_i = x_i - \bar{x}_i$ instead of just $x_i$. A squared term is also calculated for this standardized term and the polynomial model is tested again (table 12). For both standardized and unstandardized models the VIF (variance inflation factor) is calculated to check for multicollinearity. VIF represents the degree to which the standard errors are inflated due to the levels of collinearity. The suggested cutoff for the VIF is 10,0 which corresponds to a multiple correlation of .95 with the other independent variables (Hair, Black, Babin, & Anderson, 2010). The difference between table 11 and 12 is that the VIF is lowered to <3,00 indicating minimal multicollinearity while the $R^2$ and adjusted $R^2$ did not change. For interpretation purposes regarding the strength of the inverted U-shapes, the standardized path coefficients of table 12 should be used.

The results of the regression analyses indicate some inverted U-shaped curvilinear effects for both RO and MO which managers and/or CEO's of SME's should be aware of. The inverted U-shaped curvilinear effect of MO on developing incremental innovations is possibly explained by the effect that customer and competitor information and the interfunctional coordination lead to new

incremental innovations by copying ideas and products from competitors instead of developing them on their own. No shared vision of commitment to learning most likely leads to producing products without the proper knowledge, resulting in products with less quality than competitors and the inability to keep on improving this products line, and products that do no serve the (existing) competitors base of the company. The inverted U-shaped curvilinear effect of RO on developing radical innovations is possibly explained by the effects that companies who take risks, are proactive and autonomous run the risk of rushing into new markets and/or overinvesting in resources not fully understood, that have no potential for market deployment or do not bring the synergy effects and consequently could yield low returns.

*Table 12: Standardized Path Coefficients – Controlling for (inverted) U-shaped Effects*

| Description of paths | Model 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | - | - | ,303 | - | - | - | - |
| Resource Orientation² | - | - | - | -,375 | - | - | - | - |
| Market Orientation | - | - | - | - | ,177 | - | - | - |
| Market Orientation² | - | - | - | - | -,319 | - | - | - |
| $R^2$ | - | - | - | ,337 | ,268 | - | - | - |
| Δ $R^2$ | - | - | - | ,296 | ,220 | - | - | - |
| Sign. change in $R^2$ (<,05) | - | - | - | ,045 | ,038 | - | - | - |
| VIF | - | - | - | <2,467 | <1,417 | - | - | - |

*$R^2$=variance explained by dependent variables; Δ $R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off value EO = median = 4,40; Cut-off value LO = median = 5,44; VIF=variance inflation factor (collinearity diagnostic)*

Preceding regression analysis results led to the composition of two final models for incremental and radical innovation performance. Model 2 (table 10) is further tested by adding internal and external covariates to the equation.

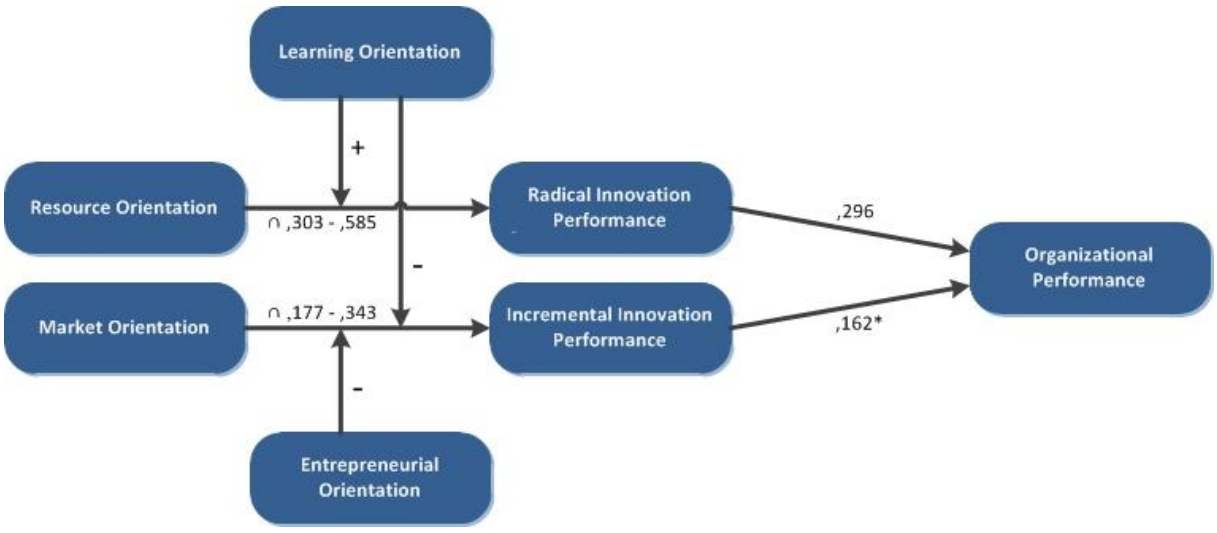


*Figure 6: Final model for strategic orientations and performance*

With regard to model 3 it was expected that both radical innovation and incremental innovation would positively influence organizational performance. Radical innovation indeed positively influences (,296) organizational performance, however, incremental innovation was just not significantly enough with 0,105. With a larger sample this relation maybe significant as well. It is hard

to believe that incremental innovations do not contribute to better organizational performance, so based on the almost significance and the discussed theory, this study assumes that both innovations contribute to organizational performance, however, the contribution of radical innovations is significantly higher than for incremental innovations.

## 4.5 Effects of covariates

This chapter discusses the internal and external covariates for the RO/MO relationship with innovation performance. Internal covariates are the degree of centralization, formalization, amount of FTE and firm age. External covariates are the degree of market turbulence, technological turbulence, competitive intensity and environmental munificence. The normal procedure to test the effects of covariates is the same as testing for moderating variables. Because the model to test (table 10) contains a split sample, testing the covariates requires making split samples for each covariate.

### *4.5.1 Centralization*

The first covariate to be discussed is centralization. The results show that when centralization is low, RO and MO do not seem to matter when developing incremental or radical innovations. Only RO has a significant relationship with radical innovation performance when learning is high. However, this regression coefficient is lower than in the normal model (table 10). It can be concluded that low centralized organizations RO and MO are inhibited to positively influence the development of radical and incremental innovations. When centralization is high, all path coefficients from the normal model are recognized and, equally important, are all significantly higher. This is contrary to findings of many researchers who found that centralization had a negative effect on the development of radical innovations. They argue that centralization inhibits the freedom, creativity and risk taking used to develop radical innovations but that centralization is needed for the development of incremental innovations. The findings of this study indicate that centralization has a positive effect on the development of both incremental and radical innovation. It might be possible that with regard to RO and radical innovation performance, centralization helps organizations to steer employees when pursuing new ideas to prevent that all employees are working on different things and no idea is fully explored and developed into a viable product. Managers have a broader view within the organization and are able to assess all projects and prioritize the viable ones and cancel not viable ones to prevent that too much resources are spread among too many projects and no projects are developed in time into new innovations. With regard to MO and incremental innovation performance, centralization could be beneficial because it enhances information about customers and competitors to be communicated from top management to employees. More centralization means more guidance and information to be pointed to employees.

*Table 13: Centralization*

| *Description of paths* | **Low Centralization** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***Low Entrepreneurial*** | | ***High Entrepreneurial*** | | ***Low Learning*** | | ***High Learning*** | |
| | ***Incremental innovation*** | ***Radical innovation*** | ***Incremental innovation*** | ***Radical innovation*** | ***Incremental innovation*** | ***Radical innovation*** | ***Incremental innovation*** | ***Radical innovation*** |
| Resource Orientation | - | - | - | - | - | - | - | ,496** |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | - | - | - | - | - | - | ,245 |
| $\Delta R^2$ | - | - | - | - | - | - | - | ,194 |

| Description of paths | High Centralization | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,576*** | - | ,744** | - | ,543*** | - | ,693*** |
| Market Orientation | ,450** | - | - | - | ,373* | - | - | - |
| $R^2$ | ,328 | ,441 | - | ,470 | ,197 | ,337 | - | ,510 |
| Δ $R^2$ | ,289 | ,408 | - | ,417 | ,146 | ,295 | - | ,461 |

*$R^2$=variance explained by dependent variables; Δ $R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Centralization = 2,60; *** P<.001; ** P<.01; * P<.05; - not significant*

Furthermore, high centralization also seems to increase the effect of LO on RO with regard to radical innovation performance. This indicates that the effect commitment to learning and shared vision is better coordinated/controlled when employees are steered and empowered by their managers to focus on developing and maintaining a unique resource base. Also, where in the normal model EO has no effect on RO and radical innovation, high centralization triggers a significant effect of EO on RO. This indicates that risk taking, proactiveness and autonomy has a significant effect on RO by giving employees the confidence to pursue new resources. Without centralization, employees might be not confident enough to make decisions about which ideas, technologies and other resources to pursue in extending the resource base.

### 4.5.2 Formalization

With regard to the influence of formalization on innovation performance no consensus is reached among researchers. Results show that high formalization is beneficial for the development of radical innovations through uniqueness, dynamism and synergy of the resource base when LO and EO is low (figure 11). One could argue that rules, procedures, job descriptions etc. are beneficial to the development of radical innovations because employees know how far they could go with exploratory activities because the boundaries are quite clear. Having no boundaries can harm the effectiveness of employees because they constantly question whether what they do is not disapproved by managers. Also, clear protocols and rules create guidance when decisions must be made whether or not to further pursue new development projects. Low formalization is beneficial for the development of radical innovations through uniqueness, dynamism and synergy of resources when LO and EO are high. Compared to the normal model, the coefficients are significantly higher, especially when learning is high (1,056). This suggests, as discussed in the theoretical framework, that risk taking, proactiveness, autonomy and generative learning are only possible when employees are not bounded by protocols, rules and job restrictions. Managers however must be cautious because customer and competitor orientation significantly has a negative influence on radical innovation when learning is high. This confirms the theory that learning from existing customers and competitors never can lead to new innovative and radical developments because the latent need of customers require focus on internal developments and not copying from competitors or listening to existing customer needs.

*Table 14: Formalization*

| Description of paths | Low Formalization | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,467** | - | ,657** | - | ,512** | - | 1,056*** |
| Market Orientation | ,522** | - | - | - | ,472** | - | - | -,701*** |
| $R^2$ | ,284 | ,336 | - | ,393 | ,257 | ,318 | - | ,706 |
| Δ $R^2$ | ,227 | ,283 | - | ,341 | ,208 | ,273 | - | ,667 |

| Description of paths | High Formalization | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,663*** | - | - | - | ,580* | - | ,434* |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | ,407 | - | - | - | ,329 | - | ,178 |
| $\Delta R^2$ | - | ,353 | - | - | - | ,246 | - | ,128 |

*$R^2$=variance explained by dependent variables; $\Delta R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Formalization = 3,60; *** P<.001; ** P<.01; * P<.05; - not significant*

With regard to MO and incremental innovation performance, the results of this study contradict the expectations. One would expect that high formalization is beneficial for the development of incremental innovations and that low formalization has no or a negative effect on incremental innovations. The results indicate the opposite. Low formalization positively influences (even strengthens) the influence of customer orientation and competitor orientation on incremental innovation performance where with high formalization no relation exists. The more formalization, rules and boundaries, the less likely customer orientation and competitor orientation are beneficial to the development of incremental innovations. It is possible that information about customers and competitors are not taken into account when developing incremental innovations because employees have clear tasks, procedures and job descriptions that room for improving existing products and product lines is very small.

### 4.5.3 Firm Size

The split sample regression path coefficients indicate that smaller organizations have more potential to develop incremental and radical innovation than larger organizations. Only for organizations with high EO high firm size is beneficial for developing radical innovation through RO, because this relation is inhibited when the firm size is low. Risk taking, proactiveness and autonomy are strongly correlated to incremental innovation when companies are small, and correlated to radical innovation when companies are larger. This could indicate that small companies cannot take as much risk as larger companies due to resource constraints in competing for radical products. They are however successful at developing unique features for existing products that no competitor has.

Small companies should have low EO and high LO when developing radical innovations and high EO and low EO when developing incremental innovations. Larger companies only develop radical innovations through RO when having high EO and high LO. It was expected that smaller organizations have greater financial constraints, more personnel bottlenecks in terms of too few or inadequately qualified personnel, and they often do not have other products to compensate for a lack of sales and profits.

*Table 15: Firm Size*

| Description of paths | Low Firm Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,602*** | - | - | - | ,492* | - | ,716*** |
| Market Orientation | ,366* | - | ,744* | - | ,540** | - | - | - |
| $R^2$ | ,238 | ,418 | ,350 | ,366 | ,324 | ,341 | - | ,369 |
| $\Delta R^2$ | ,181 | ,375 | ,285 | ,302 | ,262 | ,282 | - | ,314 |

| Description of paths | High Firm Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | - | - | ,455** | - | - | - | ,448* |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | - | - | ,202 | - | - | - | ,175 |
| Δ $R^2$ | - | - | - | ,160 | - | - | - | ,128 |

*$R^2$=variance explained by dependent variables; Δ $R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Amount of FTE = 2,00; *** P<.001; ** P<.01; * P<.05; - not significant*

However, the model shows that smaller organizations are more likely to develop incremental and radical innovations. Furthermore, when the size of the organizations is higher, no relation between MO and incremental innovation exists and no relation between RO and radical innovation exists when LO and EO is low. One could argue that despite the financial constraints and difficulties making tradeoffs, smaller organizations are more flexible with learning and anticipating on new industry developments because they have less bureaucratic constraints. Financial resources and more formalized development processes of larger organizations do not seem to benefit the innovativeness.

### 4.5.4 Firm age

Firm age is often measured to assess the degree of experience a company has in a particular market. Expected was that older organizations possess the competencies to develop and commercialize innovations by themselves and that smaller companies are more likely to seek for sources of external financing and ways to engage in innovation by forming strategic alliances with customers, suppliers, knowledge institutions and other organizations in order to leverage the resources of others to compensate their own deficiencies. The results show that firm age has a significant effect on moderator EO with regard to the relationship between MO and incremental innovation. For both high and low firm age, no relationship exists in the split samples from EO, while the effect of LO is the same as in the normal model. With regard to radical innovation performance it is recognized when the firm age is low, high EO and low LO is inhibiting focusing on RO to lead to radical innovations. This indicates that young organizations with (presumably) limited experience are not successful at developing radical innovations by focusing on resource orientation when they are risk taking, proactive and autonomous. For adaptive learning the same is true; when there is no commitment to learning and there is no shared intent, these young inexperienced organizations are not successful at developing radical innovations through RO because there is a possible lack of knowledge and unique resources. For organizations with more experience and thus firm age, the effect of EO is recognized in the relationship between RO and radical innovation performance although the overall effect of RO on radical innovation performance is lower compared to the normal model. The effect of EO could indicate that older firms that are not willing to take risk and acting proactive are less successful at developing radical innovations because experience on the long term causes routines and inertia in the organization.

*Table 16: Firm Age*

| Description of paths | Low Firm Age | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,533** | - | - | - | - | - | ,552** |
| Market Orientation | - | - | - | - | ,416* | - | - | - |
| $R^2$ | ,245 | ,367 | - | - | ,269 | - | - | ,252 |
| Δ $R^2$ | ,185 | ,316 | - | - | ,196 | - | - | ,197 |

| Description of paths | High Firm Age | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,399* | - | ,567** | - | ,411** | - | ,537** |
| Market Orientation | - | - | - | - | ,366* | - | - | - |
| $R^2$ | - | ,259 | - | ,327 | ,190 | ,237 | - | ,249 |
| $\Delta R^2$ | - | ,213 | - | ,288 | ,145 | ,195 | - | ,195 |

*$R^2$=variance explained by dependent variables; $\Delta R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Company Age = 3,00; *** P<.001; ** P<.01; * P<.05; - not significant*

### 4.5.5 Market turbulence

With regard to market turbulence, this study provides some interesting findings that contradict the expectations of the theoretical framework. The most striking observation is that, irrespective of the degree of market turbulence, it is not related to the development of incremental innovations and thus the influence of MO. One would expect that in environments with low market turbulence, customer preferences/customer demand is predictable and customers articulate their demands resulting in incremental innovation on existing product families. The results show no relation between MO and incremental innovation performance when using a split sample. With regard to RO, results indicate that when EO is low and LO is high, the effect of RO on radical innovation performance becomes obsolete when market turbulence is low. When market turbulence is high, the relationship between RO and radical innovation performance becomes obsolete when learning is low. In other words, in environments where customer demand is relative stable and predictable, risk taking, proactiveness and autonomy lead to the development of radical innovations. Seems logic, leaving a stable market for an uncertain future by chasing radical innovations provides a certain risk. Further, low LO through low commitment to learning and shared intent seems to be more beneficial than high LO. In stable markets with predictable demand, generative learning from resources works counterproductive and adaptive learning benefits the development of radical innovations. The opposite is true for LO when market turbulence is high. Unstable markets where customers change quickly from suppliers and continuously search for new products, do require a strong commitment to learning from resources and shared intent when developing radical innovations.

*Table 17: Market Turbulence*

| Description of paths | Low Market Turbulence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | - | - | ,538* | - | ,453* | - | - |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | - | - | ,269 | - | ,205 | - | - |
| $\Delta R^2$ | - | - | - | ,199 | - | ,150 | - | - |

| Description of paths | High Market Turbulence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,606** | - | ,562* | - | - | - | ,613*** |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | ,301 | ,556 | - | ,288 | ,368 | ,404 | - | ,350 |
| $\Delta R^2$ | ,227 | ,509 | - | ,233 | ,283 | ,324 | - | ,304 |

*$R^2$=variance explained by dependent variables; $\Delta R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Market Turbulence = 4,67; *** P<.001; ** P<.01; * P<.05; - not significant*

Furthermore, in highly turbulence markets, low entrepreneurial behavior do seems to be beneficial to the development of radical innovations. It could be that developing and maintaining a strong resource base does not requires risk taking, proactiveness and autonomy to develop radical innovations for the latent need of the dissolute potential customers.

### 4.5.6 Technological turbulence

The results of the regression analysis provide evidence that reject the expectations from the theoretical framework. Expected was that in times of technological turbulence when organizations compete for a new technical standard, the focus is on RO and generative learning. Competitors would compete with exploratory activities till a dominant design emerges. Once a dominant design emerges, an era of incremental change starts where the technological turbulence is low (Anderson & Tushman, 2001). However, the results show that when technological turbulence is high, the effect of RO on radical innovation performance is not strengthened. Furthermore, where high learning was expected, no regression coefficient is recognized. The results show that low turbulence is most beneficial for generative learning. This could mean that when competitors are actively competing for a dominant design, other strategic orientations (maybe also EO) are more important than generative learning. In more stable markets, generative learning does seem to be beneficial for the development of radical innovations through focusing on resources. The results indicate further that no relationship exists between MO and incremental innovation when technological turbulence is high. This is in accordance with Grinstein (2008) who found that technology turbulence negatively affects the importance of MO because in these times research and development limit the role of MO in driving innovations. This strengthens the expectations that technological turbulence whether it be low or high is only correlated with the relationship between RO and radical innovation performance.

*Table 18: Technological Turbulence*

| Description of paths | Low Technological Turbulence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,508** | - | ,496* | - | ,532** | - | ,662** |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | ,360 | - | ,227 | - | ,289 | - | ,338 |
| $\Delta R^2$ | - | ,299 | - | ,165 | - | ,227 | - | ,277 |

| Description of paths | High Technological Turbulence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,494** | - | ,535** | - | ,452* | - | - |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | ,344 | - | ,321 | - | ,285 | - | - |
| $\Delta R^2$ | - | ,279 | - | ,269 | - | ,228 | - | - |

*$R^2$=variance explained by dependent variables; $\Delta R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Technological Turbulence = 4,20; *** P<.001; ** P<.01; * P<.05; - not significant*

### 4.5.7 Competitive intensity

Expected was that the higher the competitive intensity, the stronger the relationship between MO and innovation consequences is. In a market where competition is high, customers have many alternatives to satisfy their needs and organizations must monitor and respond to customer needs closely to make sure that customers choose their products/services over rival products/services. Thus, the higher the competitive intensity, the more customer/competitor oriented (MO over RO) a

company should be. In highly competitive environments, pursuing exploitative innovations improves the organizations performance by expanding existing resources and defending existing markets through increasing customer loyalty. Compared to the normal model; the results show that in low competitive intensive environments RO only leads to radical innovation when EO is low. Entrepreneurial behavior is not recommended when focusing on a unique resource based when developing radical innovations when the amount of competitors is low. Low competitive intensity also stimulates incremental innovation when learning is low. Companies in markets without a lot of competitors are convinced that they can extent their profits in the same market by making small improvements in products based on customer needs and competitor action by improving, extending or modifying products developed initially by competitors. When the competitive intensity is high, the results show that RO leads to the development of radical innovations although not more than in the normal model with the exception of high learning. This indicates that in high competitive intensive environments, commitment to learning and having a shared vision provides a strong increase of the effect of focusing on focusing on a unique resource base. The more competitors' one has, the more generative learning is required to stand out from the crowd by offering customers unique features competitors that competitors do not have. The effect of MO on incremental innovation is not present when competitive intensity is high. It seems to inhibit the development of incremental innovation because companies change their priorities to finding new niches instead of competing for small margins based on existing customer demand and competitor actions. These results are contrary to the expectations of the theoretical framework which stated that the higher the competitive intensity, the stronger the relationship between MO and innovation outcomes would be.

*Table 19: Competitive Intensity*

| Description of paths | Low Competitive Intensity | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,421* | - | - | - | - | - | - |
| Market Orientation | - | - | - | - | ,573** | - | - | - |
| $R^2$ | - | ,263 | - | ,232 | ,334 | - | - | - |
| Δ $R^2$ | - | ,196 | - | ,176 | 283 | - | - | - |

| Description of paths | High Competitive Intensity | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low Entrepreneurial | | High Entrepreneurial | | Low Learning | | High Learning | |
| | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation | Incremental innovation | Radical innovation |
| Resource Orientation | - | ,547** | - | ,536** | - | ,523** | - | ,765*** |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | ,368 | - | ,277 | - | ,278 | - | ,449 |
| Δ $R^2$ | - | ,320 | - | ,221 | - | ,218 | - | ,410 |

*$R^2$=variance explained by dependent variables; Δ $R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Competitive Intensity = 3,60; *** P<.001; ** P<.01; * P<.05; - not significant*

### 4.5.8 Environmental munificence

The last covariate is environmental munificence. It was expected that highly munificent environments provide enough resources for innovation and differentiation by building organizational slack resources. Organizations in high munificent environments are better able to develop the competencies necessary to pursue an exploration strategy, while in less munificent environments organizations must focus on improving efficiency and lowering their cost without adjusting the products. Results indicate that environmental munificence only correlates to resource orientation. Whether the munificence is low or high, MO does not lead to the development of incremental and radical innovations. With regard to RO, some differences are recognized when assessing the degree

of munificence. When the munificence is low, RO leads to the development of radical innovations with the exception of organizations that have low entrepreneurial behavior. This could indicate that when the environment provides not enough resources, risk taking and generative learning is required to invest in developing a unique resource base. High LO seems to be quite beneficial for the development of radical innovation in low munificent environments. It could be argues that in these environments companies search for new lucrative products instead of staying in a saturated market. This fits the findings with high munificent environments, where RO leads to the development of radical innovations and incremental innovation (!), only when EO and LO are low. This could indicate that when organizations are in high munificent environments, taking risk, proactive and focusing on generative learning is not required and focus on RO is enough to develop innovations. This supports the notion that these organizations are not dependent on environmental resources but on internal strengths and resources.

*Table 20: Environmental Munificence*

| *Description of paths* | Low Environmental Munificence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Low Entrepreneurial* | | *High Entrepreneurial* | | *Low Learning* | | *High Learning* | |
| | *Incremental innovation* | *Radical innovation* | *Incremental innovation* | *Radical innovation* | *Incremental innovation* | *Radical innovation* | *Incremental innovation* | *Radical innovation* |
| Resource Orientation | - | - | - | ,685*** | - | ,427* | - | ,794*** |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | - | ,238 | - | ,518 | - | ,327 | - | ,482 |
| $\Delta R^2$ | - | ,169 | - | ,487 | - | ,271 | - | ,443 |

| *Description of paths* | High Environmental Munificence | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Low Entrepreneurial* | | *High Entrepreneurial* | | *Low Learning* | | *High Learning* | |
| | *Incremental innovation* | *Radical innovation* | *Incremental innovation* | *Radical innovation* | *Incremental innovation* | *Radical innovation* | *Incremental innovation* | *Radical innovation* |
| Resource Orientation | ,366* | ,619*** | - | - | ,447* | ,567** | - | - |
| Market Orientation | - | - | - | - | - | - | - | - |
| $R^2$ | ,246 | ,389 | - | - | ,306 | ,329 | - | - |
| $\Delta R^2$ | ,188 | ,342 | - | - | ,248 | ,273 | - | - |

*$R^2$=variance explained by dependent variables; $\Delta R^2$= variance explained by dependent variable corrected by the number of independent variables and the number of cases; Cut-off = median EO = 4,40; LO = 5,44; Covariate Environmental Munificence = 4,00; *** P<.001; ** P<.01; * P<.05; - not significant*

# 5. Conclusion, limitations and implications

The objective of this study was to investigate to what extent different configurations of strategic orientation explained the differences in innovation performance at established manufacturing SME's in the Netherlands. An extensive literature study of more than 150 articles provided four general strategic orientations. Resource orientation (RO), market orientation (MO), entrepreneurial orientation (EO) and learning orientation (LO) are related to each other in direct, moderating and mediating models. Although many more strategic orientations are introduced by researchers throughout the years, all of them are derived from or itemizations of the four general orientations. The theoretical framework of this study proposed two possible models, direct and moderating, in which differences in innovation performance could be explained. Empirical data acquired from 100 manufacturing SME's in the Netherlands provided evidence for the moderating model, where learning orientation and entrepreneurial orientation moderate the relationship between market orientation, resource orientation, radical innovation performance and incremental innovation performance.

## 5.1 Conclusion

The question to be answered now is what the strategic orientation of SME's must be when striving for incremental innovation, radical innovation or both and fitting this strategic orientation with the internal organization and the external environment.

### *Radical innovation*

Based on the results of this study it can be concluded that SME's that aim for sustained competitive advantage with regard to radical innovation performance have to develop and deploy unique and costly-to-imitate (bundles of) resources for the purpose of exploiting environmental opportunities and neutralizing threats (Paladino, 2007). This results in a unique (superior valuable) resource base that is immobile and heterogeneous (Barney, 1991) that is needed for the development of radical innovations. A superior valuable resource base produces synergy (degree of resource sharing within the company to fully exploit the benefits), dynamism (degree of integration and deployment of resources to induce organizational learning) and uniqueness (the degree of difficultness for rivals to imitate the resource base). Focusing on own resources leads to the development of products and services that would not have been developed when focusing on customer needs and competitor/market information. This is in line with the theoretical expectations that focusing on MO only serves current customer needs and focusing on RO results in products that create new markets and thus serve latent customer needs. SME's must assess their unique selling points and the uniqueness of their resource base and build further on this when striving for the development of radical innovations. When new radical products are born, market intelligence is needed to assess opportunities in the market to deploy these new products.

This study found that generative learning (or double loop learning) is beneficial for the development of radical innovations but not obliged. It suggests that SME's without a clear focus on empowering employees through a shared vision and commitment to learning (adaptive learning) are also able to develop radical innovations, but that SME's that do focus on empowering employees through a shared vision, commitment to learning and thinking out-of-the-box are slightly more successful at developing radical innovations. When striving for the development of radical innovations to create new markets with (at least in the beginning) high profits, focus on generative learning is recommended. These results seem quite logic because the dynamism dimension of RO is connected with learning and knowledge is one important resource on itself. SME's that strive for a sustainable competitive advantage with regard to the development of radical innovations should retain and deploy rapidly knowledge and experience held within their human resources. Ongoing changes in technology, complexity and the global environment require the development of a learning and self-refreshing organization that attracts well educated and high potential specialists.

SME's striving for the development of radical innovations must be aware of the curvilinear effect of resource orientation. The split samples of the moderating model provide evidence that too much focus on RO in entrepreneurial SME's has a negative effect on developing radical innovations. It suggests that SME's that take risk, are proactive and autonomous risk rushing into new markets and/or overinvesting in resources not fully understood, that have no potential for market deployment or do not bring the synergy effects and consequently could yield low returns. Managers must assess regularly whether investments in particular resources lead to the anticipated outcomes. R&D processes should have evaluation points after each step in the development process where the continuation of projects is assessed and prioritized.

### *Incremental innovation*

The results show that SME's that aim for sustained competitive advantage with regard to incremental innovation performance should be concerned with all the activities involved in gathering and understanding information about the customers and competitors in the target market and disseminating this information throughout the organization. This results in providing customers with products and services with superior value in comparison with its competitors. Companies must continually adapt to the changing environment and new market opportunities and align their internal organization accordingly to exploit, develop or obtain the necessary resources. If they cannot attain resources and/or activities themselves, they must use external sources like strategic alliances, mergers or acquisitions. As discussed in the previous paragraph, the results of this study are in line with the theoretical expectations that MO is only applicable for serving existing customers in existing markets. Customers express their current needs for improvements on existing product lines and companies that deliver first, cheaper or with higher quality are more likely to gain market share. Monitoring customers, involving them in improving products and monitoring actions of competitors creates knowledge that must be communicated throughout the whole organization.

In line with the theoretical assumptions are also the results with regard to the role of learning. Where radical innovation development requires generative learning, incremental innovation development requires adaptive (single loop) learning. Adaptive learning refers to learning within (un)recognized constraints that reflect the organizations assumptions about its internal organization and its environment. It is usually focused on opportunities within the scope of the organizations activities (Slater & Narver, 1995) and is quite effective for the development of core capabilities. Doing thing better, smarter, cheaper and quicker than competitors results in competitive advantage with regard to incremental innovation performance. This operational excellence requires focus on improving routines, quick acting on changing customer demand and outperforming competitors. When generative learning is in place when striving for incremental innovations, the effect of MO is cancelled. It suggests that shared vision and commitment to learning by thinking out-of-the-box is not beneficial for incremental innovations.

The same is true for entrepreneurial behavior. Data of this study indicates that SME's that act entrepreneurial, when striving for incremental innovations, find that the effect of MO on incremental innovation performance is cancelled out and the likelihood to develop incremental innovations is quite low. This finding seems quite logic when one assesses the basics of the orientations. Entrepreneurial behavior hampers MO because it ignores customer demands and competitor actions and acts autonomous (no interfunctional coordination). To serve existing markets and compete with existing competitors, one must acquire and dissemilate this information throughout the organization. Being entrepreneurial by taking risk, proactiveness and autonomy is more likely beneficial for the development of radical innovations (although this effect is not clearly recognized in this study).

As with radical innovations; SME's striving for the development of incremental innovations must be aware of the curvilinear effect of market orientation. The results of the regression analysis show that too much focus on MO in adaptive (single loop) learning organizations has a negative effect on the development of incremental innovations. It is possible that customer and competitor information and the interfunctional coordination lead to new incremental innovations by copying ideas and products from competitors instead of understanding customer demand and develop improvements and supplements themselves. Adaptive learning most likely leads to the development of products without having the proper knowledge that is required. This results in products with less quality than competitors and the inability to keep on improving this products line, and products that do no serve the (existing) competitors base of the company. Managers should monitor its R&D process and must prevent that they are continuously one step behind of its competitors. Precondition is the understanding of customer needs and developing qualitative products.

These results of this study indicate that the development of radical and incremental innovations cannot be implemented within the same processes. The challenge, for smaller SME's in particular, is to manage both processes sequentially or simultaneously. This requires different internal characteristics, strategic orientations and external environment. Unsuccessful companies could have problems aligning their internal organization with the strategy and the external environment when internal or external conditions change. Table 21 summarizes the differences between radical and incremental innovation performance outcomes. Formalization and centralization can be influenced by managers and CEO's and are therefore included in this overview.

*Table 21: Summary radical and incremental innovation performance*

| | Incremental innovation performance | Radical innovation performance |
|---|---|---|
| **Resource orientation** | No effect | Significant positive effect, inverted U-shaped effect when EO is high |
| **Market orientation** | Significant positive effect, inverted U-shaped effect when LO is low | No effect |
| **Entrepreneurial orientation** | Cancels the effect of MO | No effect |
| **Learning orientation** | Cancels the effect of MO | Significant positive effect on RO |
| **Formalization** | Low formalization: significant positive effect<br>High formalization: cancels the effect of MO | Low formalization: significant positive effect when LO and EO are high<br>High formalization: significant positive effect when LO and EO are low |
| **Centralization** | Low centralization: cancels the effect of MO<br>High centralization: Significant positive effect | Low centralization: cancels the effect of RO, exept when LO is high<br>High centralization: Significant positive effect |

## 5.2 Managerial implications

The results of this study bear some important implications for manufacturing SME's in the Netherlands. First, organizational ambidexterity is discussed. Furthermore, the theory of Hamel & Prahalad about "Strategy as stretch and leverage" is reviewed.

### *Organizational ambidexterity*

The results of this study indicate that radical innovation development and incremental innovation development require different organizational modes. Not only is a different learning mode (LO) required, but also different modes with regard to RO, MO and EO. When the desired outcome of innovation changes companies also have to adjust their internal organization. When companies have multiple product lines with products in different stages of the product life cycle, these two modes must be managed simultaneously instead of sequentially. However, taking into account the

implications of the organizational characteristics and environmental characteristics, one can only conclude that the development of incremental and radical innovations cannot be integrated in one and the same process. Take for example the ongoing discussion on the influence of formalization and centralization. Where centralization is beneficial for both radical and incremental innovation performance, formalization is only positive for the development of radical innovations when EO and LO are low. A low degree of formalization is however positive for the development of radical innovations when LO and EO are high. The results show that for the development of incremental innovations low formalization has an overall positive effect where high formalization cancels the effect of MO on incremental innovation performance. Every business unit or SME's engaged in one product line should assess its organizational characteristics and environmental characteristics and align it with its strategy.

Ideally, separate business units must be set up, but at SME's the ability to create separate business units is not always possible. Therefore, managers and CEO's of SME's must consider ambidexterity in their product development processes and day-to-day routines. Simultaneously or sequentially managing the two contradictory processes requires companies to be ambidextrous. This study provides evidence that ambidexterity is needed at SME's also, not only at larger companies. However, SME's with fewer resources than large multinationals are mostly not able to incorporate two different alignments within their organization at the same time. The most important reason is money. Larger companies have the financial resources to do both and to assign additional resources to both processes. Smaller companies are, because of limited financial resources, forced to concentrate on one and adjust their entire organization to the changing environment with the chance of organizational inertia and market exit when the (core) product cycle declines. Ambidextrous organizations that implement the two modes simultaneously have the difficult task to allocate its resources to two (or more) different product/market combinations that are in different stages of the product life cycle. Although difficult, these organizations are most successful by achieving sustained competitive advantage. They finance their radical innovation development activities with turnover from the existing product and markets. When a radical innovation is developed, they are able to create new markets with lucrative turnover because of the absence of competitors. With regard to financing the development of radical innovations with turnover from existing products, the implications of Hamel & Prahalad (1993) with regard to resource leveraging are important to consider. They argue that resources can be "leveraged" to reduce the gap between market opportunities and existing resources. Resource leveraging is an alternative for downsizing in disengaging resources for new strategic objectives. Resource leveraging seeks to get the most out of the existing resources by "concentrating them more effectively on key strategic goals; by accumulating them more efficiently, by complementing one kind of resource with another to create higher order value; by conserving resources wherever possible; and by recovering them from the marketplace in het shortest possible time" (p. 78). For detailed information on must read the entire article of Hamel & Prahalad (1993).

Managing an organization that incorporated both exploitative and explorative activities, managing this duality and specifically the role of owners/top management is crucial. Owners/top managers must be clearly committed to and consistently emphasize the importance of short-term management and long-term innovation (Tushman & Nadler, 1986). They must stimulate efficiency and incremental innovations for exploitative activities and they must stimulate out-of-the-box thinking by commitment to learning and communicating a clear vision for explorative activities. Further, they must facilitate the duality by building supportive organizational structures and allocating resources accordingly. However, SME's mostly do not have the ability to separate exploitation processes from exploration processes because they do not have sufficient resources to set up structural separated business units simultaneously. Most likely employees in charge of development are continuously occupied with developing both radical and incremental innovations. To be successful, these employees (and their managers) themselves need to be ambidextrous. Individuals who are

ambidextrous are able to engage in both exploration and exploitation activities. Although, separating these contradicting processes within an individual is not possible, there is some evidence that managers can be ambidextrous.

Managers and sometimes employees need to host contradictions, conduct multiple different tasks within a certain period of time and they have to both refine and renew their knowledge, skills, and expertise (Mom, Van den Bosch, & Volberda, 2007). Raisch, Birkinshaw, Probst, & Tushman (2009) argued that qualitative communication throughout the entire company could lead to individual ambidexterity. Without employees understanding the initiatives of top management, the initiatives will have a minimal impact on individual's capacity for ambidexterity. Socialization, recognition and team-building practices help individuals to think and act ambidextrously (Raisch, Birkinshaw, Probst, & Tushman, 2009). Mom, Van den Bosch, & Volberda (2007) found that top-down knowledge inflows of managers positively relate to the extent to which these managers conduct exploitation activities, while they do not relate to managers' exploration activities. Furthermore, they found that bottom-up and horizontal knowledge inflows of managers positively relate to these managers' exploration activities, while they do not relate to managers' exploitation activities. Besides the personal characteristics also organizational context influence the ability of a manager to be ambidextrous. Organizational structures which provide managers with decision-making authority are more likely to stimulate richer sense-making and cognitive processes resulting in ambidextrous abilities (Raisch, Birkinshaw, Probst, & Tushman, 2009). In sum, when managers or employees themselves need to be ambidextrous, the organizational structure must support clear and qualitative communication about goals, vision and mission for both exploitative and explorative activities. The opportunity to exercise social contacts, recognition and teambuilding facilitate the needed culture. Furthermore, ambidextrous individuals have to transfer knowledge top down and horizontal throughout the organization and need decision making authority to act effectively.

### *Strategy as stretch and leverage*

This thesis started with the article of Hamel & Prahalad (1993) who argue that companies who want to be more successful than competitors need to stretch their strategy by creating strategic intent in which a gap is created between resources and ambitions. This strategic intent is future-oriented and outside the range of planning. It creates a misfit between resources and current opportunities. Hamel & Prahalad argue that without ambition, long term commitment and vision (stretch) companies are not able to defeat competitors. An organization has to learn to concentrate, accumulate, complement conserve and recover resources if it is to achieve its stretch goals. In the long run, a strategic intent can be converted into market dominance only by creating new markets and developing radical innovations.

Strategic planning, creating a fit between company resources and current market opportunities, leads to the development of incremental innovations. Market orientation (MO) is the key orientation to acquire knowledge and needs of current markets and customers and making small adjustments in the resource base to supply on this demand. This outside-in process, leading to the development of incremental innovations, is indeed different from the inside-out process of stretch which leads to the development of radical innovations. The results of this study indeed support the latter. Focus on internal capabilities and resources (RO) and organizational learning (LO) lead to the development of radical innovations with an inside-out approach. However, its success does not depend on the degree of LO, but it does contribute to the success. The results show that with LO the radical innovation performance is slightly higher. Vision and commitment (to learning) give an additional boost that maybe provides companies with more lucrative new opportunities. One must conclude that Hamel & Prahalad are right about strategic planning versus strategic intent and its effect on innovation performance. Having a strong resource orientation where the focus is on leveraging the resource base, attaining its uniqueness and creating synergy is more important than ambition, commitment

and shared vision (at least for SME's). One would expect that with "ambition" also entrepreneurial elements (EO) are visible like proactiveness and risk taking. The results of this study do not support this expectation. This does however fits the theory of Hamel & Prahalad. They argue that with shared intent, companies must set a long term plan but also control for incremental step in between. These incremental adjustments reduce the degree of risk and proactiveness.

While a broad strategic direction (strategic intent) is critical to the process, it is equally important to recognize dramatic changes in the environment. SME's must, within their long term commitment and vision, adjust their strategy by acting on new obstacles and unforeseen circumstances. SME's must have dynamic capabilities to steer their organization and if necessary switch from organizational mode. The goal of strategic intent is to fold the future back into the present despite of the changes in the environment.

Hamel & Prahalad agree that developing radical innovations and leveraging existing ones (incremental innovations) require two different strategic orientations. SME's should develop unique (bundles of) resources which lead to the development of radical innovations and use market information to refine and leverage these resources with incremental innovations. These incremental innovations also finance the development/acquiring of new resources. Although contradictory, studies show that companies perform better when exercising both sequentially or simultaneously (Tushman & O'Reilly, 1996; Benner & Tushman, 2003; Levinthal and March, 1993; March, 1991; Greve, 2007; Bierly & Daly, 2007). What Hamel & Prahalad do not take into account is that these two processes cannot be executed within the same processes (especially at SME's). Literature about exploration/exploitation dynamics and the concept of ambidexterity is developed years after the article of Hamel & Prahalad was published. Although they are one of the first to recognize the importance of strategic intent (LO), the implications of their article must be assessed with caution.

After almost two decades, the suggestions of Hamel & Prahalad for resource leveraging are still quite relevant, especially for SME's. With a limited resource base, SME's must be inventive in creating slack resources needed for development of radical innovations. Exploiting an existing resource base requires incremental innovations the keep the resource base up to date. Without improving in the resource base, competitors offer better products with additional features. Hamel & Prahalad (1993) offer some guidelines that could create some additional resources needed for the development of radical innovations. Leveraging is used to reduce the gap between market opportunities and existing resources. Resource leveraging is an alternative for downsizing in disengaging resources for new strategic objectives. Resource leveraging seeks to get the most out of the existing resources by "concentrating them more effectively on key strategic goals; by accumulating them more efficiently, by complementing one kind of resource with another to create higher order value; by conserving resources wherever possible; and by recovering them form the marketplace in het shortest possible time" (p. 78). It seems logic that resource leveraging contributes to the development of radical innovations by creating slack resources. However, because RO and its dimensions (synergy, dynamism and uniqueness) are most important for radical innovation performance, it is plausible that there is a stronger direct effect of resource leveraging on radical innovation performance than through the creation of slack resources as suggested by Hamel & Prahalad. Future research must give insights in whether RO and resource leveraging are directly or indirectly linked to the radical innovation performance. There are some elements of resource leveraging visible in RO, but the construct of RO does not entail all elements as proposed by Hamel & Prahalad.

## 5.3 Implications for further research

This study adopts the RO scale of Paladino (2007) as a comprehensive collective construct for internal strategic orientation that substitutes all internal focused constructs of different literature streams (for example innovation orientation, technology orientation, product orientation etc.). Results indicate that RO is a stable and strong construct which leads to radical innovation. For all literature streams that developed internal focused constructs as an attempt to explain the variance as an opposite to market orientation, it is recommended to build further on the RO construct of Paladino. Research must not continue to invent concepts around market orientation and entrepreneurial behavior to explain radical innovation development (for example "proactive MO"), but should focus on building further on and testing the focus on resources and internal capabilities as the driver of developing new products, new services, new methods of production, new markets, new sources of supply and new ways of organizing.

With regard to the EO construct it can be concluded that the conceptual scale for autonomy is strong and significant. However, innovativeness and aggressiveness did not survive the factor analysis. Further research must find whether or not these should be excluded from the EO construct in the future. As discussed, innovativeness could be a product of strategic orientation instead of a dimension and aggressiveness is possibly not a prerequisite for EO. On the contrary, the latter dimension only consisted of one measurement item. Adding more items may lead to a stable dimension for aggressiveness after all. LO also loaded as a strong construct, even though the dimension open-mindedness was not significant. Further research must reveal whether open-mindedness loads with larger and different samples or that it should be replaced or excluded from the construct. Further research must also explore the possibilities for other strategic orientations. For example, Mu & Di Benedetto (2011) used networking orientation as an addition to the orientation. Networking orientation can be conceptualized as "*the extent to which a firm's business strategy stresses effective and efficient location of network partners, management of network relationships, and improvement of network performance*" (p. 341). However, the network configuration is also a form of resource, so the continuous question is whether new concepts fit with MO/RO or represent a new orientation. Further research could however test whether new/other orientations influence RO/MO and their influence on innovation performance.

This study uses an operationalization of innovation performance where not dynamics (e.g. innovativeness or exploration/exploitation) are the output measurements, but real output is measured (new products, new services, new methods of production, opening new markets, new sources of supply and new ways of organizing). This operationalization of innovation performance proves to be a strong and significant construct. The approach of this study is far more reliable and theoretically justifiable. Many studies use innovativeness as an output, but one could argue that being innovative does not directly imply that the innovations are indeed fully commercialized. Other studies, for example Mu & Di Benedetto (2011), use "New product commercialization performance" (divided in new product advantage, new product novelty, number of new products introduced into market) which also recognize the importance of testing the absolute output and not the ability to do someting. Futur research must use different contructs for both radical and incremental innovation to distiguish different effect. Using one construct and assume that low score represents incremental and high score respresents radical innovation is less reliable. Also, future research must measure the innovation performance (new product commercialization performance) and not the ability to be innovative (dynamics).

The most important findings of this study indicate that high EO and high LO inhibit MO to lead to incremental innovations. Research must find out why entrepreneurial behavior and generative learning make customer and competitor orientation obsolete when pursuing incremental innovations. Furthermore, MO does not contribute to radical innovations and RO does not contribute

to incremental innovations. Additional research can provide insights why this is the case. Insights are also required why entrepreneurial behavior does not strengthen the relationship between RO and radical innovations. Especially because many articles argue that entrepreneurial behavior is needed when pursuing radical innovations. An explanation could be that EO, as argued in the analysis of this study, is influencing, for example, the speed of introducing new products to the market or implementing new means of producing. This results in a competitive advantage over competitors. However, it does not influence the degree of radicalness of the innovation itself. Although a lot of research recognizes a curvilinear effect when assessing MO and innovation performance, no study takes RO into account and use two innovation performance constructs. Using the setup of this study (moderating model with radical innovation and incremental innovation performance constructs) reveals also a curvilinear effect with RO and negative effects of EO and LO with MO.

Another important implication derived from the evidence in this study is about the exploration and exploitation literature stream. This literature suggests that for development of radical versus incremental innovations different learning modes are required. The evidence supports this. However, the important differences of RO, MO and EO that are complementary to learning modes (LO) are not included in this literature. For SME's and larger companies research must include constructs that assess the differences between resource focus, market knowledge and entrepreneurial behavior when striving to improve the exploration/exploitation literature.

Future research must give insights in whether RO and resource leveraging are directly or indirectly linked to the radical innovation performance. There are some elements of resource leveraging visible in RO, but the construct of RO does not entail all elements as proposed by Hamel & Prahalad. It could be that the creation of slack resources is needed and thus the relation between RO or resource leveraging is indirect connected with radical innovation performance.

## 5.4 Limitations

The results of this study bear some limitations for generalization to the entire SME's population in the Netherlands. First, this study is of a cross-sectional nature. At the moment of measuring the innovation performance, it is assumed that the strategic characteristics recognized at the company are in place for at least three years. The input and the output of the assumed causal relationship is measured at the same moment. Second, one could argue that because the constructs used in this study are derived from large company studies, the questions are not (or less) applicable to use at SME's. The complexity of the questions and the topics of the questions could be difficult to process for smaller companies because some topics are difficult to assess in a smaller company (for example interdepartmental coordination) or difficult to identify (for example synergy effects). Large companies are usually more familiar with those questions and topics. Third, although the CEO's of SME's are the only persons, at least for smaller SME's, that can answer questions about strategy, innovation- and organizational performance, some weaknesses arise with it. There is a possibility that the CEO answers the questions more positively than employees would have. For example centralization that refers to the decision-making freedom of employees. Further, but in the same line of reasoning, they can overrate the radicalness of innovations in comparison with competitors. Also, they might not have all the market information that sales managers have with regard to the questions about competitors and customers. When researching strategy among SME's in a single cross-sectional analysis these limitations are inevitable. Conducting multiple interviews/ questionnaires at every layer of an organization and among multiple respondents would the only option to increase the reliability of the results. This would be, however, very time consuming and complex for large sample studies.

Although the statistical analysis provides all scales, models and coefficients significant at 0,05, the sample is too small for generalizations to the whole population of manufacturing SME's in the Netherlands. However, 19 of the 23 branches are represented in the sample of 100 small and medium sized companies. The sample has most companies with FTE's between 10 and 100 FTE's with only 13 companies exceeding the 100 FTE's. Further, the age is evenly spread over all categories. Therefore this sample is heterogeneous enough despite of the size.

## References

*Innovatie in het MKB. (2010). Retrieved april 22, 2011, from Kennissite MKB en Ondernemerschap: http://www.ondernemerschap.nl*

*Ahuja, G., & Lampert, C. M. (2001). Entrepreneurship in the Large Corporation: A Longitudinal Study of How Established Firms Create Breaktrough Inventions. Strategic Management Journal, 521-543.*

*Anderson, J. C., & Gerbing, D. W. (1982). Some methods for respecifying. Journal of Marketing Research, 453-460.*

*Anderson, P., & Tushman, M. L. (2001). Organizational Environments and Industry Exit: the effects of Uncertainty, Munificence and Complexity. Industrial and Corporate Change, 675-711.*

*Argyris, C., & Schön, D. A. (1978). Organizational Learning. New York: Prentice Hall.*

*Atuahene-Gima, K. (2005). Resolving the Capability-Rigidity Paradox in New Product Innovation. Journal of Marketing, 61-83.*

*Atuahene-Gima, K., Slater, S. F., & Olsen, E. M. (2005). The Contingent Value of Responsive and Proactive Market Orientations for New Product Program Performance. Journal of Product Innovation Management, 464-482.*

*Babbie, E. (2007). The practice of social research. Stamford: Thomson Wadsworth.*

*Bagozzi, R. P., & Yi, Y. (1998). On the evaluation of structural equation model. Journal of Academic Marketing Science, 74-94.*

*Baker, W. E., & Sinkula, J. M. (2009). The Complementary Effects of Market Orientation and Entrepreneurial Orientation on Profitability in Small Businesses. Journal of Small Business Management, 443-464.*

*Baretto, I. (2010). Dynamic Capabilities: A Review of Past Research and an Agenda for the Future. Journal of Management, 256-280.*

*Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management, 99-120.*

*Baron, R. A. (2006). Opportunity Recognition as Pattern Recognition: How Entrepreneurs "Connect the Dots" to Identify New Business Opportunities. Academy of Management Perspectives, 104-117.*

*Baum, J., & Wally, S. (2003). Strategic Decision Speed and Firm Performance. Strategic Management Journal, 1107-1129.*

*Benner, M. J., & Tushman, M. L. (2003). Exploitation, Exploration, And Process Management: The productivity Dilemma Revisited. Academy of Management Review, 238-256.*

*Bierly, P. E., & Daly, P. S. (2007). Alternative Knowledge Strategies, Competitive Environment, and Organizational Performance in Small Manufacturing Firms. Entrepreneurship Theory and Practice, 493-516.*

*Bruins, A. (2006). Ondernemerschap en Strategie in het MKB. Zoetermeer: EIM.*

*Calantone, R., & Cavusgil, S. Z. (2002). Learning Orientation, Firm Innovation Capability, and Firm Performance. Industrial Marketing Management, 515-524.*

*Calantone, R., Garcia, R., & Droge, C. (2003). The Effects of Environmental Turbulence on New Product Development Strategy Planning. The Journal of Product Innovation Management, 90-103.*

*Chandy, R. K., & Tellis, G. G. (1998). Organizing for Radical Product Innovation: The Overlooked Role of Willingness to Cannibalize. Journal of Marketing Research, 474-487.*

*Chen, D.-N., & Liang, T.-P. (2011). Knowledge evolution strategies and organizational performance: A strategic fit analysis. ARTICLE IN PRESS.*

*Cheng, J. L., & Kesner, I. F. (1997). Organizational Slack and Response to Environmental Shifts: The Impact of Resource Allocation Patterns. Journal of Management, 1-18.*

*Collis, D. J., & Montgomery, C. A. (1995). Competing on Resources: Strategy in the 1990s. Harvard Business Review, 118-129.*

*Covin, J. C., & Slevin, D. P. (1989). Strategic Management of Small Firms in Hostile and Benign Environments. Strategic Management Journal, 75-87.*

*Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. Psychometrika , 297-334.*

*Crook, R. T., Ketchen, D. J., Combs, J. G., & Todd, S. Y. (2008). Strategic Resources and Performance: A Meta-Analysis. Strategic Management Journal, 1141-1154.*

*Daniel, F., Lohrke, F. T., Fornaciari, C. J., & Turner, R. A. (2004). Slack Resources and Firm Performance: A Meta-analysis. Journal of Business Research, 565-574.*

*De Visser, M., De Weerd-Nederhof, P., Faems, D., Song, M., Van Looy, B., & Visscher, K. (2010). Structural Ambidexterity in NPD Processes: A Firm-level Assessment of the Impact of Differentiated Structures on Innovation Performance. Technovation, 291-299.*

*Desarbo, W. S., Di Benedetto, C. A., Song, M., & Sinha, I. (2005). Revisiting the Miles and Snow Strategic Framework: Uncovering Interrelationships Between Strategic Types, Capabilities, Environmental Uncertainty, and Firm Performance. Strategic Management Journal, 47-74.*

*Droge, C., Calantone, R., & Harmancioglu, N. (2008). New Product Success: Is It Really Controllable by Managers in Highly Turbulent Environments. The Journal of Product Innovation Management, 272-286.*

*Eisenhardt, K. M. (1989). Building Theories from Case Study Research. The Academy of Management Review, 532-550.*

*Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: What are they? Strategic Management Journal, 1105-1121.*

*European Commission. (2003). The new SME definition: User guide and model declaration. Brussels: European Commission.*

*Fornell, C., & Larcker, D. (1981). Evaluating Structural Equation. Journal of Marketing Research, 39-50.*

*Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. The Journal of Product Innovation Management, 110-132.*

*Gerring, J. (2007). Case study research: principles and practices. Cambridge: Cambridge University Press.*

*Grant, R. M. (2010). Contemporary Strategy Analysis. New York: John Wiley & Sons Ltd.*

*Greve, H. R. (2007). Exploration and Exploitation in Product Innovation. Industrial and Corporate Change, 945-975.*

*Grinstein, A. (2008). The Effect of Market Orientation and its Components on Innovation Consequences: a Meta-analysis. Journal of Academic Marketing Science, 166-173.*

*Hagedoorn, J., & Duysters, G. (2002). External sources of innovative capabilities: the preference for strategic alliances, mergers and acquisitions. Journal of Management Studies, 167-188.*

*Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate Data Analysis. New Jersey: Pearson Prentice Hall.*

*Hakala, H. (2010). Strategic Orientations in Management Literature: Three Approaches to Understanding the Interaction Between Market, Technology, Entrepreneurial and Learning Orientations. International Journal of Management Reviews.*

*Hamel, G., & Prahalad, C. K. (1993). Strategy as stretch and leverage. Harvard Business Review, 75-84.*

*Hamel, G., & Prahalad, C. K. (1994). Competing for the future. Harvard Business Review, 122-128.*

*Hamel, G., & Prahalad, C. K. (2005). Strategic Intent. Harvard Business Review, 148-161.*

*Henderson, R. M., & Clark, K. B. (2004). Architectural Innovation. In M. L. Tushman, & P. Anderson, Managing Strategic Innovation and Change (pp. 92-128). New York: Oxford University Press.*

*Huber, G. P. (1991). Organizational Learning: The Contributing Processes and Literatures. Organizational Science, 88-112.*

*Hult, G., Hurley, R., & Knight, G. (2004). Innovativeness: Its antecedents and impact on business performance. Industrial Marketing Management, 429-438.*

*Jansen, J. J., Van Den Bosch, F. A., & Volberda, H. W. (2006). Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators. Management Science, 1661-1674.*

*Jansen, J., Tempelaar, M., van den Bosch, F., & Volberda, H. (2009). Structural Differentiation and Ambidexterity: The Mediating Role of Integration Mechanisms. Organization Science, 797-811.*

*Jaworski, B. J., & Kohli, A. K. (1993). Market Orientation: Antecedents and Consequences. Journal of Marketing, 53-70.*

*Jimenez-Jimenez, D., & Sanz-Valle, R. (2011). Innovation, Organizational Learning, and Performance. Journal of Business Research, 408-417.*

*Johannessen, J., Olsen, B., & Lumpkin, G. T. (2001). Innovation as newness: what is new, how new, and new to whom? European Journal of Innovation Management, 20-31.*

*Kirca, A. H., Jayachandran, S., & Bearden, W. O. (2005). Market Orientation: A Meta-Analytic Review and Assessment of Its Antecedents and Impact on Performance. Journal of Marketing, 24-41.*

*Kollman, T., & Stockmann, C. (2010). Antecedents of strategic ambidexterity: effects of entrepreneurial orientation on exploratory and exploitative innovations in adolescent organisations. International Journal of Technology Management, 153-173.*

*Kraaijenbrink, J., Spender, J. C., & Groen, A. J. (2010). The Resource-Based View: A Review and Assessment of Its Critiques. Journal of Management, 349-372.*

*Ledwith, A., & O'Dwyer, M. (2009). Market Orientation, NPD Performance, and Organizational Performance in Small Firms. Journal of Product Innovation Management, 652-661.*

*Levinthal, D. A., & March, J. G. (1993). The Myopia of Learning. Strategic Management Journal, 95-112.*

*Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance. The Academy of Management Review, 135-172.*

*Lumpkin, G. T., & Dess, G. G. (2001). Linking Two Dimensions of Entrepreneurial Orientation to Firm Performance: The Moderating Role of Environment and Industry Life Cycle. Journal of Business Venturing, 429-451.*

*Lumpkin, G. T., Cogliser, C. C., & Schneider, D. R. (2009). Understanding and Measuring Autonomy: An Entrepreneurial Orientation Perspective. Entrepreneurship Theory and Practice, 47-69.*

*March, J. G. (1991). Exploration and Exploitation in Organizational Learning. Organization Science, 71-87.*

*Mazzarol, T., Reboud, S., & Volery, T. (2010). The Influence of Size, Age and Growth on Innovation Management in Small Firms. International Journal of Technology Management, 98-115.*

*Menguc, B., & Auh, S. (2006). Creating a Firm-Level Dynamic Capability through Capitalizing on Market Orientation and Innovativeness. Journal of the Academy of Marketing Science, 63-73.*

*Miles, M. B., & Huberman, A. M. (1994). Qualitative Data Analysis. Thousand Oaks: Sage Publications Inc.*

*Miles, R. E., & Snow, C. C. (1978). Organizational strategy, structure, and process. New York: McGraw-Hill.*

*Miller, D. (1983). The Correlates of Entrepreneurship in three Types of Firms. Management Science, 770-791.*

*Mom, T. J., Van den Bosch, F. A., & Volberda, H. W. (2007). Investigating managers' exploration and exploitation activities: The influence of top-down, bottom-up, and horizontal knowledge inflows. Journal of Management Studies, 910-931.*

*Mu, J., & Di Benedetto, C. A. (2011). Strategic orientations and new product commercialization: mediator, moderator, and interplay. R&D Management, 337-359.*

*Narayanan, V. K. (2001). Managing Technology and Innovation for Competitive Advantage. New Jersey: Prentice Hall.*

*Narver, J. C., & Slater, S. F. (1990). The Effect of a Market Orientation on Business Profitability. Journal of Marketing, 20-35.*

*Narver, J. C., Slater, S. F., & MacLachlan, D. L. (2004). Responsive and Proactive Market Orientation and New-Product Success. Journal of Product Innovation Management, 334-347.*

*Ndofor, H. A., Sirmon, D. G., & He, X. (2011). Firm Resources, Competitive Actions and Performance: Investigating a Mediated Model with Evidence From the In-Vitro Diagnostic Industry. Strategic Management Journal.*

*Nunnally, J. (1978). Psychometric Theory. New York: McGraw-Hill.*

*O'Reilly, C. A., & Tushman, M. L. (2004). The Ambidextrous Organization. Harvard Business Review, 74-81.*

*O'Reilly, C. A., & Tushman, M. L. (2008). Ambidexterity as a Dynamic Capability: Resolving the Innovaters Dilemma. Research in Organizational Behavior, 185-206.*

*Paladino, A. (2007). Investigating the Drivers of Innovation and New Product Success: A Comparison of Strategic Orientation. The Journal of Product Innovation Management, 534-553.*

*Paladino, A. (2008). Analyzing the Effects of Market and Resource Orientations on Innovative Outcomes in Times of Turbulence. The Journal of Product Innovation Management, 577-592.*

*Paladino, A. (2009). Financial Champions and Masters of Innovation: Analyzing the Effects of Balancing Strategic Orientations. The Journal of Product Innovation Management, 616-626.*

*Perez Lopez, S., Montes Peon, J., & Vazquez Ordas, C. (2004). Managing Knowledge: The Link Between Culture And Organizational Learning. Journal of Knowledge Management, 93-104.*

*Porter, M. E. (1985). Competitve Advantage: Creating and Sustaining Superior Performance. New York: Free Press.*

*Pullen, A., de Weerd-Nederhof, P., Groen, A., Song, M., & Fisscher, O. (2009). Successful Patterns of Internal SME Characteristics Leading to High Overall Innovation Performance. Creativity and Innovation Management, 209-222.*

*Raisch, S., & Birkinshaw, J. (2008). Organizational Ambidexterity: Antecedents, Outcomes, and Moderators. Journal of Management, 1-35.*

*Raisch, S., Birkinshaw, J., Probst, G., & Tushman, M. L. (2009). Organizational Ambidexterity: Balancing Exploitation and Exploration for Sustained Performance. Organization Science, 685-695.*

*Reijonen, H., & Komppula, R. (2010). The Adoption of Market Orientation in SMEs: Required Capabilities and Relation to Success. Journal of Strategic Marketing, 19-37.*

*Schindehutte, M., Morris, M. H., & Kocak, A. (2008). Understanding Market-driving Behavior: The role of Entrepreneurship. Journal of Small Business Management, 4-26.*

*Schumpeter, J. A. (1942). Capitalism, Socialism, and Democracy. New York: Harper Torchbooks.*

*Shadish, W., Cook, T., & Campbell, D. (2002). Experimental & Quasi-Experimental Designs for Generalized Causal Inference. Boston: Houghton Mifflin.*

*Sinkula, J. M., Baker, W. E., & Noordewiet, T. (1997). A Framework for Market-based Organizational Learning: Linking Values, Knowledge, and Behavior. Journal of the Academy of Marketing Science, 305-318.*

*Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing Firm Resources in Dynamic Environments to Create Value: Looking Inside the Black Box. Academy of Management Review, 273-292.*

*Slater, S. F., & Narver, J. C. (1995). Market Orientation and the Learning Organization. Journal of Marketing, 63-74.*

*Slater, S. F., Olson, E. M., & Hult, T. M. (2006). The Moderating Influence Of Strategic Orientation On The Strategy Formation Capability-Performance Relationship. Strategic Management Journal, 1221-1231.*

*Teece, D. J. (2007). Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance. Strategic Management journal, 1319-1350.*

*Teece, D. T., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. Strategic Management journal, 509-533.*

*Treacy, M., & Wiersema, F. (1995). The Discipline of Market Leaders. Reading, MA: Addison-Wesley.*

*Trott, P. (2008). Innovation Management and New Product Development. New Jersey: Pearson Education.*

*Tushman, M., & Nadler, D. (1986). Organizing for Innovation. California Management Review, 74-92.*

*Tushman, M., Smith, W. K., Wood, R. C., Westerman, G., & O'Reilly, C. (2010). Organizational Designs and Innovation Streams. Industrial and Corporate Change, 1331-1366.*

*Wang, C. L. (2008). Entrepreneurial Orientation, Learning Orientation and Firm Performance. Entrepreneurship Theory and Practice, 635-657.*

*Wang, C. L., & Ahmed, P. K. (2004). The Development and Validation of the Organizational Innovativeness Construct Using Confirmatory Factor Analysis. European Journal of Innovation Management, 303-313.*

*Wiklund, J., & Shepherd, D. (2003). Knowledge-based Resources, Entrepreneurial Orientation, And the Performance of Small and Medium-Sized Businesses. Strategic Management Journal, 1307-1314.*

*Wit, B., & Meyer, R. (2010). Strategy Process, Content, Context. Cheriton House: Cengage Learning EMEA.*

*Wong, H., & Ellis, P. D. (2007). Is market orientation affected by the product life cycle? Journal of World business, 145-156.*

*Yin, R. K. (2003). Case Study Research. Design and Methods. Thousand Oaks: Sage Publications Inc.*

*Zhao, Y., Li, Y., Lee, S. H., & Chen, L. B. (2011). Entrepreneurial Orientation, Organizational Learning, and Performance: Evidence From China. Entrepreneurship Theory and Practice, 293-317.*

*Zhou, K. Z., Yim, C. K., & Tse, D. K. (2005). The Effects of Strategic Orientations on Technology- and Market-Based Breakthrough Innovations. Journal of Marketing, 42-60.*

# Appendices

## Appendix 1: Industry branch codes Dutch Chamber of Commerce

Branch codes (SBI) Chamber of Commerce – www.kvk.nl - July 2011

*Selected branches for this study:*

| SBI 2008 | Branche omschrijving |
|---|---|
| 10 | Vervaardiging van voedingsmiddelen |
| 11 | Vervaardiging van dranken |
| 12 | Vervaardiging van tabaksproducten |
| 13 | Vervaardiging van textiel |
| 14 | Vervaardiging van kleding |
| 15 | Vervaardiging van leer, lederwaren en schoenen |
| 16 | Primaire houtbewerking en vervaardiging van artikelen van hout, kurk, riet en vlechtwerk (geen meubels) |
| 17 | Vervaardiging van papier, karton en papier- en kartonwaren |
| 18 | Drukkerijen, reproductie van opgenomen media |
| 19 | Vervaardiging van cokesovenproducten en aardolieverwerking |
| 20 | Vervaardiging van chemische producten |
| 21 | Vervaardiging van farmaceutische grondstoffen en producten |
| 22 | Vervaardiging van producten van rubber en kunststof |
| 23 | Vervaardiging van overige niet-metaalhoudende minerale producten |
| 24 | Vervaardiging van metalen in primaire vorm |
| 25 | Vervaardiging van producten van metaal (geen machines en apparaten) |
| 26 | Vervaardiging van computers en van elektronische en optische apparatuur |
| 27 | Vervaardiging van elektrische apparatuur |
| 28 | Vervaardiging van overige machines en apparaten |
| 29 | Vervaardiging van auto's, aanhangwagens en opleggers |
| 30 | Vervaardiging van overige transportmiddelen |
| 31 | Vervaardiging van meubels |
| 32 | Vervaardiging van overige goederen |

*Not selected branches for this study:*

| SBI 2008 | Branche omschrijving |
|---|---|
| 01 | Landbouw, jacht en dienstverlening voor de landbouw en jacht |
| 02 | Bosbouw, exploitatie van bossen en dienstverlening voor de bosbouw |
| 03 | Visserij en kweken van vis en schaaldieren |
| 06 | Winning van aardolie en aardgas |
| 08 | Winning van delfstoffen (geen olie en gas) |
| 09 | Dienstverlening voor de winning van delfstoffen |
| 33 | Reparatie en installatie van machines en apparaten |
| 35 | Productie en distributie van en handel in elektriciteit, aardgas, stoom en gekoelde lucht |
| 36 | Winning en distributie van water |
| 37 | Afvalwaterinzameling en –behandeling |
| 38 | Afvalinzameling en -behandeling; voorbereiding tot recycling |
| 39 | Sanering en overig afvalbeheer |
| 41 | Algemene burgerlijke en utiliteitsbouw en projectontwikkeling |
| 42 | Grond-, water- en wegenbouw (geen grondverzet) |
| 43 | Gespecialiseerde werkzaamheden in de bouw |
| 45 | Handel in en reparatie van auto's, motorfietsen en aanhangers |
| 46 | Groothandel en handelsbemiddeling (niet in auto's en motorfietsen) |
| 47 | Detailhandel (niet in auto's) |

| | |
|---|---|
| 49 | Vervoer over land |
| 50 | Vervoer over water |
| 51 | Luchtvaart |
| 52 | Opslag en dienstverlening voor vervoer |
| 53 | Post en koeriers |
| 55 | Logiesverstrekking |
| 56 | Eet- en drinkgelegenheden |
| 58 | Uitgeverijen |
| 59 | Productie en distributie van films en televisieprogramma´s; maken en uitgeven van geluidsopnamen |
| 60 | Verzorgen en uitzenden van radio- en televisieprogramma's |
| 61 | Telecommunicatie |
| 62 | Dienstverlenende activiteiten op het gebied van informatietechnologie |
| 63 | Dienstverlenende activiteiten op het gebied van informatie |
| 64 | Financiële instellingen (geen verzekeringen en pensioenfondsen) |
| 65 | Verzekeringen en pensioenfondsen (geen verplichte sociale verzekeringen) |
| 66 | Overige financiële dienstverlening |
| 68 | Verhuur van en handel in onroerend goed |
| 69 | Rechtskundige dienstverlening, accountancy, belastingadvisering en administratie |
| 70 | Holdings (geen financiële), concerndiensten binnen eigen concern en managementadvisering |
| 71 | Architecten, ingenieurs en technisch ontwerp en advies; keuring en controle |
| 72 | Speur- en ontwikkelingswerk |
| 73 | Reclame en marktonderzoek |
| 74 | Industrieel ontwerp en vormgeving, fotografie, vertaling en overige consultancy |
| 75 | Veterinaire dienstverlening |
| 77 | Verhuur en lease van auto's, consumentenartikelen, machines en overige roerende goederen |
| 78 | Arbeidsbemiddeling, uitzendbureaus en personeelsbeheer |
| 79 | Reisbemiddeling, reisorganisatie, toeristische informatie en reserveringsbureaus |
| 80 | Beveiliging en opsporing |
| 81 | Facility management, reiniging en landschapsverzorging |
| 82 | Overige zakelijke dienstverlening |
| 84 | Openbaar bestuur, overheidsdiensten en verplichte sociale verzekeringen |
| 85 | Onderwijs |
| 86 | Gezondheidszorg |
| 87 | Verpleging, verzorging en begeleiding met overnachting |
| 88 | Maatschappelijke dienstverlening zonder overnachting |
| 90 | Kunst |
| 91 | Culturele uitleencentra, openbare archieven, musea, dieren- en plantentuinen, natuurbehoud |
| 92 | Loterijen en kansspelen |
| 93 | Sport en recreatie |
| 94 | Levensbeschouwelijke en politieke organisaties, belangen- en ideële organisaties, hobbyclubs |
| 95 | Reparatie van computers en consumentenartikelen |
| 96 | Wellness en overige dienstverlening; uitvaartbranche |
| 97 | Huishoudens als werkgever van huishoudelijk personeel |
| 98 | Niet-gespecificeerde productie van goederen en diensten door particuliere huishoudens voor eigen gebruik |
| 99 | Extraterritoriale organisaties en lichamen |

## Appendix 2: Email invitation for online survey (Dutch)

*Email zonder contactpersoon*

Onderwerp: Strategie en innovatie binnen het MKB

T.a.v.: Directie/managementteam

Geachte heer of mevrouw,

Mijn naam is Roy Reulink en ik onderzoek welke strategische eigenschappen van Nederlandse MKB bedrijven leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen. Dit onderzoek naar strategie en innovatie binnen het MKB maakt het mogelijk een model te ontwikkelen dat kan meten hoe een bedrijf presteert en wat het kan doen om betere resultaten op het gebied van innovatie te behalen. Het onderzoek wordt uitgevoerd als afstudeeropdracht voor mijn opleiding bedrijfskunde aan de universiteit Twente.

Om een statistisch onderbouwd model te ontwikkelen heb ik data nodig van bedrijven. Uw bedrijf is hiervoor geselecteerd op basis van Kamer van Koophandel branchecodes. Ik wil u willen vragen of u via onderstaande link een vragenlijst zou willen invullen. Het invullen kost u hooguit 15 tot 25 minuten. Wat ik u wil aanbieden als tegenprestatie zijn de resultaten van het onderzoek, waarmee u inzicht krijgt in hoe strategische eigenschappen van een bedrijf kunnen leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen die een positief effect kunnen hebben op uw winst en toekomstperspectief.

Link naar vragenlijst: <<link>>

De door u ingevulde gegevens zullen alleen gebruikt worden voor dit onderzoek en worden na afronding van het onderzoek vernietigd. De bedrijfsnaam en contactgegevens worden gecodeerd en zijn alleen, zolang het onderzoek loopt, inzichtelijk voor mijzelf.

Ik hoop dat u mij wilt helpen met mijn onderzoek waarmee ik mijn opleiding succesvol kan afronden. Mocht u vragen, opmerkingen of suggesties hebben, dan kunt u altijd contact met mij opnemen via onderstaande contactgegevens. Ik kan u, indien gewenst, ook in contact brengen met mijn supervisors van de universiteit.

Alvast bedankt voor uw medewerking!

Met vriendelijke groet,

Roy Reulink
Student Universiteit Twente
E-mailadres: r.b.j.reulink@student.utwente.nl

*Email met contactpersoon*

Onderwerp: Strategie en innovatie binnen het MKB

T.a.v.: <<voorletters>> <<achternaam>>

Geachte <<aanhef>> <<achternaam>>,

Mijn naam is Roy Reulink en ik onderzoek welke strategische eigenschappen van Nederlandse MKB bedrijven leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen. Dit onderzoek naar strategie en innovatie binnen het MKB maakt het mogelijk een model te ontwikkelen dat kan meten hoe een bedrijf presteert en wat het kan doen om betere resultaten op het gebied van innovatie te behalen. Het onderzoek wordt uitgevoerd als afstudeeropdracht voor mijn opleiding bedrijfskunde aan de universiteit Twente.

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Link naar vragenlijst: <<link>>

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Roy Reulink
Student Universiteit Twente
E-mailadres: r.b.j.reulink@student.utwente.nl

*Herinnering email zonder contactpersoon*

Onderwerp: Strategie en innovatie binnen het MKB: nog 100 te gaan!

T.a.v.: Directie/managementteam

Geachte heer of mevrouw,

Mijn naam is Roy Reulink en ik onderzoek welke strategische eigenschappen van Nederlandse MKB bedrijven leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen. Enkele weken geleden heb ik u een email gestuurd met een uitnodiging om mee te werken aan mijn onderzoek. Hoewel al diverse bedrijven het online vragenformulier hebben ingevuld en de resultaten veelbelovend zijn, heb ik nog niet genoeg respons gehad voor een statistische analyse. Graag zou ik u willen vragen of u deze vragenlijst alsnog zou willen invullen. Het invullen kost u hooguit 15 tot 25 minuten.

Dit onderzoek naar strategie en innovatie binnen het MKB maakt het mogelijk een model te ontwikkelen dat kan meten hoe een bedrijf presteert en wat het kan doen om betere resultaten op het gebied van innovatie te behalen. Het onderzoek wordt uitgevoerd als afstudeeropdracht voor mijn opleiding bedrijfskunde aan de universiteit Twente. Wat ik u wil aanbieden als tegenprestatie zijn de resultaten van het onderzoek, waarmee u inzicht krijgt in hoe strategische eigenschappen van een bedrijf kunnen leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen die een positief effect kunnen hebben op uw winst en toekomstperspectief.

Link naar vragenlijst: <<link>>

De door u ingevulde gegevens zullen alleen gebruikt worden voor dit onderzoek en worden na afronding van het onderzoek vernietigd. De bedrijfsnaam en contactgegevens worden gecodeerd en zijn alleen, zolang het onderzoek loopt, inzichtelijk voor mijzelf.

Ik hoop dat u mij wilt helpen met mijn onderzoek waarmee ik mijn opleiding succesvol kan afronden. Mocht u vragen, opmerkingen of suggesties hebben, dan kunt u altijd contact met mij opnemen via onderstaande contactgegevens. Ik kan u, indien gewenst, ook in contact brengen met mijn supervisors van de universiteit.

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Met vriendelijke groet,

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E-mailadres: r.b.j.reulink@student.utwente.nl

*Herinnering email met contactpersoon*

Onderwerp: Strategie en innovatie binnen het MKB: nog 100 te gaan!

T.a.v.: <<voorletters>> <<achternaam>>

Geachte <<aanhef>> <<achternaam>>,

Mijn naam is Roy Reulink en ik onderzoek welke strategische eigenschappen van Nederlandse MKB bedrijven leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen. Enkele weken geleden heb ik u een email gestuurd met een uitnodiging om mee te werken aan mijn onderzoek. Hoewel al diverse bedrijven het online vragenformulier hebben ingevuld en de resultaten veelbelovend zijn, heb ik nog niet genoeg respons gehad voor een statistische analyse. Graag zou ik u willen vragen of u deze vragenlijst alsnog zou willen invullen. Het invullen kost u hooguit 15 tot 25 minuten.

Dit onderzoek naar strategie en innovatie binnen het MKB maakt het mogelijk een model te ontwikkelen dat kan meten hoe een bedrijf presteert en wat het kan doen om betere resultaten op het gebied van innovatie te behalen. Het onderzoek wordt uitgevoerd als afstudeeropdracht voor mijn opleiding bedrijfskunde aan de universiteit Twente. Wat ik u wil aanbieden als tegenprestatie zijn de resultaten van het onderzoek, waarmee u inzicht krijgt in hoe strategische eigenschappen van een bedrijf kunnen leiden tot de ontwikkeling van verbeterde of totaal nieuwe producten en processen die een positief effect kunnen hebben op uw winst en toekomstperspectief.

Link naar vragenlijst: <<link>>

De door u ingevulde gegevens zullen alleen gebruikt worden voor dit onderzoek en worden na afronding van het onderzoek vernietigd. De bedrijfsnaam en contactgegevens worden gecodeerd en zijn alleen, zolang het onderzoek loopt, inzichtelijk voor mijzelf.

Ik hoop dat u mij wilt helpen met mijn onderzoek waarmee ik mijn opleiding succesvol kan afronden. Mocht u vragen, opmerkingen of suggesties hebben, dan kunt u altijd contact met mij opnemen via onderstaande contactgegevens. Ik kan u, indien gewenst, ook in contact brengen met mijn supervisors van de universiteit.

Alvast bedankt voor uw medewerking!

Met vriendelijke groet,

Roy Reulink
Student Universiteit Twente
E-mailadres: r.b.j.reulink@student.utwente.nl

## Appendix 3: Original and new constructs

### Incremental innovation (original scale, not used in this study) (Johannessen, Olsen, & Lumpkin, 2001)

Has your company made changes during the last three years that were perceived to be new for the company, but which have previously been used by other firms, within the following areas? (Please circle one response in each row).

- New products Yes No
- New services Yes No
- New methods of production Yes No
- Opening new markets Yes No
- New sources of supply Yes No
- New ways of organizing Yes No

### Radical innovation (original scale, not used in this study) (Johannessen, Olsen, & Lumpkin, 2001)

Has your company made changes during the last three years that were perceived to be new to the industry in which the company operates, within the following areas? (Please circle one response in each row).

- New products Yes No
- New services Yes No
- New methods of production Yes No
- Opening new markets Yes No
- New sources of supply Yes No
- New ways of organizing Yes No

### Incremental innovation (modified scale, used in this study) (Johannessen, Olsen, & Lumpkin, 2001)

- Our company introduced new products to the market during the last three years that were perceived to be new for the company, but which have previously been introduced to the market by other companies
- Our company introduced new services to the market during the last three years that were perceived to be new for the company, but which have previously been introduced to the market by other companies
- Our company implemented new methods of production during the last three years that were perceived to be new for the company, but which have previously been used by other companies
- Our company entered new markets during the last three years that were perceived to be new for the company, but which have previously been entered by other companies
- Our company found new sources of supply during the last three years that were perceived to be new for the company, but which have previously been used by other companies
- Our company implemented new ways of organizing during the last three years that were perceived to be new for the company, but which have previously been used by other companies

### Radical innovation (modified scale, used in this study) (Johannessen, Olsen, & Lumpkin, 2001)

- Our company introduced new products to the market during the last three years that were perceived to be new to the industry in which our company operates
- Our company introduced new services to the market during the last three years that were perceived to be new to the industry in which our company operates
- Our company implemented new methods of production during the last three years that were perceived to be new to the industry in which our company operates
- Our company entered new markets during the last three years that were perceived to be new to the industry in which our company operates
- Our company found new sources of supply during the last three years that were perceived to be new to the industry in which our company operates
- Our company implemented new ways of organizing during the last three years that were perceived to be new to the industry in which our company operates

### Organizational Performance (new scale)

- How did the sales (turnover) for your business develop during the past 3 years?
- How did the profitability for your business develop during the past 3 years?
- How did the market share of your business develop during the past 3 years?

## Appendix 4: Guide and questions for online questionnaire (Dutch)

Het invullen van de vragenlijst duurt hooguit 15-25 minuten. De vragen gaan over de strategie, de bedrijfsomgeving, de interne organisatie en de innovatie prestaties van uw bedrijf. Het zijn voornamelijk stellingen die snel beantwoord kunnen worden door aan te geven of u het er wel of niet mee eens bent. De door u ingevulde gegevens worden alleen voor dit onderzoek gebruikt en zullen na afronding van het onderzoek direct worden vernietigd. De bedrijfsnaam en contactgegevens zullen gecodeerd worden en alleen inzichtelijk zijn voor de onderzoeker.

Alvast bedankt voor uw medewerking!

Toelichting: Middelen van een bedrijf kunnen tastbaar (gebouw, machines, land, gereedschappen, geld, verzekeringen), niet-tastbaar (technologie, patenten, reputatie, relaties), maar ook menselijk (kennis en kunde van medewerkers) zijn.

| | |
|---|---|
| 01ALCN | Naam van uw bedrijf: |
| 02COYF | Jaar van oprichting bedrijf: |
| 03COFT | Aantal FTE (fulltime medewerkers): |
| 04ALNR | Uw naam: |
| 05ALER | Uw email adres (voor resultaten onderzoek): |
| 06COIC | *Tot welke van de onderstaande branches rekent u uw bedrijf? (SBI codes, industrie categorie, 1 antwoord mogelijk)* |
| | *10 Vervaardiging van voedingsmiddelen*<br>*11 Vervaardiging van dranken*<br>*12 Vervaardiging van tabaksproducten*<br>*13 Vervaardiging van textiel*<br>*14 Vervaardiging van kleding*<br>*15 Vervaardiging van leer, lederwaren en schoenen*<br>*16 Primaire houtbewerking en vervaardiging van artikelen van hout, kurk, riet en vlechtwerk (geen meubels)*<br>*17 Vervaardiging van papier, karton en papier- en kartonwaren*<br>*18 Drukkerijen, reproductie van opgenomen media*<br>*19 Vervaardiging van cokesovenproducten en aardolieverwerking*<br>*20 Vervaardiging van chemische producten*<br>*21 Vervaardiging van farmaceutische grondstoffen en producten*<br>*22 Vervaardiging van producten van rubber en kunststof*<br>*23 Vervaardiging van overige niet-metaalhoudende minerale producten*<br>*24 Vervaardiging van metalen in primaire vorm*<br>*25 Vervaardiging van producten van metaal (geen machines en apparaten)*<br>*26 Vervaardiging van computers en van elektronische en optische apparatuur*<br>*27 Vervaardiging van elektrische apparatuur*<br>*28 Vervaardiging van overige machines en apparaten*<br>*29 Vervaardiging van auto's, aanhangwagens en opleggers*<br>*30 Vervaardiging van overige transportmiddelen*<br>*31 Vervaardiging van meubels*<br>*32 Vervaardiging van overige goederen*<br>*00 Overige* |

Geef voor onderstaande stellingen aan in hoeverre u het ermee eens of oneens bent. (1 = zeer mee oneens; 2 = mee oneens; 3 = enigszins mee oneens; 4 = neutraal; 5 = enigszins mee eens; 6 = mee eens; 7 = zeer mee eens)

| | |
|---|---|
| 07ROUN | We streven er voortdurend naar om ervoor te zorgen dat onze middelen niet gemakkelijk kunnen worden geïdentificeerd door concurrenten |
| 08ROUN | We streven er voortdurend naar om ervoor te zorgen dat onze middelen niet gemakkelijk kunnen worden nagemaakt door concurrenten |
| 09ROUN | We hebben veel tijd geïnvesteerd en/of moeite gedaan om ervoor te zorgen dat het moeilijk is voor een ander bedrijf om dezelfde middelen die wij hebben in bezit te krijgen |
| 10ROUN | We streven er voortdurend naar om ervoor te zorgen dat het bijna onmogelijk is om onze combinatie van middelen te gebruiken in een ander bedrijf |
| 11ROUN | Wij monitoren onze belangrijkste middelen om te bepalen of concurrenten in staat zouden zijn om ze na te maken |
| 12ROUN | Onze strategie is gericht op het ervan verzekeren dat concurrenten het moeilijk vinden om onze middelen na te maken |
| 13ROUN | We proberen er zeker van te zijn dat onze concurrenten het moeilijk vinden om de middelen die ons succes bepalen te identificeren |
| 14ROSY | We delen de belangrijkste middelen tussen afdelingen zodat er geen duidelijk identificeerbare eigenaar van is |
| 15ROSY | We proberen ervoor te zorgen dat onze middelen worden verspreid over (en voordelen opleveren voor) meerdere afdelingen |
| 16ROSY | We proberen ervoor te zorgen dat onze middelen worden verspreid over (en voordelen opleveren voor) verschillende lagen binnen het bedrijf |
| 17RODY | In onze processen hebben we een aantal middelen geïntegreerd om onze efficiëntie en effectiviteit te verhogen |
| 18RODY | We proberen ervoor te zorgen dat onze middelen fungeren als triggers voor het collectief leren binnen het bedrijf |
| 19RODY | Wij proberen ervoor te zorgen dat onze middelen fungeren als triggers voor innovatie binnen het bedrijf |
| 20RODY | We proberen ervoor te zorgen dat onze middelen fungeren als triggers voor het gezamenlijk oplossen van problemen met belanghebbende partijen |
| 21RODY | Onze middelen vormen de belangrijkste drijfveren voor het ontwikkelen van strategieën die ons in staat stellen om efficiëntie en effectiviteit te bereiken |
| 22MOCO | Het topmanagement bespreekt regelmatig de sterke en zwakke punten van concurrenten |
| 23MOCO | We reageren snel op acties van concurrenten |
| 24MOCO | We richten ons op klanten en klantgroepen waar we concurrentievoordeel hebben of kunnen ontwikkelen |
| 25MOCO | Onze verkopers delen informatie binnen ons bedrijf over de strategieën van concurrenten |
| 26MOCU | Wij monitoren en evalueren nauwkeurig onze mate van betrokkenheid bij het bedienen van de behoeften van de klant |
| 27MOCU | Onze strategieën hebben als doel de toegevoegde waarde voor de klant te verhogen |
| 28MOCU | Ons concurrentievoordeel is gebaseerd op het begrijpen van klantbehoeften |
| 29MOCU | Onze bedrijfsdoelstellingen zijn gebaseerd op klanttevredenheid |
| 30MOCU | We besteden veel aandacht aan after-salesservice |
| 31MOCU | We meten regelmatig klanttevredenheid |
| 32MOIN | Het topmanagement bezoekt regelmatig belangrijke klanten |
| 33MOIN | Onze medewerkers delen informatie over succesvolle en niet succesvolle klantervaringen met alle andere medewerkers binnen het bedrijf |
| 34MOIN | Al onze bedrijfsafdelingen (bijvoorbeeld, marketing / verkoop, productie, R&D, etc) werken samen aan het bedienen van de behoeften van onze markten |
| 35MOIN | Al onze managers begrijpen hoe iedereen in ons bedrijf kan bijdragen aan het creëren van waarde voor de klant |
| 36MOIN | Al onze bedrijfsafdelingen delen middelen met andere afdelingen |

| | |
|---|---|
| 37LOCO | Onze managers zijn het er over het algemeen over eens dat het leervermogen van ons bedrijf de basis is van ons concurrentievoordeel |
| 38LOCO | Leren is de sleutel tot verbetering en is daarom een van de fundamentele waarden binnen ons bedrijf |
| 39LOCO | De persoonlijke ontwikkeling van medewerkers binnen ons bedrijf wordt gezien als een investering en niet als kostenpost |
| 40LOCO | In ons bedrijf wordt leren gezien als een belangrijke bron dat nodig is om als bedrijf te kunnen overleven |
| 41LOSH | Er is een gemeenschappelijk doel in ons bedrijf |
| 42LOSH | Er is volledige overeenstemming over onze strategische visie op alle niveaus, functies en afdelingen |
| 43LOSH | Alle medewerkers zijn toegewijd aan de doelstellingen van dit bedrijf |
| 44LOSH | Medewerkers zien zichzelf als partners die de toekomst van het bedrijf mede bepalen |
| 45LOOP | We zijn niet bang om kritisch te kijken naar veronderstellingen die we eerder gemaakt hebben met betrekking tot onze klanten |
| 46LOOP | Medewerkers van ons bedrijf zijn zich er van bewust dat de manier waarop zij naar de markt kijken voortdurend moet worden bijgesteld |
| 47LOOP | We vragen ons regelmatig gezamenlijk af of de manier waarop we informatie over klanten gebruiken voor ons bedrijf nog goed is |
| 48EOAU | Ons bedrijf ondersteunt de inspanningen van individuen en/of teams die autonoom werken zonder dat ze zich verlaten op senior managers om hun werk te begeleiden |
| 49EOAU | De managers van ons bedrijf zijn van mening dat de beste resultaten ontstaan wanneer individuen en/of teams zelf bepalen welke zakelijke kansen ze nastreven (in plaats van de directie het voortouw neemt in het nastreven van zakelijke kansen) |
| 50EOAU | Individuen en/of teams die kansen in de markt nastreven nemen in dit bedrijf zelf beslissingen, zonder dat ze voortdurend goedkeuring moeten vragen aan hun leidinggevenden alvorens ze deze beslissingen nemen |
| 51EOAUX | De directie (meer dan initiatieven en input van werknemers) spelen een belangrijke rol bij het identificeren en selecteren van kansen in de markt die het bedrijf nastreeft |
| 52EOINX | In het algemeen zijn topmanagers van mijn bedrijf voorstander van een sterke nadruk op de marketing van beproefde producten en diensten (in plaats van een sterke nadruk op research & development, technologisch vooruitstrevendheid en innovaties) |
| 53EOINX | In de afgelopen drie jaar heeft mijn bedrijf weinig tot geen nieuwe productlijnen of diensten op de markt geïntroduceerd |
| 54EOINX | In mijn bedrijf zijn merendeels kleine veranderingen in productlijnen of diensten doorgevoerd (in plaats van grote drastische veranderingen aan productlijnen of diensten) |
| 55EOIN | De topmanagers van mijn bedrijf moedigen het experimenten en het origineel oplossen van problemen aan (in plaats van het imiteren van methoden die andere bedrijven hebben gebruikt voor het oplossen van hun problemen) |
| 56EOIN | Ons bedrijf heeft de voorkeur om eigen unieke en nieuwe productiemethoden en -processen te ontwerpen (in plaats van het implementeren van methoden en technieken die anderen hebben ontwikkeld en bewezen) |
| 57EOPRX | Met betrekking tot concurrentie reageert ons bedrijf meestal op acties die geïnitieerd zijn door concurrenten (in plaats van het zelf initiëren van acties waar de concurrentie dan op reageert) |
| 58EOPRX | Met betrekking tot concurrentie is ons bedrijf zelden het eerste bedrijf dat nieuwe producten/diensten, administratieve of operationele technieken introduceert |
| 59EOPRX | Met betrekking tot concurrenten probeert ons bedrijf meestal confrontaties met concurrenten te voorkomen, met een voorkeur voor een "leven-en-laten-leven" houding (in plaats van een concurrerende "uitschakelen-van-concurrenten" houding) |
| 60EOPRX | De topmanagers van ons bedrijf hebben een sterke neiging om de markleider te volgen bij het introduceren van nieuwe producten of ideeën (in plaats van zelf voorsprong te nemen op concurrenten door het introduceren van nieuwe ideeën of procedures) |
| 61EORIX | De topmanagers van ons bedrijf hebben een sterke voorkeur voor projecten met een laag risico en normaal en stabiel rendement (in plaats van een voorkeur voor projecten met een hoog risico en een kans op zeer hoog rendement) |

| | |
|---|---|
| 62EORIX | Gezien de aard van onze marktomgeving geloven de topmanagers van ons bedrijf dat de beste tactiek het geleidelijk ontdekken van de marktomgeving is door middel van zorgvuldig en stapsgewijs gedrag (in plaats van massale en ingrijpende handelingen uit te voeren die nodig zijn om de doelstellingen van het bedrijf te bereiken) |
| 63EORIX | Wanneer ons bedrijf beslissingen moet nemen in situaties met veel onzekerheid neemt het meestal een voorzichtige en afwachtende houding aan, om de kans op het maken van kostbare beslissingen te minimaliseren (in plaats van een krachtige, agressieve houding aan te nemen om de kans te maximaliseren potentiële kansen in de markt te benutten) |
| 64EORIX | De topmanagers van ons bedrijf geven de voorkeur aan het grondig bestuderen van een probleem alvorens middelen in te zetten om het op te lossen (in plaats van snel geld uit te geven aan mogelijke oplossingen) wanneer problemen onze vooruitgang beperken |
| 65EOCO | Ons bedrijf is zeer agressief en uitermate concurrerend als het gaat om marktaandeel van de concurrentie in handen te krijgen |
| 66COMT | In onze branche, veranderen de voorkeuren van klanten regelmatig |
| 67COMT | Onze klanten hebben de neiging om altijd te blijven zoeken naar nieuwe producten |
| 68COMT | Soms zijn onze klanten prijsgevoelig en soms is de prijs relatief onbelangrijk |
| 69COMT | Er is vraag naar onze producten en diensten van klanten die ze nooit eerder gekocht hebben |
| 70COMT | Nieuwe klanten hebben de neiging om product gerelateerde behoeften te hebben die anders zijn dan die van onze bestaande klanten |
| 71COTT | De technologie in onze branche verandert snel |
| 72COTT | Technologische veranderingen bieden grote kansen in onze branche |
| 73COTT | Het is heel moeilijk om te voorspellen hoe het met de technologie zal staan in onze branche over twee/drie jaar |
| 74COTT | In onze branche zijn een groot aantal nieuwe product ideeën mogelijk gemaakt door technologische doorbraken |
| 75COTTX | Technologische ontwikkelingen in onze branche zijn relatief gering |
| 76COCO | De concurrentie in onze branche is moordend |
| 77COCO | Er zijn veel ''promotie oorlogen'' in onze branche |
| 78COCO | Alles wat een bedrijf in onze branche aanbiedt, kunnen concurrenten ook makkelijk en snel aanbieden |
| 79COCO | Prijsconcurrentie is een kenmerk van onze branche |
| 80COCO | Je hoort bijna elke dag wel van nieuwe acties van concurrenten |
| 81COEN | Er zijn maar een paar externe bedreigingen voor het voortbestaan en het welzijn van ons bedrijf |
| 82COEN | Onze markten zijn rijk aan investeringskapitaal |
| 83COEN | Economische ontwikkeling programma's (subsidies) bieden voldoende steun voor onze branche |
| 84COEN | Onze branche biedt veel winstgevende mogelijkheden |
| 85COENX | Ons bedrijf is actief in een bedreigende marktomgeving |
| 86COCE | Er kan door werknemers weinig actie worden ondernomen totdat een supervisor een beslissing goedkeurt |
| 87COCE | Een persoon die zijn eigen beslissingen wil nemen wordt snel ontmoedigd |
| 88COCE | Zelfs kleine zaken moeten door medewerkers worden voorgelegd aan iemand hoger in rang voor een definitief besluit |
| 89COCE | Medewerkers van een afdeling moeten altijd hun leidinggevende vragen voordat zij iets mogen doen |
| 90COCE | De meeste beslissingen die mensen maken moeten goedgekeurd worden door een supervisor |
| 91COFO | Welke situatie zich ook voordoet, er zijn geschreven procedures beschikbaar hoe met die situatie om te gaan |
| 92COFO | Binnen de afdelingen van de organisatie nemen regels en procedures een centrale plaats in |
| 93COFO | Van iedereen in de organisatie worden geschreven verslagen bijgehouden met betrekking tot zijn/haar prestaties |
| 94COFO | Medewerkers in onze organisatie worden frequent gecontroleerd op het overtreden van regels |

| | |
|---|---|
| 95COFO | Geschreven functieomschrijvingen zijn geformuleerd voor functies op ieder niveau binnen de organisatie |
| 96ININ | Ons bedrijf introduceerde gedurende de afgelopen drie jaar nieuwe producten op de markt die werden gezien als nieuw voor het bedrijf, maar die al eerder op de markt zijn gebracht door andere bedrijven |
| 97ININ | Ons bedrijf introduceerde gedurende de afgelopen drie jaar nieuwe diensten op de markt die werden gezien als nieuw voor het bedrijf, maar die al eerder op de markt zijn gebracht door andere bedrijven |
| 98ININ | Ons bedrijf implementeerde gedurende de afgelopen drie jaar nieuwe methoden van produceren die werden gezien als nieuw voor het bedrijf, maar die al eerder geïmplementeerd werden door andere bedrijven |
| 99ININ | Ons bedrijf heeft gedurende de afgelopen drie jaar nieuwe markten betreden die werden gezien als nieuw voor het bedrijf, maar die al eerder door andere bedrijven werden betreden |
| 100ININ | Ons bedrijf gebruikte gedurende de afgelopen drie jaar nieuwe bronnen van toelevering die werden gezien als nieuw voor het bedrijf, maar die al eerder door andere bedrijven werden gebruikt |
| 101ININ | Ons bedrijf implementeerde gedurende de afgelopen drie jaar nieuwe manieren van organiseren die werden gezien als nieuw voor het bedrijf, maar die al eerder door andere bedrijven werden geïmplementeerd |
| 102INRA | Ons bedrijf introduceerde gedurende de afgelopen drie jaar nieuwe producten op de markt die werden gezien als nieuw voor de branche waarin ons bedrijf actief is |
| 103INRA | Ons bedrijf introduceerde gedurende de afgelopen drie jaar nieuwe diensten op de markt die werden gezien als nieuw voor de branche waarin ons bedrijf actief is |
| 104INRA | Ons bedrijf implementeerde gedurende de afgelopen drie jaar nieuwe methoden van produceren die werden gezien als nieuw voor de branche waarin ons bedrijf actief is |
| 105INRA | Ons bedrijf heeft gedurende de afgelopen drie jaar nieuwe markten betreden die werden gezien als nieuw voor de branche waarin ons bedrijf actief is |
| 106INRA | Ons bedrijf gebruikte gedurende de afgelopen drie jaar nieuwe bronnen van toelevering die werden gezien als nieuw voor de branche waarin ons bedrijf actief is |
| 107INRA | Ons bedrijf implementeerde gedurende de afgelopen drie jaar nieuwe manieren van organiseren die werden gezien als nieuw voor de branche waarin ons bedrijf actief is |

Geef voor de volgende vragen de ontwikkeling aan welke het best past bij uw bedrijf. (1 = sterk gedaald; 2 = gedaald; 3 = enigszins gedaald; 4 = gelijk gebleven; 5 = enigszins gestegen; 6 = gestegen; 7 = sterk gestegen)

| | |
|---|---|
| 110ORPE | Hoe heeft de verkoop (omzet) van uw bedrijf zich ontwikkeld gedurende de afgelopen 3 jaar? |
| 111ORPE | Hoe heeft de winstgevendheid van uw bedrijf zich ontwikkeld gedurende de afgelopen 3 jaar? |
| 112ORPE | Hoe heeft het marktaandeel van uw bedrijf zich ontwikkeld gedurende de afgelopen 3 jaar? |

## Appendix 5: Confirmatory factor analysis

| *Resource Orientation (Paladino, 2008)* | Component 1 | 2 | 3 |
|---|---|---|---|
| **Uniqueness** | | | |
| ROUN12 Our strategy is geared toward ensuring competitors would find it difficult to imitate our resource base | ,836 | | |
| ROUN07 We constantly strive to ensure that our resources cannot be easily identified by competitors | ,803 | | |
| ROUN10 We constantly strive to ensure that it would be almost impossible to use our combination of resources in another corporation | ,803 | | |
| ROUN09 We have dedicated much time and effort to ensure that it would be difficult for another company to acquire the same resources we have | ,796 | | |
| ROUN13 We try to make certain that our competitors find it difficult to determine the resources that may lead to our success | ,783 | | |
| ROUN11 We monitor our key resources to determine if competitors would be able to replicate them. | ,771 | | |
| ROUN08 We constantly strive to ensure that our resources cannot be easily imitated by competitors | ,766 | | |
| **Dynamism** | | | |
| RODY20 We work to ensure our resources act as triggers for collaborative problem solving with stakeholders | | ,853 | |
| RODY19 We work to ensure our resources act as triggers for innovation within the company | | ,799 | |
| RODY18 We work to ensure our resources act as triggers for collective learning within the company | | ,785 | |
| RODY21 Our resources are the principle drivers used to develop strategies that enable us to achieve efficiency or effectiveness | | ,778 | |
| RODY17 We integrate a number of resources to increase our efficiency and effectiveness | | ,776 | |
| **Synergy** | | | |
| ROSY15 We work to ensure our resources span (provide benefits) to several departments | | | ,876 |
| ROSY16 We work to ensure our resources span (provide benefits) to different levels within the company | | | ,817 |
| ROSY14 We share key resources across departments to ensure they lack a clearly identified owner | | | ,686 |
| Cronbach's Alpha coefficient (Cronbach, 1951): | ,926 | ,912 | ,820 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: ,865; Bartlett's Test of Sphericity: Approx. Chi-Square: 1135,830; df: 105; Sig.: ,000; Variance explained: 72,67%

[a] Reverse coded items, which are recoded in the same direction before analyzing

[b] Deleted items after second-order convergent validity check

[c] Deleted items after first-order discriminant validity check

[d] First order variable deleted after confirmatory factor analysis

| *Market Orientation (Narver & Slater, 1990)* | Component 1 | 2 | 3 |
|---|---|---|---|
| **Interfunctional coordination** | | | |
| MOIN34 All our firm departments (e.g., marketing/sales, manufacturing, R&D, finance/accounting) are integrated in serving the needs of our target markets. | ,857 | | |
| MOIN36 All our firm departments share resources with other departments | ,849 | | |
| MOIN35 All of our managers understand how everyone in our firm can contribute to creating customer value | ,839 | | |
| MOIN33 We freely communicate information about our successful and unsuccessful customer experiences across all firm[c] departments | - | | |
| MOIN32 Top management regularly visits important customers[b] | - | | |
| **Customer orientation** | | | |
| MOCU28 Our competitive advantage is based on understanding customer needs | | ,906 | |
| MOCU27 Business strategies are driven by the goal of increasing customer value | | ,833 | |
| MOCU29 Our business objectives are driven by customer satisfaction | | ,832 | |
| MOCU26 We closely monitor and assess our level of commitment in serving customer's needs[b] | | - | |
| MOCU30 We pay close attention to after-sales service[b] | | - | |
| MOCU31 We frequently measure customer satisfaction[b] | | - | |
| **Competitor orientation** | | | |
| MOCO23 We respond rapidly to competitive actions | | | ,837 |
| MOCO22 Top management regularly discuss competitors' strength and weaknesses | | | ,830 |
| MOCO25 Our salespeople share information about competitors strategies | | | ,789 |
| MOCO24 We target customers and customer groups where we have or can develop competitive advantage[b] | | | - |
| Cronbach's Alpha coefficient (Cronbach, 1951): | ,836 | ,873 | ,808 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: ,781; Bartlett's Test of Sphericity: Approx. Chi-Square: 430,651; df: 36; Sig.: ,000; Variance explained: 76,70%

[a] Reverse coded items, which are recoded in the same direction before analyzing

[b] Deleted items after second-order convergent validity check

[c] Deleted items after first-order discriminant validity check

[d] First order variable deleted after confirmatory factor analysis

| *Learning Orientation (Sinkula, Baker, & Noordewiet, 1997)* | Component 1 | 2 | 3 |
|---|---|---|---|
| **Shared vision** | | | |
| LOSH43 All employees are committed to the goals of this organization | ,911 | | |
| LOSH41 There is a commonality of purpose in my organization | ,798 | | |
| LOSH44 Employees view themselves as partners in charting the direction of the organization | ,795 | | |
| LOSH42 There is total agreement on our organizational vision across all levels, functions, and divisions | ,789 | | |
| **Commitment to learning** | | | |
| LOCO38 The basic values of this organization include learning as a key to improvement | | ,809 | |
| LOCO40 Learning in my organization is seen as a key commodity necessary to guarantee organizational survival | | ,792 | |
| LOCO39 The sense around here is that employee learning is an investment, not an expense | | ,747 | |
| LOCO37 Managers basically agree that our organization's ability to learn is the key to our competitive advantage | | ,698 | |
| **Open-mindedness**[d] | | | |
| LOOP47 We regularly collectively question our own business about the way we interpret customer information[c] | | | - |
| LOOP45 We are not afraid to reflect critically on the shared assumptions we have made about our customers[b] | | | - |
| LOOP46 Personnel in this organization realize that the way they perceive the marketplace must be continually questioned[b] | | | - |
| Cronbach's Alpha coefficient (Cronbach, 1951): | ,874 | ,799 | - |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: ,834; Bartlett's Test of Sphericity: Approx. Chi-Square: 362,103; df: 28; Sig.: ,000; Variance explained 68,90%

[a] Reverse coded items, which are recoded in the same direction before analyzing

[b] Deleted items after second-order convergent validity check

[c] Deleted items after first-order discriminant validity check

[d] First order variable deleted after confirmatory factor analysis

| *Entrepreneurial Orientation (Lumpkin, Cogliser, & Schneider, 2009)* | Component | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| **Proactiveness** | | | | | |
| EOPR57 In dealing with competition, my firm typically responds to action which competitors initiate as compared with initiating action which the competition then responds to[a] | ,866 | | | | |
| EOPR58 In dealing with competition, my firm is very seldom the first business to introduce new products/services, administrative techniques and operating technologies[a] | ,817 | | | | |
| EOPR60 The top managers of my firm have a strong tendency to "follow the leader" in introducing new products or ideas (rather than being ahead of other competitors in introducing novel ideas or practices)[a] | ,683 | | | | |
| EOPR59 In dealing with competitors, my firm typically seeks to avoid competitive clashes, preferring a "live-and-let-live" posture (rather than a competitive "undo-the-competitors" posture)[ab] | - | | | | |
| **Autonomy** | | | | | |
| EOAU50 In my firm, individuals and/or teams pursuing business opportunities make decisions on their own without constantly having to obtain approval from their supervisors before making decisions | | ,851 | | | |
| EOAU49 The managers of my firm believe that the best results occur when individuals and/or teams decide for themselves what business opportunities to pursue (rather than when the CEO and top managers provide the primary impetus for pursuing business opportunities | | ,864 | | | |
| EOAU48 My firm supports the efforts of individuals and/or teams that work autonomously without relying on senior managers to guide their work | | ,783 | | | |
| EOAU51 In my firm, the CEO and top management team (rather than employee initiatives and input) play a major role in identifying and selecting the entrepreneurial opportunities my firm pursues[ab] | | - | | | |
| **Risk taking** | | | | | |
| EORI62 The top managers of my firm believe that, owing to the nature of the environment, it is best to explore the environment gradually via careful, incremental behavior (rather than bold, wide-ranging acts necessary to achieve the firm's objectives)[a] | | | ,763 | | |
| EORI64 The top managers of my firm prefer to study a problem thoroughly before deploying resources to solve it instead of being quick to spend money on potential solutions if problems are holding us back[a] | | | ,743 | | |
| EORI61 The top managers of my firm have a strong proclivity for low risk projects (with normal and certain rates of return) rather than high risk projects (with chances of very high return)[a] | | | ,658 | | |
| EORI63 When confronted with decision-making situations involving uncertainty, my firm typically adopts a cautious, "wait-and-see" posture in order to minimize the probability of making costly decisions (as compared with a bold, aggressive posture to maximize the probability of exploiting potential opportunities)[a] | | | ,570 | | |
| **Innovativeness**[c] | | | | | |
| EOIN56 My firm prefers to design its own unique new processes and methods of production rather than adapting methods and techniques that others have developed and proven[c] | | | | - | |
| EOIN55 The top managers of my firm favor experimentation and original approaches to problem solving rather than imitating methods that other firms have used for solving their problems[c] | | | | - | |

| | | | | | |
|---|---|---|---|---|---|
| EOIN52 In general, top managers of my firm favor a strong emphasis on the marketing of tried and true products and services as compared with an emphasis on R & D, technological leadership, and innovations[ab] | | | | - | |
| EOIN53 In the last three years, my firm has marketed no new lines of products or services as compared with very many new product lines or services[ab] | | | | - | |
| EOIN54 In my firm, changes in product or service lines have been mostly of a minor nature as compared with being quite dramatic[ab] | | | | - | |
| **Competitive aggressiveness**[c] | | | | | |
| EOCO65 My firm is very aggressive and intensely competitive rather than making no special effort to take business from the competition[b] | | | | | - |
| Cronbach's Alpha coefficient (Cronbach, 1951): | ,739 | ,796 | ,713 | - | - |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: ,686; Bartlett's Test of Sphericity: Approx. Chi-Square: 319,495; df: 45; Sig.: ,000; Variance explained: 65,50%

[a] Reverse coded items, which are recoded in the same direction before analyzing

[b] Deleted items after second-order convergent validity check

[c] Deleted items after first-order discriminant validity check

[d] First order variable deleted after confirmatory factor analysis

| *Covariates* | Component | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| **Centralization (Jansen, Van Den Bosch, & Volberda, 2006)** | | | | | | |
| COCE89 Unit members need to ask their supervisor before they do almost anything | ,895 | | | | | |
| COCE88 Even small matters have to be referred to someone higher up for a final decision | ,854 | | | | | |
| COCE90 Most decisions people make here have to have their supervisor's approval | ,830 | | | | | |
| COCE86 There can be little action taken by employees until a supervisor approves a decision | ,776 | | | | | |
| COCE87 A person who wants to make his own decisions would be quickly discouraged | ,768 | | | | | |
| **Technological turbulence (Paladino, 2008)** | | | | | | |
| COTT71 The technology in our industry is changing rapidly | | ,825 | | | | |
| COTT72 Technological changes provide big opportunities in our industry | | ,778 | | | | |
| COTT74 A large number of new product ideas have been made possible through technological breakthroughs in our industry | | ,774 | | | | |
| COTT75 Technological developments in our industry are relatively minor[a] | | ,751 | | | | |
| COTT73 It is very difficult to forecast where the technology in our industry will be in the next two to three years | | ,583 | | | | |
| **Competitive intensity (Jaworski & Kohli, 1993)** | | | | | | |
| COCO76 Competition in our industry is cutthroat | | | ,827 | | | |
| COCO77 There are many ''promotion wars'' in our industry | | | ,779 | | | |
| COCO79 Price competition is a hallmark of our industry | | | ,702 | | | |
| COCO80 One hears of a new competitive move almost every day | | | ,691 | | | |
| COCO78 Anything that one competitor can offer, others can match readily | | | ,690 | | | |
| **Formalization (Jansen, Van Den Bosch, & Volberda, 2006)** | | | | | | |
| COFO91 Whatever situation arises, written procedures are available for dealing with it | | | | ,812 | | |
| COFO92 Rules and procedures occupy a central place in the organizational unit | | | | ,777 | | |
| COFO93 Written records are kept of everyone's performance | | | | ,750 | | |
| COFO95 Written job descriptions are formulated for positions at all levels in the organizational unit | | | | ,685 | | |
| COFO94 Employees in our organizational unit are frequently checked for rule violations | | | | ,650 | | |
| **Market Turbulence (Paladino, 2008)** | | | | | | |
| COMT68 Sometimes our customers are price sensitive, but on other occasions price is relatively unimportant | | | | | ,781 | |
| COMT67 Our customers tend to look for new products all the time | | | | | ,642 | |
| COMT69 We are witnessing demand for our products and services from customers who never bought them before | | | | | ,527 | |
| COMT66 In our kind of business, customers' product preferences change over time[b] | | | | | - | |
| COMT70 New customers tend to have product-related needs that are different from those of our existing customers[c] | | | | | - | |
| **Environmental munificence (Baum & Wally, 2003)** | | | | | | |
| COEN82 Our markets are rich in investment capital | | | | | | ,768 |
| COEN83 Economic development programs offer sufficient support for our business community. | | | | | | ,626 |
| COEN84 Our markets are rich in profitable opportunities | | | | | | ,599 |

| | | | | | | |
|---|---|---|---|---|---|---|
| COEN81 There are few external threats to the survival and well-being of our firm[b] | | | | | | - |
| COEN85 Our firm operates in a threatening business environment[ac] | | | | | | - |
| Cronbach's Alpha coefficient (Cronbach, 1951): | ,891 | ,813 | ,804 | ,799 | ,565 | ,547 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: ,653; Bartlett's Test of Sphericity: Approx. Chi-Square: 1178,529; df: 325; Sig.: ,000; Variance explained: 62,71%

[a] Reverse coded items, which are recoded in the same direction before analyzing

[b] Deleted items after convergent validity check

[c] Deleted items after discriminant validity check

[d] First order variable deleted after confirmatory factor analysis

| *Dependent variables* | Component 1 | 2 | 3 |
|---|---|---|---|
| **Radical Innovation Performance (Johannessen, Olsen, & Lumpkin, 2001)** | | | |
| INRA104 Our company implemented new methods of production during the last three years that were perceived to be new to the industry in which our company operates | ,742 | | |
| INRA107 Our company implemented new ways of organizing during the last three years that were perceived to be new to the industry in which our company operates | ,739 | | |
| INRA106 Our company found new sources of supply during the last three years that were perceived to be new to the industry in which our company operates | ,724 | | |
| INRA105 Our company entered new markets during the last three years that were perceived to be new to the industry in which our company operates | ,671 | | |
| INRA103 Our company introduced new services to the market during the last three years that were perceived to be new to the industry in which our company operates | ,577 | | |
| INRA102 Our company introduced new products to the market during the last three years that were perceived to be new to the industry in which our company operates | ,541 | | |
| **Organizational Performance** | | | |
| ORPE111 How did the profitability for your business develop during the past 3 years? | | ,906 | |
| ORPE110 How did the sales (turnover) for your business develop during the past 3 years? | | ,900 | |
| ORPE112 How did the market share of your business develop during the past 3 years? | | ,852 | |
| **Incremental Innovation Performance (Johannessen, Olsen, & Lumpkin, 2001)** | | | |
| ININ99 Our company entered new markets during the last three years that were perceived to be new for the company, but which have previously been entered by other companies | | | ,751 |
| ININ100 Our company found new sources of supply during the last three years that were perceived to be new for the company, but which have previously been used by other companies | | | ,690 |
| ININ98 Our company implemented new methods of production during the last three years that were perceived to be new for the company, but which have previously been used by other companies | | | ,668 |
| ININ101 Our company implemented new ways of organizing during the last three years that were perceived to be new for the company, but which have previously been used by other companies | | | ,663 |
| ININ96 Our company introduced new products to the market during the last three years that were perceived to be new for the company, but which have previously been introduced to the market by other companies | | | ,607 |
| ININ97 Our company introduced new services to the market during the last three years that were perceived to be new for the company, but which have previously been introduced to the market by other companies[b] | | | - |
| Cronbach's Alpha coefficient (Cronbach, 1951): | ,779 | ,909 | ,731 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: ,761; Bartlett's Test of Sphericity: Approx. Chi-Square: 557,777; df: 91; Sig.: ,000; Variance explained: 58,26%

[a] Reverse coded items, which are recoded in the same direction before analyzing
[b] Deleted items after convergent validity check
[c] Deleted items after discriminant validity check
[d] First order variable deleted after confirmatory factor analysis

## Appendix 6: Correlation coefficients

Correlation coefficients – Second order variables – Full Sample

| N=100 | x̄ | σ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Resource orientation | 4,49 | 1,03 | 1,000 | | | | | | | | | | | | | | |
| 2. Market orientation | 5,26 | 0,84 | ,381** | 1,000 | | | | | | | | | | | | | |
| 3. Learning orientation | 5,26 | 0,78 | ,295** | ,679** | 1,000 | | | | | | | | | | | | |
| 4. Entrepreneurial orientation | 4,42 | 0,72 | ,324** | ,283** | ,446** | 1,000 | | | | | | | | | | | |
| 5. Incremental innovation | 4,17 | 1,31 | ,282** | ,294** | ,154 | ,136 | 1,000 | | | | | | | | | | |
| 6. Radical innovation | 3,67 | 1,17 | ,564** | ,323** | ,332** | ,332** | ,329** | 1,000 | | | | | | | | | |
| 7. Organizational performance | 4,42 | 1,52 | ,442** | ,314** | ,329** | ,279** | ,260** | ,349** | 1,000 | | | | | | | | |
| 8. Centralization | 2,83 | 1,10 | -,235* | -,219* | -,279** | -,417** | -,148 | -,203* | -,069 | 1,000 | | | | | | | |
| 9. Technological turbulence | 4,19 | 1,14 | ,259** | ,138 | ,042 | ,065 | ,167 | ,303** | ,101 | ,157 | 1,000 | | | | | | |
| 10. Competitive intensity | 3,79 | 1,22 | -,056 | ,305** | ,053 | -,211* | ,076 | -,059 | -,080 | ,132 | ,059 | 1,000 | | | | | |
| 11. Formalization | 3,65 | 1,18 | ,228* | ,237* | ,261** | ,203* | ,126 | ,257** | ,166 | ,173 | ,107 | ,112 | 1,000 | | | | |
| 12. Market turbulence | 4,68 | 1,07 | ,218* | ,213* | ,170 | -,005 | ,050 | ,172 | ,210* | -,036 | ,243* | -,040 | ,081 | 1,000 | | | |
| 13. Environmental munificence | 3,92 | 1,04 | ,303** | ,152 | ,223* | ,066 | ,090 | ,234* | ,297** | -,023 | ,167 | -,157 | ,084 | ,262** | 1,000 | | |
| 14. Company age | 3,54 | 1,80 | -,020 | -,037 | -,036 | -,045 | -,057 | -,058 | -,063 | -,112 | -,032 | ,140 | -,154 | -,059 | -,093 | 1,000 | |
| 15. Amount of FTE | 3,04 | 2,10 | ,165 | ,032 | ,068 | ,244* | ,182 | ,184 | ,113 | -,118 | ,043 | -,032 | ,159 | ,034 | ,089 | ,214* | 1,000 |

N = number of cases; x̄ = mean; σ = standard deviation; ** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level