

HRM in innovative, high-tech manufacturing SMEs



Master thesis by

Thessa Huisman

Supervisors: Dr. Ir. J. de Leede &

Dr. A.C. Bos – Nehles

Acknowledgements

First of all I would like to thank my husband. He stood by my side not only during the writing of my master thesis, but during the last four years of college. He gave me all the space I needed and offered a listening ear if I wanted to talk about it. At times when I was done with it, he always cheered me up and encouraged me to go on.

Off course I also want to thank my first supervisor Jan de Leede for the feedback sessions where I was going to without having any clue about how to continue with my thesis and where I always left with new ideas and the motivation to work further on the thesis. Furthermore I would like to thank my second supervisor, Anna Bos, for the feedback she gave me at the end of the process to improve my thesis.

The idea of this specific research topic came from myself. I worked at a small start-up company named Guardian R&D that was very innovative. Guardian R&D was specialized in foam of polyurethane and solid elastomers that can be used for many different products from suitcases to complete houses. The most innovative part of the organization was the fact that we were able to add a third component, for example bamboo or flax, that makes the product a lot cheaper. Next to this the company sells machines for the production of these kinds of products. Guardian R&D as a very young company has little experience in dealing with several different issues, including HRM. Because there is no large financial buffer and the company has to deal with different projects that have deadlines and for that an over- or undersupply of personnel can be deadly to the organization, it is crucial to employ the right people with the right skills at the right time. Guardian R&D wanted to be prepared for the future and to create opportunities for growth. Among other things my task was to develop an HR strategy that would eventually contribute to the performance of the firm. Unfortunately the director who was also the inventor and developer was diagnosed of cancer last April. From that moment on we as a company were unable to fulfill the needs of our customers and in July we had to decide to apply for bankruptcy. As the topic of this thesis was not only interesting for Guardian R&D, but also for other small innovative manufacturing companies, the thesis could still be finished after some rewriting. I would like to thank the directors of Guardian R&D for trusting me and for giving me high autonomy and a lot of responsibilities in performing my job.

Abstract

Purpose - This thesis aims to study the relationship between HR practices and innovation in high-tech innovative manufacturing SMEs.

Relevance - This research extends existing research by providing research findings based on multiple case studies, while at the same time enabling practitioners to understand how human resource management could be used to increase their innovativeness that could eventually lead to increased firm performance.

Methodology - After a thorough review of the literature a conceptual model is formed where strategy and context are seen as determinants of HRM and where HRM influences innovation. In this thesis innovation is seen as a very important indicator of firm performance. These factors are studied by conducting semi-structured interviews at 7 different high-tech innovative manufacturing SMEs. At those companies the CEO or the person responsible for HRM is interviewed and when possible also a second employee.

Findings - The research findings show, in line with existing literature, that there are differences in HRM between small- and medium-sized firms. Where HRM in small firms is very limited, more HR practices are used at medium-sized firms, like promotion opportunities and training and development. According to the literature several HR practices can be used to enhance innovation. High autonomy and highly educated personnel seems to enhance innovation according to the results. Participation is very important in almost all companies. Training and development is also important, but mainly for process innovation. The conceptual model that was proposed at the end of the theoretical framework was not fully supported by the results of the interviews. The relationship between strategy and HRM could not be found. For context and HRM a very diverse relationship could be identified.

Research Limitations - The main disadvantage of conducting qualitative research through semi-structured interviews with only one or two people per company is that results are subjective, because it will not represent the opinion of the whole company. Besides that, it would be imaginable that the respondents, especially the CEO's, would sketch a picture that is more positive than the reality actually is. It is not studied if there are other determinants that could influence HRM in high-tech innovative SMEs, so it is possible that the conceptual model can be extended with more factors.

Theoretical Implications - The conceptual model as introduced after studying the existing literature differs from the model that was formulated after conducting the research. Strategy could not be identified as determinant of HRM and no evidence could be found about the relationship between training and development in small organizations and staff rewards and innovation. For context a very diverse relationship is found.

Practical Implications - HRM can positively affect firm performance within high-tech innovative manufacturing SMEs, through certain sets of HR practices in alignment with overall strategy. In order to enhance firm performance through innovation, the following HR practices can be applied: High autonomy, achieved by less formalized policies and procedures, appraisals focused on results and longer-term criteria, training and development that is ongoing, less standardized and focusses on individual knowledge requirements, participation through good communication and being open to ideas.

Table of contents

| | |
|---|----|
| Acknowledgements | 1 |
| Abstract | 2 |
| Index of figures and tables | 5 |
| List of abbreviations | 5 |
| 1. Introduction..... | 6 |
| 1.1 Research origin | 6 |
| 1.2 Research objectives..... | 7 |
| 1.3 Practical and theoretical relevance | 8 |
| 1.4 Research questions..... | 8 |
| 1.5 Thesis structure | 8 |
| 2. Theoretical framework: HRM in innovative SMEs..... | 9 |
| 2.1 Human resource management..... | 9 |
| 2.1.1 Definition | 9 |
| 2.1.2 HRM in SMEs | 10 |
| 2.1.3 The contingency perspective on HRM..... | 12 |
| 2.1.4 Overview..... | 13 |
| 2.2 Innovation | 14 |
| 2.2.1 Definition of innovation | 14 |
| 2.2.2 Innovation in SMEs | 16 |
| 2.3 HR practices and innovation..... | 17 |
| 2.3.1 Staff selection | 17 |
| 2.3.2 Training and development | 17 |
| 2.3.3 Appraising..... | 18 |
| 2.3.4 Staff rewards | 18 |
| 2.3.5 Autonomy | 19 |
| 2.4 Context | 20 |
| 2.4.1 The external context..... | 20 |
| 2.4.2 The internal context | 21 |
| 2.5 Strategy | 23 |
| 2.5.1 Corporate-level strategy..... | 23 |
| 2.5.2 Business-level strategy | 23 |
| 2.5.3 Operational strategies..... | 24 |

| | |
|--|----|
| 2.6 Conceptual model | 25 |
| 3. Methodology | 26 |
| 3.1 Research design..... | 26 |
| 3.2 Data collection method | 26 |
| 3.3 Sample and participants..... | 26 |
| 3.4 Case descriptions..... | 27 |
| 3.5 Operationalization..... | 29 |
| 3.5.1 Core concepts..... | 29 |
| 3.6 Data analysis..... | 31 |
| 4. Results and data-analysis | 33 |
| 4.1 Data-analysis by topic..... | 33 |
| 4.1.1 Context | 33 |
| 4.1.2 Strategy | 35 |
| 4.1.3 Human resource management..... | 36 |
| 4.1.4 HR practices..... | 36 |
| 4.1.5 Innovation | 40 |
| 4.2 Data-analysis: Case comparison and relationships | 42 |
| 4.2.1 Strategy and context as determinants of HRM | 42 |
| 4.2.2 Human resource management within high-tech SMEs..... | 44 |
| 4.2.3 HRM and innovation..... | 45 |
| 5. Discussion and conclusion | 48 |
| 5.1 Discussion | 48 |
| 5.1.1 Conceptual model | 48 |
| 5.1.2 Methodology | 49 |
| 5.1.3 Results and data-analysis | 50 |
| 5.1.4 Theoretical implications | 50 |
| 5.1.5 Practical implications..... | 51 |
| 5.1.6 Summary of limitations | 51 |
| 5.1.7 Summary of suggestions for further research..... | 51 |
| 5.2 Conclusion | 51 |
| 6. References | 54 |
| 6.1 Websites..... | 54 |
| 6.2 References..... | 54 |

Index of figures and tables

| | | |
|-------------|----------------------------|-------|
| Figure 1.1: | Conceptual model | p. 25 |
| Figure 1.1: | Conceptual model | p. 47 |
| Figure 1.2: | New conceptual model | p. 48 |
| | | |
| Table 3.1: | Company facts | p. 27 |
| Table 3.2: | Interviewees (director/HR) | p. 28 |
| Table 3.3: | Interviewees (random) | p. 28 |
| Table 3.4: | Interview questions | p. 30 |
| Table 4.1: | Strategy | p. 35 |
| Table 4.2: | Context and strategy | p. 42 |
| Table 4.3: | HRM to company size | p. 44 |
| Table 4.4: | HRM to company age | p. 45 |
| Table 4.5: | Innovation | p. 46 |

List of abbreviations

| | |
|------|--|
| HRM | = Human Resource Management |
| HR | = Human Resources |
| IWB | = Innovative work behavior |
| SHRM | = Strategic Human Resource Management |
| CE | = Corporate Entrepreneurship |
| R&D | = Research and Development |
| SME | = Small Medium Enterprise |
| MKB | = Midden- en kleinbedrijf (in English: SME) |
| MT | = Management Team |
| RBV | = Resource Based View |
| VRIN | = Valuable, Rare, Inimitable and Non-substitutable |

1. Introduction

1.1 Research origin

This master thesis will address the relationship between HR practices and innovation specifically within SMEs that are innovative, that work with new technologies and that manufacture their products itself. Multiple case studies will be conducted after a thorough literature review in order to gain more knowledge about this topic.

The underlying goal of studying the relationship between innovation and HRM is to find out if and how HRM can be used to increase innovation with the ultimate goal to increase firm performance. For firms that aim for innovation, the extent to which they aim to build an innovation climate and to generate innovative output is crucial so in that case innovation can be seen as an important indicator of firm performance (De Winne & Sels, 2010). Companies that are innovative need very different capabilities compared to companies that work mostly with established technologies and products. Lots of articles and books have been written about HRM and its relationship with firm performance like (Knol, 2013) for Dutch companies, (Katou & Budhwar, 2010) for Greek manufacturing companies, (de Leede & Looise, 2005), (Bowen & Ostroff, 2004) and (Sels, Winne, et al., 2006) that focus specifically on SMEs, but it appears from that literature that the effects of HRM differ a lot in different situations. This means that one HR practice or a certain HR system can be very effective in one situation, but doesn't make a difference in another situation. Especially for SMEs the effects of HR practices differ a lot what means their needs also differ, for example because small companies need to be much more flexible and organizational structures are more informal (Zheng, O'Neill, & Morrison, 2009). Because of that a specific group of companies is chosen as research topic for this thesis in order to reduce variability.

With respect to HRM this thesis focusses on HR practices. These HR practices are tools that organizations can use to influence the behavior and capabilities of their employees. Training and development is an example of an HR practice. Through training and development capabilities can be increased and it also positively influences motivation. By using HR practices in a good way it can increase firm performance, because it increases individual and/or team performance. For high-tech innovative SMEs the innovation output is very important so it would be logical and in line with the best fit approach that HR should also focus on this innovation output. Innovation in general is about inventing new things and bringing this to the market. It can be about new products, services or technologies.

According to existing literature (Beer, Spector, Lawrence, Mills, & Walton, 1984) there are several factors that determine the HRM of an organization. According to the literature, mainly based on large companies, these factors include stakeholder factors like shareholders and unions and situational factors like strategy, labor market and unions. Contingency and institutional theorists have argued that contextual factors and isomorphic pressures both internal and external to the organization primarily determine the role of HRM within organizations. Examples of external pressures include the tightness of labor markets, legislative statutes that support implementing HRM, and unionization, while examples of internal factors include how centralized the organization is and characteristics of the HR department itself, such as the aptitude of HR managers (Brandl & Pohler, 2010). Specifically theory on institutional isomorphism identified three ways in which decision making in firms can be

influenced: Coercive mechanisms relate to the legal dimension, mimetic mechanisms relate to the social dimension and the normative mechanisms to the cultural dimension. According to this theory, context can be seen as a determinant of HRM. Context includes the internal context like the organizational culture and the external context that includes for example the market position of an organization. Organizations try to adjust their HR practices to the conditions in a specific organizational field, what means this theory is also in line with the best-fit approach (Farndale & Paauwe, 2007).

According to the literature on strategic HRM, the HR strategy should be aligned with the overall business strategy in order for it to be effective (Boselie, 2010). Within the strategic HRM literature, organizational strategy is seen as the primary contingency factor. Contingency theories posit that the relationship between the relevant independent variable and the dependent variable will be different for different levels of the critical contingency variable (Delery & Doty, 1996). This means that according to the contingency perspective and literature on strategic HRM, strategy can be seen as a determinant of HRM. Scientific research at small and large European companies suggests also that business strategy tends to influence HRM practices, in order to integrate the way organizations respond to their competitive environments, both through the development of corporate strategies and through the internal adaptation for strategy implementation (Cunha & Cunha, 2004).

1.2 Research objectives

Studies by McEvoy (1984) and Marlow and Patton (1993) revealed effective management of human resources to be a good predictor of small business survival, so paying attention to HRM is not only important for larger companies, but also for SMEs. Manufacturing organizations compete in an environment that is characterized by uncertainty, increased global competition, the fragmentation of markets, an increasing dependence on non-price competitiveness and a high level of technological change. To survive and compete in such an environment, there is widespread agreement on the importance of an organization's ability to innovate and manage change (Holman et al., 2012). This means that for high-tech innovative manufacturing SMEs the innovativeness is important in order to survive and achieve competitive advantage. Therefore the objective of this research is to extend existing literature by studying the relationship between HRM and innovation within high-tech innovative manufacturing SMEs. This is a very ambitious goal, because of its broad scope and the many factors that can influence this relationship. Therefore it is chosen to focus specifically on HR practices and high-tech innovative manufacturing SMEs.

This will be done by comparing multiple cases according to semi-structured interviews. It is chosen to focus on high-tech innovative manufacturing SMEs, because there is no literature available on this specific group of companies and as HR outcomes differ between different groups of companies it is not enough to apply general literature about HRM and performance to this companies. The goal of this research is to find out these differences, to find out what specific HR practices are relevant and effective at high-tech innovative manufacturing SMEs. Therefore the existing literature will be studied and the results of that literature review will be studied in practice.

1.3 Practical and theoretical relevance

This research is of both highly practical and theoretical relevance as it extends existing research by providing research findings based on a multiple case study, while at the same time enabling practitioners to understand how human resource management could be used to increase their innovativeness that could eventually lead to increased firm performance. Different authors have studied the relationship between HRM and innovation. De Winne and Sels (2010) for example, studied the relationship between HRM and innovation in Belgian start-ups and they found a positive relationship between HR practices and innovativeness. Ceylan (2012) showed with his results that a commitment-based HR system has a positive effect on process, organizational and marketing innovation activities (Ceylan, 2012). For Chinese organizations results were found that four HRM practices: hiring and selection, reward, job design and teamwork, were positively related to employee creativity while training and performance appraisal were not. Employee creativity fully mediated the relationships between those four HRM practices and organizational innovation. Results suggest that HR practices can play an important role in managing people to promote innovation in these organizations (Jiang, Wang, & Zhao, 2012).

The results of these studies indicate that specific factors of HRM positively influence innovation. This literature, however, focuses mostly on larger organizations or specifically on start-ups, while more established SMEs employ much more employees than large companies do in the Netherlands, what makes it an important research group. In 2011 SMEs employment was almost 70% of total employment within the Netherlands (CBS, 2011). Results of SMEs are expected to be different from that of large companies, because SMEs often have limited resources and less knowledge about HRM. Besides that, corporate culture is often more informal and smaller companies are often more dependent on their context what means that they have to be more flexible. Because all these factors are likely to be different from large companies, HRM is expected to have a different impact.

1.4 Research questions

Following the research origin and objectives the next main research question can be formulated: “How can HR practices within innovative high-tech manufacturing SMEs enhance innovation?”

In order to be able to give an answer to the main research question, a few sub questions are formulated that will be answered first. These sub questions include the variables as explained earlier.

- What HR practices do high-tech innovative manufacturing SMEs use?
- What is the effect of strategy on HR practices in high-tech innovative SMEs?
- What is the effect of organizational context on HR practices in high-tech innovative SMEs?
- What is the relationship between HR practices and innovation in high-tech innovative SMEs?

1.5 Thesis structure

The first chapter of this thesis has made clear what the research objectives are and what questions will be answered. In order to find answers to these questions a literature research is conducted in the next chapter. Chapter three describes the methodology of the research that will be conducted based on the literature review. In chapter four the results of the study will be outlined and the results will be analyzed, followed by the conclusion in chapter five. Chapter five will also include the implications of the study, the limitations and suggestions for further research.

2. Theoretical framework: HRM in innovative SMEs

This chapter consists of a literature review which results in a theoretical framework that is the base for the qualitative multiple case study that will be conducted in the next chapters.

At the beginning of this study it was expected that certain relationships will exist within the field of this research. These relationships are derived from the Harvard model of Beer et al. (1984) where stakeholder interests and situational factors influence HRM, the situational factors influence the stakeholder interests, HRM influences HR outcomes and the HR outcomes lead to long-term consequences (Beer et al., 1984). The main focus of this thesis is on the relationship between HRM and innovation. Innovation in this case can be seen as the desired HR outcome. According to prior studies an organizations' innovativeness can determine the performance of that organization (De Winne & Sels, 2010) and (Delery & Doty, 1996), so innovation is an important determinant of firm performance. The relationship between innovation and firm performance will not specifically be studied in this thesis, but including it in this introduction gives the overall picture and the eventual goal. As explained in the introduction, strategy and context are seen as determinants of HRM in this thesis, in line with the institutional theory, the contingency perspective and literature on strategic HRM.

The expected relationships as explained here will be studied within this chapter. Each relationship is explained in a separate section. At the end of chapter two a conceptual model will be drawn, filled in with the variables found in the studied literature.

2.1 Human resource management

The aim of this section is to explain the concept of HRM. In order to do so, firstly the definition of HRM is made clear. As this thesis is focused on HRM in SMEs, a subsection is dedicated to this topic. Besides that, the organization of HRM, HR strategies and different perspectives on HRM will be discussed.

2.1.1 Definition

Literature on human resource management (HRM) knows many different definitions and approaches. In this thesis the focus is on strategic human resource management (SHRM), because the focus of this thesis is to see HRM in the context of the business. SHRM focuses on issues of linking HRM to the business strategy, designing high-performance work systems and adding value through good people management in an attempt to gain sustained competitive advantage (Boselie, 2010). The key difference between traditional and strategic concepts, is the extent to which the management of HR is integrated into the strategic decision making processes which direct organizational efforts towards coping with the environment. Unlike conventional assets, strategic human resources, as a form of intellectual or organizational capital, are largely invisible and cannot appear on the firm's balance sheet. Such assets could only be found in a skilled, motivated and adaptable workforce, and in the HRM system that strategically develops and sustains it (Karami, Jones, & Kakabadse, 2008). The basic premise underlying SHRM is that organizations adopting a particular strategy require HR practices that are different from those required by organizations adopting alternative strategies. The HR strategy is seen as a system where different practices within the system interact with and reinforce each other. This HR strategy is linked directly to superior performance (Delery & Doty, 1996). Karami, Jones and Kakabadse (2008) showed with their study that the link between SHRM and performance is not only apparent in big companies and

multinationals but also in small and medium enterprises. Their results show that increasing HR capacities of the firm will positively correlate with the increasing performance of the firm and that in the high performance firms, human resources have been more involved in the process of formulating strategy than in low performing ones. These results are, however, not generalizable to all sectors because the study only involved the electrical and electronic manufacturing sector.

2.1.2 HRM in SMEs

SMEs are small and medium enterprises and can be divided in three categories according to the Dutch standards of the MKB. Micro-organizations have less than 10 employees, small organizations employ between 10 and 49 employees and medium organizations employ less than 250 employees (Europa, 2003). The ability to manage human resources in a consistent and effective manner helps small firms attract and retain high quality and competent employees who are in turn able to create added value, enable firms to better develop and maintain competitive advantage and thereby sustain superior performance in the longer term (Zheng et al., 2009).

The different HR needs and practices between small and large firms tend to be stratified by business characteristics represented by these firms. Smaller firms are arguably managed predominantly by their founders or owners with potentially centralized decision making in resource allocation. Small firms, in particular those family-owned businesses may also be rather time and cost-conscious. They are more likely to take opportunistic behavior in strategically choosing more or less HR practices that could best utilize their limited resources in order to achieve maximum performance outcomes. On the other hand, small firms are often more flexible and competitive when compared to larger firms (Zheng et al., 2009).

Recruiting, motivating and retaining employees seems to be a major challenge for small firms. Studies by McEvoy (1984) and Marlow and Patton (1993) revealed effective management of human resources to be a good predictor of small business survival. Research by Dun and Bradstreet (2001), in turn, showed that managerial incompetence, especially in the field of HRM, is the main cause of failures in smaller firms (Sels, De Winne, et al., 2006). The main reasons for the lack of sophisticated HR practices in small businesses seem to be the lack of time and (financial) resources and the absence of HR experts. However, growing evidence shows that HR practices in smaller firms may be more sophisticated than previously expected. For example, Golhar and Deshpande (1997) found that many HR practices do not differ significantly between large and small firms. Bacon et al. (1996) suggest that small business managers are increasingly aware of new management approaches such as team working, devolved management, performance appraisals, etc. and that innovative HR practices are no longer restricted to large companies. They argue that small businesses are in many ways the ideal site for the development of HRM because of the direct communication, flatter hierarchy, greater flexibility and clearer impact of each employee on organizational performance (Sels, De Winne, et al., 2006).

SMEs are less likely than larger organizations to have adopted sophisticated practices for recruitment, to provide training, to conduct performance appraisals, or develop policies on discipline and equal opportunities. The absence of sophisticated practice in SMEs has been associated with a number of poor HR outcomes. For example, SMEs are the principal source of unfair dismissal

applications to UK employment tribunals, and jobs in SMEs are less secure than jobs in larger firms. In addition, surveys of SMEs indicate that a lack of skilled labor impedes small firm growth (Bacon & Hoque, 2005). This indicates that HRM is not only valuable in large organizations, but also in SMEs. Most SMEs seem to rely on informal practices, but there are small enterprises that do invest in HRM. The study of Bacon and Hoque (2005) has proven that whether a SME invests in HRM or not is dependent on the skill requirements of the employees. When a company needs low-skilled employees that are easily replaceable, the company doesn't invest in HRM and vice versa.

When a micro-organization grows, the position and influence of the director changes. More and more tasks are delegated to (line)managers, because the director can't do it on his own anymore. The HRM function, however, is still fulfilled by the director. Choices and behavior of the director directly influence the work and the employees. SMEs need to be flexible in order to respond quickly on market demands, what is possible because internal communication is very direct. Employment relationships are often very personal and the fit between employee and organization is crucial (Knol, 2013). At the point the company grows from a small organization to a medium-sized organization HR systems and instruments will get more formalized and usually an HR professional will be hired.

According to the study of Deshpande & Golhar (1997) SMEs do find HRM important. They concluded that both large and small Canadian manufacturing firms indicated that all nine workforce characteristics studied are important, and no difference based on firm size was found. HR managers of both types of firms prefer to fill vacancies from within the organization and use job posting and bidding extensively. While one-on-one interviews are popular among both large and small firms, large firms make more extensive use of written tests and panel interviews. While some firms in both types used strategies aimed at reinforcing workforce characteristics reported as important, others did not (Golhar & Deshpande, 1997).

Most of the time SMEs don't have a separate HR strategy, it may not even be rare that they do not have a specific strategy at all. This is mostly caused by the fact that entrepreneurs don't have the knowledge to formulate a good strategy, they don't have the time for it because they are focused on the day-to-day business and they don't see the benefits of it.

Knol (2013) mentions that different studies have concluded that SMEs can achieve an effective HRM system by the use of more simple and less formal HR practices.

Within larger firms it is common that there is a separate HR department that consists of an HR manager and several HR professionals. The HR department typically has two different roles. The first role is traditional and administrative, in which the HR department is considered primarily the administrator of functions such as payroll and benefits. Extensions of this administrative role focus on the functions of promoting employee welfare, which arises out of the human relations movement. The second role is more strategic and is diversely defined in the literature by the hierarchical position of the HR department, the participation of the senior HR manager in the strategy planning process, and the discussion of strategic HR matters at a senior level. Contingency and institutional theorists have argued that contextual factors and isomorphic pressures both internal and external to the organization primarily determine the HR department's role, which develops similarly across organizations facing similar enablers and constraints. Examples of external

pressures include the tightness of labor markets, legislative statutes that support implementing HRM, and unionization, while examples of internal factors include how centralized the organization is and characteristics of the HR department itself, such as the aptitude of HR managers (Brandl & Pohler, 2010).

2.1.3 The contingency perspective on HRM

From the contingency perspective it can be argued that superior performance can be achieved in the case that the HR policy is consistent with other aspects of the organization (Delery & Doty, 1996). Knol (2013) found support for this within the SMEs he studied. He found that HRM is more effective in the case of better alignment. The contingency perspective represents the best-fit approach (Delery & Doty, 1996). In order to achieve this, it is important to develop an HR strategy in addition to setting an overall business strategy.

Implementing a specific HR strategy can be very beneficial to a company. For example, it encourages proactive behavior as formulating strategy focusses on the future rather than solving problems at the moment they occur. It can help to develop a focused set of strategic objectives that capitalizes on its special talents and know-how and it can help to identify the difference between the current situation and the future vision. Besides that, it is possible to identify the HR constraints and opportunities. In developing an effective HR strategy, a company will face several challenges like developing an HR strategy that reinforces the overall business strategy, coping with the environment and avoiding excessive concentration on day-to-day problems (Gómez-Mejía, Balkin, & Cardy, 2010).

Brandl & Pohler (2010) concluded from their study that the extent to which the CEO has formulated a “clear explicit or implicit overall strategy” affects his or her willingness to delegate responsibility for HRM. Clarity of business strategy allows managers to create a concrete outline of what HR systems are needed to achieve the strategy, and to which areas of the organization those strategies should be applied. Specification of strategy involves setting priorities and enables delegation. It also provides a frame that allows others who are given responsibility over decision-making to formulate and implement HR policy and activities without constantly reassuring the CEO of the necessity of these activities.

In selecting HR strategies, there is no strategy that is good or bad. The success of the HR strategy depends on the fit with other factors. According to Gómez-Mejía et al. (2010) the key factors in this context are organizational strategies, environment, organizational characteristics and organizational capabilities.

In order to align the overall business strategy with the HR strategy, Gómez-Mejía et al. (2010) have selected HR strategies that fit Porter’s three major types of business strategies, namely overall cost leadership, differentiation and focus. As in this paper the focus is on high-tech innovation companies, only the part of the differentiation strategy will be discussed here. HR strategies that fit this type of strategy include an emphasis on innovation and flexibility, broad job classes, loose work planning, external recruitment, team-based training, emphasis on individual-based pay and use of performance appraisal as development tool (Gómez-Mejía et al., 2010).

2.1.4 Overview

The theoretical framework so far has given an idea about HRM for this thesis. According to the above, HRM is able to strengthen an organization and it is proposed that HRM can lead to an increase of innovativeness that will eventually lead to an increase of firm performance.

2.2 Innovation

This section starts with an explanation of the innovation concept, followed by specific literature on innovation in SMEs. This section concludes with the HR practices that increase innovativeness according to the existing literature.

2.2.1 Definition of innovation

There are many different definitions of innovation, but it is always about something new. It can be a product or a service, innovation can be continuous or discontinuous, it can be something completely new to the market or just new to some people. Innovation is not only about inventing new things, it is also about bringing this new thing to the market. Innovation is driven by the ability to see connections, to spot opportunities and to take advantage of them (Tidd & Bessant, 2009). This means that in the first place there needs to be a market for the product. If there is a market for the product the next step is to commercialize it. This point in the process can be called the Valley of death (Markham, 2002). The Valley of Death is the gap between the technical invention or market recognition of an idea and the efforts to commercialize it. It represents a lack of structure, resources and expertise. Crossing the Valley of Death requires champions, resources and formal development processes. Often, the champion's role and the need for resources are unclear and interact in an *ad hoc* fashion. In this thesis the focus will be on technical product innovation, whether incremental or radical, because the research questions focus on innovation in manufacturing companies specifically.

Absorptive capacity is defined as the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends. Firms with higher absorptive capability demonstrate stronger ability of learning from partners, integrating external information and transforming it into firm-embedded knowledge. Empirical studies have not developed and validated a multidimensional construct of absorptive capability, but a significant number of prior studies use R&D intensity (defined as R&D expenditure divided by sales) as a proxy to absorptive capability. R&D investment is a necessary condition for the creation of absorptive capacity (Wang & Ahmed, 2007). The ability to utilize external knowledge is often a byproduct of R&D investment. Organizational units with a high level of absorptive capacity invest more in their own R&D and have the ability to produce more innovations (Tsai, 2001). When engaging in product development, an organization can choose between two strategies according to the literature. These are market pull versus technology push. The best strategy to adopt is dependent on the relative novelty of the new product. For incremental or product line extensions, market pull is likely to be the preferred route, as customers are familiar with the product type and will be able to express preferences easily. In case that customers may be unaware of, or unable to articulate, their needs the balance shifts to a technology-push strategy (Tidd & Bessant, 2009).

Tidd and Bessant (2009) have identified several key features of the innovative organization. These include:

- A shared vision, leadership and the will to innovate.
- An appropriate structure with a good balance between organic and mechanistic options for particular contingencies.
- Key individuals like promoters, champions and gatekeepers that energize and facilitate innovation.
- Effective team working.
- Participation in organization-wide continuous improvement activity.
- A positive approach to creative ideas, supported by relevant motivation systems.
- Internal and external customer orientation and extensive networking.

Besides product innovation, within manufacturing companies process innovation is also very important. This captures the introduction of new production methods, new management approaches, and new technology that can be used to improve production and management processes. Process innovativeness is imperative in overall innovative capability, in that an organization's ability to exploit their resources and capabilities, and most importantly, the ability to recombine and reconfigure its resources and capabilities to meet the requirement of creative production is critical to organizational success (Wang & Ahmed, 2004).

Empirical evidence from the study of Camisón & Villar-López (2014) demonstrates that organizational innovation (OI) and technological innovation capabilities (IC) both positively affect firm performance, emphasizing the importance of distinguishing between IC types because behavior affecting firm performance is different in each case. While product IC, as OI, has a direct effect on firm performance, the procedure to achieve an improvement in FP through the development of process IC is mediated by product IC. These results are in accordance with RBV as the complex interrelationships among innovations types and capabilities that generate the most valuable, distinctive, and difficult to imitate strategic assets that allow the firm to achieve superior performance. This evidence is based on a study at 144 Spanish industrial organizations (Camisón & Villar-López, 2014). Kemp et al. (2003) studied the relationship between innovative output and firm performance in SMEs. Firm performance is measured by four different indicators: turnover growth, employment growth, profit and productivity. For only two indicators, significant effects are found, turnover growth and employment growth. Differences are found between small- and medium-sized firms. For small firms the innovative output has a much bigger impact on the turnover growth than for medium-sized firms. For employment growth the opposite effect is observed: for small firms innovative output does not influence the level of employment growth, for medium-sized firms there is a positive effect (Kemp, Folkerlinga, Jong, & Wubben, 2003).

2.2.2 Innovation in SMEs

Innovation in SMEs differs from innovation in larger organizations. According to the study of Hoffman et al. (1998) these differences are the following: SMEs are more likely to involve product innovation (sometimes based on R&D) than process innovation (which is important nonetheless), will be focused heavily on producing products for niche markets rather than mass markets, will be more frequently organized formally within larger SMEs and tend to be more ad-hoc or project driven in smaller SMEs, will be more common among final product firms and are least likely to be found among component subcontractors, will generate incremental innovations as well as major breakthroughs, will frequently involve some form of external linkage and are likely to be associated with growth in output, turnover and employment, thus implying that weak firms (little or no growth) are either not successful innovators or are overcome by their weakness in other aspects of the competitive struggle. Within SMEs, especially high-tech companies, internal factors are more important than external factors in the success or failure of an organization. Among the internal factors shown to be most important determinants of innovative activity and economic success are a high incidence of qualified scientists and engineers (and the knowledge base they represent) among employees and strong leadership provided by an highly educated manager or founder/entrepreneur (Hoffman, Parejo, Bessant, & Perren, 1998).

Innovation also differs in the way new ideas are found. Innovation is particularly challenging for SMEs as they often suffer from the lack of information needed to generate new ideas. For example, in order to find the next generation of technology, SMEs should have a broader view through interacting with a wide range of companies; however, most SMEs mainly rely on the Internet to search for new ideas, which is not the case for large companies. Some SMEs try to get ideas from technical outsourcing and from having formal and informal business relationships with other companies because they lack the resources to support a team to think of leading-edge technology (Yeo, Kim, Coh, & Kang, 2013).

2.3 HR practices and innovation

A growing body of research, rooted in the RBV, acknowledges that sources by themselves rarely are a source of competitive advantage. They are more likely to be so if they are deployed to affect a desired end, if they are developed through or supported by business processes and management practices. The primary role of management and management practices can be defined as integrating the specialist knowledge resident in individuals into processes, products and services and establishing the coordination necessary for this knowledge integration. Particularly HR practices can play a role in stimulating innovation by sustaining processes of knowledge creation, transfer and integration (De Winne & Sels, 2010).

2.3.1 Staff selection

A successful innovation process requires highly qualified people to be involved. For corporate innovation in terms of CE, the objective of staff selection is to form an appropriate resource base of human capital to foster entrepreneurial activity in the established SME. Based on previous HRM research results the authors suggested that companies that employ staff with expert knowledge and several entrepreneurial abilities, such as creativity and proactiveness, can react quickly when unexpected opportunities or changes occur. Thus, in general, the selection criteria should be in line with the CE dimensions of innovativeness, risk propensity, proactiveness, corporate venturing, and self-renewal. In addition, it is important to enlarge this resource base continuously over time to avoid the blindness that results from conducting routine procedures. The measurement items connect the construct of staff selection and CE. The analysis revealed four aspects that should be integrated into this construct. First, new management staff should have relevant KSAOs (Knowledge, Skills, Abilities and other Characteristics), meaning the staff is creative or has a zest for action. Second, they anticipate that new external employees will be important for new ideas, thereby creating higher levels of CE. Third, ways to advance in one's own career path should be manifold. This aspect motivates employees to follow unconventional ideas or take risks. It can lead to both higher CE intensity and an individual development within the company. Fourth, skills such as the ability to work in a team are important for CE, as entrepreneurial activities are naturally team oriented (Schmelter, Mauer, Börsch, & Brettel, 2010). Chen and Huang (2009) take the same point of view in their study by stating that when firms develop innovation activities, they encounter relatively greater uncertainty and variability in the innovation process, and they need creative employees who are flexible, risk taking, and tolerant of uncertainty and ambiguity. Therefore, firms must place more emphasis on these characteristics in the staffing actions. When firms use creative capabilities and innovative characteristics as hiring and selection criteria, their employees are likely to spawn diversity of ideas and commit to more innovation behaviors. Through effective staffing, employees become important sources of new ideas in the firm's innovative process. (Chen & Huang, 2009).

2.3.2 Training and development

In general, training and development is critical for the firm's performance and competitive advantage (Schmelter et al., 2010). Literature on organizational commitment and human resource theory suggests that providing training facilities may create positive employee attitude and commitment. Hence, training-focused HR practices are associated with higher innovative performance (Beugelsdijk, 2008). Training and development practices can promote entrepreneurial behavior to the extent that they apply to a range of job situations and encourage employee participation. Changing job demands and continually changing technologies suggest a need for training that is ongoing, is less

standardized, and focuses on individual knowledge requirements. This training approach enables employees to respond in unique ways to new challenges, adapt to dynamic environmental conditions, and feel comfortable with ambiguity. For effective training, programs should fit the company's strategy and work process. To unfold their full effect on CE, expert knowledge, social competence, creativity, and methodical expertise are especially important to be considered. Several items measure CE-oriented training and development. It is important to foster entrepreneurial activity in the corporate context through training activities that enforce interpersonal skills such as the ability to work in a team. Second, training that supports creativity will strengthen innovativeness and potentially strengthen self-renewal and new business development. Third, training sessions on how to transfer new ideas into business will lead to higher intensity for risk propensity and proactiveness (Schmelter et al., 2010). In addition, innovation requires employees a high level of involvement and participation. Firms may elicit employees' involvement and participation by granting them to solve problems and to participate in decision making that affects their work. A high level of participation would create the conditions to encourage employees to bring new ideas and exchange knowledge in the ongoing innovation process and, in turn, enhance innovative outcomes (Chen & Huang, 2009).

2.3.3 Appraising

Because the innovation process is often lengthy, uncertain, and multidisciplinary, firms should signal the importance and value of innovation as a corporate priority, and provide formal appraisal mechanisms to measure innovation behaviors and outputs. Positive pressure from a performance appraisal creates challenges and feelings of achievements and serves as a critical motivator for employees. Performance appraisal can enhance employees' motivation to engage in innovative activities, and make firms achieve favorable innovation results (Chen & Huang, 2009). Entrepreneurial strategy is fostered and facilitated to the extent that appraising practices emphasize results criteria, use longer-term criteria, encourage high employee participation, and recognize the accomplishments of groups of individuals. These appraising practices stimulate risk taking, a willingness to assume responsibility, and a longer term orientation (Schuler, 1986).

2.3.4 Staff rewards

Recognizing individual and team accomplishments with compensation also encourages innovation (Chen & Huang, 2009). Arguably, performance-based reward represents a commitment to employees. It provides incentives for creativity and innovation, and hence reinforces innovative performance. High individual performance is related to individualized reward. Various compensation packages are designed to reward total quality management and employee involvement, which are the focuses of many innovation-oriented firms (Lau & Ngo, 2004). Both extrinsic and intrinsic rewards are essential to motivate employees to take the challenging work, and provide them incentives to generate more new ideas and develop successful new products (Chen & Huang, 2009). A general objective of incentives is to change attitudes and motivate employees. Many studies have found that incentives that enhance positive attitudes and employee motivation can contribute to the firm's growth and performance. Regarding CE, objective staff reports have stated that adequate incentives can increase employees' risk propensity and motivation for innovation. Incentives are both financial and non-financial rewards in exchange for the employee's work performance. Appropriate rewards build on a performance evaluation that considers entrepreneurial activity. Thus, the staff evaluation should include explicit measures of innovativeness and risk propensity. This implies using qualitative and subjective measures of performance in addition to quantitative performance measures. Staff

rewards must be formed flexibly in order to react to extraordinary situations and innovative environments. Creativity, risk propensity, investing time in innovative projects, and an increase in reputation based on entrepreneurial activities are all facets of the measurement construct for staff rewards (Schmelter et al., 2010). Consistent with the idea of performance appraisal based on results, it is useful that a significant portion of compensation be a function of results. Yet, there needs to be an acceptable amount of failure allowed to achieve results (Schuler, 1986). Beugelsdijk (2008) distinguishes between incremental and radical innovation and his study showed that performance related pay only works for incremental innovation (Beugelsdijk, 2008).

2.3.5 Autonomy

According to Schuler (1986) structural autonomy encourages entrepreneurial behavior. More new and different entrepreneurial activity is fostered and facilitated by increased flexibility in a firm's policies and procedures. The policies and procedures particularly relevant to entrepreneurship are those with bureaucracy, segmentalism, and financial processes. Systematic innovation is strengthened to the extent that the bureaucracy is minimized. Less precise and looser departmental boundaries facilitate the flow of information and ideas so critical to forming new combinations. Closely associated with increasing flexibility by reducing bureaucracy, is reducing segmentalism. Reducing segmentalism and increasing integration across groups, teams, departments, and divisions fosters and facilitates idea, information, and product exchanges. Financial processes also need to become more flexible if systematic innovation is to be fostered and facilitated. Lau and Ngo (2004) agree on the statement that high autonomy can lead to an increase of innovativeness.

2.4 Context

The purpose of this section is to show how the context can influence the relationship between HRM and innovation.

The context of an organization can be divided in the external and the internal context (Boselie, 2010). The environment is what gives organizations their means of survival. It creates opportunities and it presents threats. There are four layers of the business environment. It starts with the organization, that represents the internal context. The next layer include the competitors, the next the industry or sector and the macro-environment is the highest layer. These layers represent the external context (Johnson, Whittington, & Scholes, 2011).

2.4.1 The external context

The macro-environment can be analyzed on the basis of the PESTEL framework (Johnson et al., 2011). The framework categorizes six types of environmental influences:

- Political: this factor highlights the role of government.
- Economic: this refers to macro-economic factors such as exchange rates, business cycles and differential economic growth rates around the world
- Social: this factor includes changing cultures and demographics.
- Technological: this refers to innovations such as the internet, nano-technology or the rise of new composite materials
- Environmental: this factor stands specifically for 'green' issues such as pollution and waste.
- Legal: this factor embraces legislative constraints or changes, such as health and safety legislation or restrictions on company mergers and acquisitions.

These factors can influence the success or failure of particular strategies. It are influences that cannot be influenced by an organization, especially not by an SME. Not all factors are evenly important for an organization, so it can be helpful to identify key drivers for change. These are the environmental factors likely to have a high impact on the success or failure of strategy (Johnson et al., 2011). For HRM specifically, labor legislation can influence the HR strategy. For example, law protects employees from dismissals and regulates maximum flexibility for wages or working time. Legislation creates restrictions for CEOs as to what HR issues they can address and limits the solutions for these issues (Brandl & Pohler, 2010).

The 'competition' and the 'industry and sectors' can be analyzed on the basis of the five forces framework (Porter, 2008). This framework can help identify the attractiveness of an industry in terms of five competitive forces:

- the threat of entry: these are the factors that need to be overcome by new entrants if they are to compete in an industry, like scale and experience.
- the threat of substitutes: these are products or services that offer a similar benefit to an industry's products or services, but by a different process. The price/performance ratio is critical to substitution threats.
- the power of buyers: this represents the power of immediate customers. The power of buyers is high if they are concentrated, the switching costs are low and if the buyer has the capability to supply itself.

- the power of suppliers: the power of suppliers is high if they are concentrated, switching costs are high and if they are able to cut out buyers who are acting as middlemen.
- the extent of rivalry between competitors: rivalry between competitors occurs between organizations with similar products aimed at the same customer group. There are several factors that influence the degree of competitive rivalry, namely competitor balance, industry growth rate, high fixed costs, high exit barriers and low differentiation.

In general it can be said that an industry is not attractive if the five forces are high, because there is too much competition and pressure to allow reasonable profits. The power of the five forces typically varies with the stages of the industry life cycle. As this paper is aimed at innovative high-tech companies it can be assumed the industry is at the development stage. This stage is an experimental one, typically with few players, little direct rivalry and highly differentiated products. The five forces are likely to be weak, therefore, though profits may actually be scarce because of high investment requirements.

2.4.2 The internal context

The internal context represents the organization's unique history, the administrative heritage and organization culture (Boselie, 2010). The history and culture will receive most attention in this paragraph, as the administrative heritage is also discussed in other parts of the theoretical framework.

Historical and cultural perspectives can help an understanding of both opportunities and constraints that organizations face. The business environment cannot be understood without considering how it has developed over time. The capabilities of an organization may have built up over time in ways unique for that organization. This makes it difficult for other organizations to copy, but they may also be difficult to change.

Innovation may build on historic capabilities as firms with experience and skills built over time that are most appropriate to technological changes tend to innovate more and it could be that there are new combinations of knowledge as capabilities built up in adjacent technologies are adapted in innovative ways to new technological opportunities. Organizational culture is the taken-for-granted assumptions and behaviors that make sense of people's organizational context. Culture can be conceived as consisting of different layers, namely values, beliefs, behaviors and taken-for-granted assumptions. The culture of an organization has an effect on strategy. At first, there is 'cultural glue' that means that the taken-for-granted assumptions influence the behavior of employees that can for example lead to less need for supervision. The next is 'captured by culture'. This means that managers faced with a changing business environment, are more likely to attempt to deal with the situation by searching for what they understand and cope with in terms of the existing culture. The last is 'managing culture'. Because it is difficult to observe, identify and control that which is taken for granted, it is also difficult to manage (Johnson et al., 2011).

Organization climate is an important contextual factor that signals expectations for behavior and potential outcomes of these behaviors. Organization support for innovation, which can manifest as a pro-innovation climate or culture, delivers organizational values and norms that affect the potential image gains and image risks associated with employee innovative behavior. If an organization's norms favor change, rather than tradition for its own sake, its members will seek to initiate change to be culturally appropriate. An organization climate for innovation delivers "expectancies" and

“instrumentalities” so that organization members understand that being innovative is a desirable image and engaging in innovative behavior will make them look good. From an efficiency-oriented perspective, a favorable organization climate for innovation communicates the need for change and demonstrates the belief that innovation will make the organization more efficient and successful. These values and beliefs, ingrained in the culture of the organization, will be transmitted to and become internalized by employees through the organization’s socialization processes. Employees working in organizations with strong support for innovation, therefore, are more likely than those not in such organizations to share the belief that innovation is valuable and will bring performance gains (Yuan & Woodman, 2010). This article suggests that there is a direct relationship between culture and the innovativeness of an organization. It is imaginable that the belief that innovation is valued by the organization, strengthens the effect of the HR practices that increase innovativeness. Take for example the HR practice of autonomy. High autonomy increases innovativeness according to the literature. If employees with high autonomy know that innovativeness will be valued by the company, they are able to use that autonomy to shape their job in a way that includes that innovativeness.

2.5 Strategy

From the contingency perspective it can be argued that alignment between strategy and HR practices allow organizations to achieve superior performance (Delery & Doty, 1996). This means that HR practices can be used to implement a certain strategy, because the use of HR practices in the organization can reward and control employee behavior.

Strategy, broadly formulated, is about the long-term direction of an organization. It is about making choices on how to use an organization's resources and what for (Johnson et al., 2011). Setting the overall goals of an organization inevitably affects the use and management of the human resources of a firm and for that it is important to address strategy in this thesis. Besides that, theory about the best-fit approach has proven that superior performance can be achieved through aligning the overall strategy of the firm with the HR policy.

Three levels of strategy can be identified; corporate-level strategy, business-level strategy and operational strategies. These levels will be discussed in separate paragraphs. Within SMEs these first and second layer will often not be separated as there are no or not many different business units, but as different models from both layers are useful the distinction is still made.

2.5.1 Corporate-level strategy

This level of strategy is concerned with the overall scope of an organization and how value is added to the constituent businesses of the organization whole (Johnson et al., 2011). The Ansoff product/market growth matrix provides a simple way of generating four basic directions for corporate strategy. Organizations can decide to focus on market penetration; existing products within existing markets, market development; existing products within new markets, new products; new products within existing markets or conglomerate diversification; new products within new markets.

Adaptive capability is defined as a firm's ability to identify and capitalize on emerging market opportunities. It is manifested through strategic flexibility; the inherent flexibility of the resources available to the firm and the flexibility in applying these resources. The adaptive capability can be measured through evaluating whether the firm's management systems encourage people to challenge outmoded traditions, practices and sacred cows, allow the firm to respond quickly to changes in the market and evolve rapidly in response to shifts in its business priorities.

2.5.2 Business-level strategy

Business-level strategy is about how individual businesses should compete in their particular markets (Johnson et al., 2011). Porter identified three generic strategies. It are competitive strategies what means that they are concerned with how an organization achieves competitive advantage in its domain of activity. The first strategy is cost leadership. This means that an organization aims to become the lowest-cost organization in a domain of activity. There are four key drivers that can help deliver cost-leadership, namely low input costs, economies of scale, experience and product/process design. The second strategy is a strategy of differentiation. This involves uniqueness along some dimension that is sufficiently valued by customers to allow a price premium. For this strategy it is very important to know the strategic customer and the key competitors. The third strategy is focus. This strategy targets a narrow segment of domain of activity and tailors its products or services to the needs of that specific segment to the exclusion of others. Successful focus strategies depend on at

least one of three factors: distinct segment needs, distinct segment value chains or viable segment economies.

2.5.3 Operational strategies

These type of strategy is concerned with how the components of an organization deliver effectively the corporate- and business-level strategies in terms of resources, processes and people (Johnson et al., 2011). In linking this type of strategy to HRM, workforce planning is an important factor. Within innovative SMEs it is very likely that the amount of work is hard to plan and would not always be the same. Besides that, SMEs most often have limited financial resources, so the company can't afford to have an oversupply of personnel. Customers on the other hand demand that their products will be delivered on time, so an undersupply of personnel can also be deadly to an organization. Because of that it is necessary to have a flexible workforce. Scholars have suggested that within today's competitive environment, simultaneously using both contingent or non-standard workers and standard employees may enable firms to gain access to people who possess the skills necessary to respond to fluctuations in environmental demand (Way, Lepak, Fay, & Thacker, 2010). De Leede and Van Riemsdijk (2001) concluded from their case studies in the automotive industry that companies make use of external flexworkers because they are afraid they have to fire lots of employees in case an economic downfall. Most of these external flexworkers are employed at jobs with relatively low levels of complexity that require short periods of training (Van Riemsdijk & De Leede, 2001).

In this way a blended workforce will occur, what means that standard and non-standard workers will work side by side. Standard workers are the people that have a fixed full-time contract. Non-standard workers include part-time workers and temporary workers. employees. Research has found that workforce blending worsened relations between managers and employees, decreased standard employees' loyalty, and increased their interest both in leaving their organizations and in exercising voice through unionization. However, these effects were contingent on whether the nonstandard workers were temporary or contract and on the salary and responsibilities of the standard employees (Davis-Blake, Broschak, & George, 2003).

Way et al. (2010) showed with their study that the effects of workforce mixing on standard employees depends on the strategic rationale for using contingent workers. The results provide support for a direct, negative association between using High Investment HR Strategies and firm-level standard employee withdrawal behaviors. The authors adopted the term high investment HR systems to denote a system of HR practices that reflect investments in standard employee development and long-term mutually beneficial and cooperative standard employee-employer relationships that together are expected to have a negative impact on standard employee withdrawal behaviors. The Labor Cost Contingent Labor Strategy (LCCLS) was positively related with firm-level standard employee withdrawal behaviors (Way et al., 2010).

2.6 Conceptual model

The theoretical framework of this thesis results in the conceptual model as shown in figure 1.1. The main focus is on the relationship between HRM and innovation. Strategy and context are seen as determinants of HRM. Different studies have shown the relationship between HRM and firm performance. This relationship will not be examined further within this thesis, but as mentioned before, innovation can be seen as an important indicator of firm performance in high-tech manufacturing SMEs. This model is therefore only applicable on this specific group of companies.

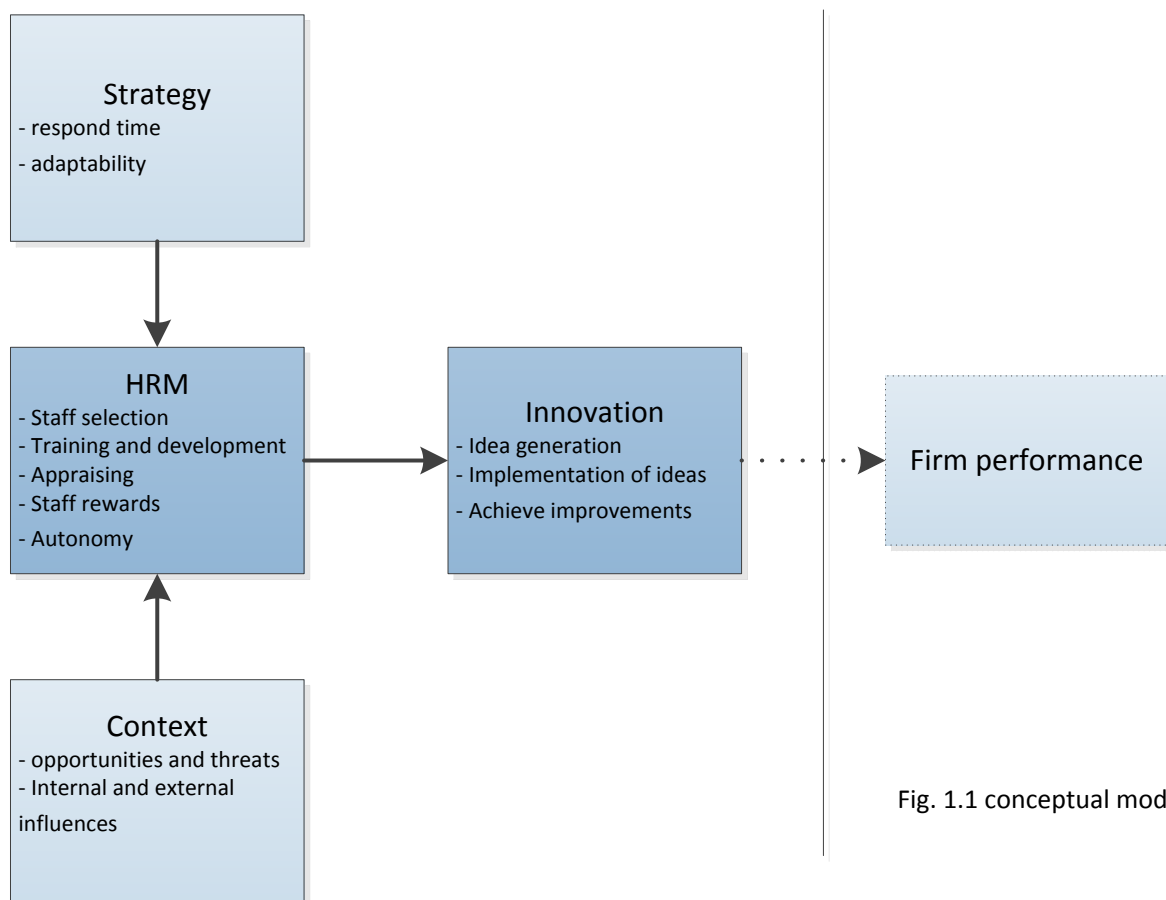


Fig. 1.1 conceptual model

3. Methodology

In this chapter the methodology will be described. First the research design will be discussed, followed by the data collection method in the second paragraph. Next to that follows the sample and participants and the operationalization. Finally the data analysis is discussed.

3.1 Research design

The research conducted for this thesis has an exploratory nature, as the objective is to get insight in the specific situation of HR practices in high-tech innovative manufacturing SMEs in the Netherlands. Existing literature focusses on a more general research group. In order to get insight in all factors included in the conceptual model and the relationships between them, data was gathered by qualitative in-depth interviews.

3.2 Data collection method

Data for this research was gathered by semi-structured interviews. The protocols used for the interviews can be found in the Appendices. Appendix A holds the interview with the CEO or the HR manager. These people are selected for the interviews, because they have the most broad knowledge of the company as they have to answer questions about HRM, strategy, innovation and context. In most cases, because of company size, the CEO is responsible for HRM at the company. Interviewing the CEO also has some limitations, because there may be a gap between what the CEO sees and experiences and what the employees see and experience. There is also a possibility that the CEO is not completely honest, because he wants to set a positive image of his company. This limitation is somewhat diminished, because most companies wanted to stay anonymous. In order to get a picture that is closest to reality, it is tried to interview one of the employees as well. Appendix B includes the interview with the employee.

Because the interviews are held in Dutch, the interview scheme is also in Dutch. The interviews are semi-structured (Saunders, Lewis, & Thornhill, 2009) to make sure all topics will be discussed but on the other hand to allow to ask additional questions and to give the interviewee to explain everything freely. The interview is supposed to take one hour and in order to manage time during the interview, every part is assigned to a certain amount of time.

A few days before the interviews took place the interviewees received a brief document that contained some information about the subjects that would be discussed. This way, the interviewees had more time to think about the subjects and what they possibly could add to the interview. Prior to the interview it was asked if it was possible that the interview was recorded and that the information given in the interview was allowed to be published. When the interviews were typed, the interviewees received the output of the interviews so that they could check the output given.

3.3 Sample and participants

Because of the limited time available, but on the other hand to get a good idea of the relationship between HRM and innovation within high-tech innovative SMEs, the goal was to conduct the interviews within 5 to 10 different companies. These companies were collected through the network of the researcher, for example via Guardian R&D and its customers and via the lane of innovation of the University of Twente. This results in a long list of companies, especially a lot of the lane of innovation. The websites of all these companies were checked in order to select companies that were innovative, were small enough to be an SME and companies that manufacture their goods

itself. All companies that are approached are located in Overijssel or Gelderland. It was tried to find SMEs with different amounts of employees, because literature indicates that within the group of SMEs, differences can be found according to size. Eventually a list of 20 companies came out and these companies were invited to participate by e-mail. Some of these companies responded very quickly that they were interested to participate, others received a reminder after a week. At the end 7 companies responded that they want to make some time for this study. Of the 13 other companies, some responded that they don't have time to participate and some didn't respond at all. The 7 companies that responded formed the eventual participant group and all of these companies were visited by the researcher for interviews. Some companies wanted to be anonymous so that they could speak freely during the interview. As it is not important for this study what the company name is and what the company exactly does and some companies asked for anonymity, it is chosen to keep all companies anonymous. It was not always possible to conduct a second interview within a company, because of limited time or absence.

3.4 Case descriptions

The interviewed companies were all SMEs that are innovative and manufacture in-house, but there are also lots of differences between them. The differences that could be expressed in numerical facts about the cases are summarized in table 3.1. Company size varies from 10 to 90 employees and the oldest company was founded in 1900 while the newest company was founded in 2003. The amount of employees that work at the office varies from 15% to 65% of total workforce. These facts will be used in section 4.2 to find out if these differences lead to different strategies and management.

| | Foundation year | Amount of employees | Amount of FTE | Ratio office/production employees |
|-----------|-----------------|---------------------|---------------|-----------------------------------|
| Company A | 1994 | 35 | 29 | 50/50 |
| Company B | 1919 | 17 | 14 | 30/70 |
| Company C | 1959 | 67 | 59,5 | 15/85 |
| Company D | 2003 | 10 | 10 | 30/70 |
| Company E | 2007 | 87 | 84 | 25/75 |
| Company F | 1900 | 90 | 77 | 30/70 |
| Company G | 1998 | 15 | 10 | 65/35 |

Table 3.1 company facts

Four of seven companies are companies that focus mostly on production. These are companies A, C, E and F. Products like bicycles, carpets, laser cut steel and partitions are produced, and/or assembled. The other three companies, of which company D and G are spin-offs of the University of Twente, focus mainly on product development and innovation. Their production rate is much lower and they outsource parts of their production.

Also according to sales development the companies differ. Company A has noticed a decline in 2009 of 15% and in 2010 of another 7%, this was caused by the economic crisis. From that moment the revenue increased slowly and will peak in 2014 because of a very large assignment. The revenue of

company B is more stable, varying between 100 and 90 percent. Company C didn't want to share its sales data. The revenue of company D fluctuates a lot, the one year the revenue doubled and the other year sales decreased by 33%. Company E grows very quick, the company was founded in 2007 and this year a revenue of 30 million euro will be reached. The revenue of company F grew steady the past few years by 3 and 5 percent and this year a growth of 23 percent is expected. Company G is a growing company where revenue was doubled in the past two years.

Differences between the cases could not only be found in company facts, but the interviewees also differ a lot. The interviewee was in every case the person of the company that was responsible for HRM. For some cases this was the director itself, sometimes it was an HR professional and sometimes it was someone that was also responsible for other things like finance. Noteworthy was that only one interviewee had finished an actual education in HRM. It was also remarkable that she worked fulltime at the largest company of all cases and HRM was her only responsibility. Table 3.2 gives an overview of the function, education and employment duration of the interviewees.

| | Function | years of employment | Education in HRM? |
|-----------|---|---------------------|-------------------|
| Company A | Operational director | 7 | No |
| Company B | Major shareholder director | 26 | No |
| Company C | HR manager/staff and production manager | | No |
| Company D | Major shareholder director | 11 | No |
| Company E | HR manager | 5 | Yes |
| Company F | Financial/HR director | 21 | No |
| Company G | Office manager, HR, finance | 8 | No |

Table 3.2 Interviewees (director/HR)

Within four of the seven companies a second interview was conducted with a random employee of the company in order to check how the employees think of the HR policy and the innovativeness of the company, whether they are aware of the organization's strategy and how they see the corporate culture. Table 3.3 gives an overview of the information about those interviewees.

| | Function | years of employment | Education |
|-----------|----------------------------|---------------------|------------------------------|
| Company A | planner and projectleader | 20 | Worked up within the company |
| Company D | Software engineer | 3,5 | ICT |
| Company F | Assistent controller | 2 | Business economics (HBO) |
| Company G | Designer and projectleader | 6 | University |

Table 3.3 Interviewees (random)

3.5 Operationalization

The interview questions were based on the theoretical framework and the methodology and operationalization used in the articles used for the theoretical framework.

The interview with the director or HR manager starts with a few general questions that may even be answered with the use of the internet. In order to save time, prior to the interviews the internet will be searched for the answers. If the answers cannot be found on the internet, the information will be gathered during the interview. The date of foundation of the company is asked, information about the product and the amount of employees and FTE. These facts can be used as control variables for the data analysis. This also counts for the introduction of the interviewee. Next to these general questions the interview goes deeper on the variables included in the conceptual model. The interview is divided in different parts, like operationalized hereunder.

The interviews with the random employee of every organization included in this study is structured in the same way as the other interview, but is a lot shorter. That interview is only used as a test on how the employees that have not fully participated in policymaking or setting general goals for the organization see the company they work for.

3.5.1 Core concepts

There are four core concepts included in the interviews. These are: HRM, strategy, context and innovation. Table 3.4 will give an overview of all questions included in the interview grouped per concept. Every question is based on specific literature. That literature is included in the table. In order to be clear about the content of the concepts, they will be explained hereunder.

| Interview questions | Literature |
|--|---|
| <i>Context en marktpositie</i> | |
| 1. Hoe is het bedrijf ontstaan? (familiebedrijf?) Wat heeft het bedrijf gemaakt tot wat het nu is? (geschiedenis, specifieke gebeurtenissen) | Boselie (2010) |
| 2. Hoe zou u de cultuur van het bedrijf omschrijven? Hoe heeft deze cultuur zich in de loop van de tijd ontwikkeld? | Boselie (2010) |
| 3. Op welke markt is het bedrijf actief? (regionaal, nationaal, internationaal) | Knol (2013) |
| 4. Hoe sterk is uw positie op de markt? | Knol (2013) |
| 5. In hoeverre heeft het bedrijf te maken met concurrentie? En wat zijn de gevolgen daarvan? | Johnson, Whittington, & Scholes (2011) |
| 6. Zijn er bepaalde invloeden van buitenaf op politiek, economisch, sociaal, technologisch, wettelijk of ecologisch gebied die invloed hebben op de bedrijfsvoering? | Johnson, Whittington, & Scholes (2011) |
| <i>Strategie</i> | |
| 7. Wat is de strategie van de onderneming? | Johnson, Whittington, & Scholes (2011) |
| 8. Richt het bedrijf zich daarbij op bestaande of nieuwe markten en producten? | Johnson, Whittington, & Scholes (2011) |
| 9. Hoe makkelijk/moeilijk kan het bedrijf zich aanpassen aan veranderingen in de markt? Waaruit is dat gebleken? | Wang & Ahmed (2007) |
| 10. Wat is de verhouding tussen fulltimers en parttimers? | (Davis-Blake, Broschak, & George, 2003) |
| 11. Wordt binnen het bedrijf ook regelmatig gebruik gemaakt van uitzendkrachten, ZZP'ers of andere tijdelijke krachten? | Van Riemsdijk & De Leede, 2001) |

| | |
|--|---|
| Innovatie | |
| 12. In hoeverre is het bedrijf bezig met het ontwikkelen van nieuwe dingen (innovaties)? | Tidd & Bessant (2009) |
| 13. Wat is de verhouding tussen product-, service- of procesinnovaties? | Wang & Ahmed (2007), Hoffman et al. (1998) |
| 14. Hoeveel procent van de omzet wordt uitgegeven aan de ontwikkeling van nieuwe producten of processen? | Wang & Ahmed (2007) |
| 15. Wie zijn de initiatiefnemers voor deze ontwikkelingen? (specifieke wensen klant, algemene marktvraag, ideeën vanuit het bedrijf zelf) | Tidd & Bessant (2009)10 |
| 16. Wie zijn binnen het bedrijf verantwoordelijk voor het ontwikkelen van innovaties en op welke manier wordt dit georganiseerd? (wordt daar apart tijd voor ingepland? Teams? Deadlines?) | Tidd & Bessant (2009)10 |
| 17. Worden de medewerkers gestimuleerd om nieuwe dingen te bedenken? Zo ja, hoe? | Tidd & Bessant (2009)10 |
| 18. Hoe wordt de weg van uitvinding naar de verkoop van het product gewaarborgd? | Markham (2002) |
| HRM | |
| 19. Is het bedrijf gebonden aan een cao of andere bedrijfstakingregelingen? | Knol (2013) |
| 20. Wat is de verhouding binnen het bedrijf tussen kantoorpersoneel en uitvoerende medewerkers? | Knol (2013) |
| 21. Wie is binnen het bedrijf verantwoordelijk voor personeelszaken? | Knol (2013), Brandl & Pohler (2010) |
| 22. Welke taken vervult deze persoon/vervullen deze personen? | Knol (2013), Brandl & Pohler (2010) |
| 23. Kent het bedrijf naast een algemene strategie een strategie gericht op HRM? Zo ja, wat houdt deze strategie in? (indien van toepassing doorvragen naar aansluiting algemene strategie en HR strategie) | Boselie (2010) |
| 24. Hoe ziet het wervings- en selectieproces eruit? | Schmelter, Mauer, Börsch, & Brettel (2010), Chen & Huang (2009) |
| 25. Wat doet het bedrijf aan training en ontwikkeling? (doorvragen naar hoeveelheid en welke groepen medewerkers) | Beugelsdijk (2008), Chen & Huang (2009) |
| 26. Hoe worden medewerkers beoordeeld? (vaste tijdstippen voor beoordelings- en/of functioneringsgesprekken? Wie doen deze gesprekken? Wat komt er in deze gesprekken aan bod?) | Chen & Huang (2009), Schuler (1986) |
| 27. Op basis waarvan worden medewerkers betaald? | Chen & Huang (2009), Lau & Ngo (2004) |
| 28. Zijn er nog speciale secundaire arbeidsvoorwaarden? | Boselie (2010) |
| 29. Is er een bepaald protocol voor promotie? | Boselie (2010) |
| 30. Hoe verloopt de communicatie met medewerkers? Worden zij op de hoogte gehouden van de prestaties van het bedrijf? | Boselie (2010) |
| 31. In hoeverre participeren medewerkers in het nemen van beslissingen? | Chen & Huang (2009) |

Table 3.4 Interview questions

3.5.1.1 Context

The context includes the internal context as well as the external context. The internal context consists of an organization's history and the organizational culture in this case. Organizational culture is shaped by assumptions and taken-for-granted ways of behavior (Johnson et al., 2011). The external context includes the macro-environment, represented by the PESTEL-framework that includes political, economic, social, technological, environmental and legal factors that can influence decision making in organizations. Also included is the competition and the market position that can be analyzed by the five forces of Porter.

3.5.1.2 Strategy

Organizational strategy is about setting long-term goals for an organization. The overall strategy determines the direction an organization is heading and in that way it influences all other aspects of an organization. The Ansoff product/market growth matrix provides a simple way of generating four basic directions for corporate strategy. Organizations can decide to focus on market penetration; existing products within existing markets, market development; existing products within new markets, new products; new products within existing markets or conglomerate diversification; new products within new markets. For a successful strategy, especially in innovative environments, adaptive capability is very important. This capability can be measured by the easiness and speed of which an organization responds to market changes. Strategy on the operational level includes, among other things, the workforce planning that influences organizational flexibility and employee behaviors.

3.5.1.3 Innovation

Innovation can be managed in different ways, every employee can be involved in the innovation process or a specific team can be selected for example. There are also different kinds of innovation. A distinction is made between product and process innovation. The absorptive capacity can be measured through dividing R&D expenditure by sales and if a company has a high absorptive capacity it is likely to produce more innovations. As innovations can only lead to increased firm performance if the valley of death is crossed, a question is added to find out how the gap from innovation to the market is managed. The other questions on innovations are asked to measure the innovative capability of the organization and to see how the innovation process is managed in general.

3.5.1.4 HRM

For the HRM part, different theories are used. Some questions were copied from the interview protocol of Knol (2013). The questions on who is responsible for HRM within the firm and what tasks are included within that function, follows from the study of Brandl and Pohler (2010), as they identified two different roles of the HR department. The questions about the interpretation of the HR practices came from the study of Katou and Budhwar (2010). They identified three important sets of determinants of HR strategy. These include: resourcing and development (recruitment, selection, compensation, promotion, incentives) and involvement and job design (safety, participation, communication).

3.6 Data analysis

After collecting the data through interviewing 7 companies, the results need to be structured in order to be able to analyze it. All interviews were audio-recorded so for the transcription the actual words can be used. The interviews were transcribed in the order of the questions of the interview

protocol and not in the order the questions were asked during the interview. This makes it easier to compare the different cases to each other. The interviews are e-mailed to the interviewees after transcription to ensure respondent validation and to prevent inaccuracies as a result of misinterpretations.

The next chapter, chapter 4, includes the results of the interviews and the analysis of the data. This chapter will be subdivided in three sections. Within the first section the 7 cases will be introduced. This includes a short description of every case and an overview of some basic information of the companies and the interviewees like company size and function of the interviewee. This is done in order to get an idea of the companies that participated in this study. Within the second section the cases are compared to each other focusing on the different topics separately. The topics on HRM, innovation, context and strategy will be discussed. The third section focusses more on the broad picture. It is tried to find relationships or trends between the different variables.

Within the analysis a distinction will be made between small and medium-sized organizations, because literature has showed already that differences in the field of HRM can be identified between the two groups of organizations (Knol, 2013).

According to Saunders et al (2009) qualitative data can be grouped into three main types of processes: summarizing of meanings, categorization of meanings and structuring of meanings using narrative.

Summarizing will compress long statements into briefer statements in which the main sense of what has been said or observed is rephrased in a few words. This type of process will be used in the next chapter if possible, to explain shortly the core of the answers of the interviewees.

Categorizing data involves two activities: developing categories and attaching these categories to meaningful chunks and data. The categories that will be used in the second section of chapter 4 are formed already as the interviews were divided into different topics. By unitizing data, units of data will be attached to the appropriate categories. These units of data may be a number of words, a line of a transcript, a sentence, a number of sentences, a complete paragraph, or some other chunk of textual data that fits the category. within the third section of chapter 4 analyzing the data through categorization will include designing suitable matrices and placing the data gathered within its sells in order to discover trends and relationships between the variables. Data will be compared over time to see if the age of companies influence the way HR is managed. Data will be compared by size to find out if the amount of people within a company influences for example the HR practices used. The influence of having an HR professional in-house or not will be studied. These are examples of how the data will be analyzed.

Structuring data using narrative is not about fragmentation of data like the previous two types, but about retaining the integrity of the data by analyzing the whole transcripts of in-depth interviews. This type of process will be used also in order to make sure that the data is interpreted in the right way and to get an idea of the overall meaning of the data.

4. Results and data-analysis

This chapter includes the results of the interviews and the analysis of the data. The cases will be compared to each other according to the different topics included in the interview and it is tried to find relationships between the variables.

4.1 Data-analysis by topic

The results of the interviews will be discussed by topic within this section. The order is based on the conceptual model, starting with strategy and context, followed by HRM and innovation.

4.1.1 Context

Within this section the foundation, culture, market-orientation and position and the competition will be discussed.

Company A was founded as a family business that grew from a very small company to a company with 35 employees. The second generation of the family is at the head of the company now and because of the company growth, external people are added to the management team. About the corporate culture the operational director replied:

“We try to be very informal and open. A little no-nonsense. We have a very flat organization, there is little hierarchy. We do not work with heads of departments. Under the management team is really only one layer. This means that everyone gets a lot of responsibilities and authority. People work very independently”.

This independence applies to the office personnel as well as for the plant personnel. The company focuses solely on the Dutch market. According to the operational director the company isn't dependent on the economic crisis and by making their products to fashion, they accomplish that customers come back for replacement after several years. This leads to a quite stable revenue pattern. The company distinguishes itself by its customers through a very fast delivery time. Because of that they say there is not much competition. The company worries about the availability of well-educated technical personnel for the future.

Company B is founded by the great-grandfather of the current director. The director describes the corporate culture as typically Achterhoeks:

“reliable, saying what you doing and do what you say. Quite informal, which is also a characteristic of a small organization, it is a flat organization, where decisions are taking quickly. We all know each other, most of them with long-term relationships”.

The company operates internationally, about 65% of total revenue comes from abroad of which 90% of Germany. There is not much competition, as there are just a few other players that are even smaller. In Germany are two tougher competitors that have more power because they are bigger, but on the other hand they are not as flexible. Compared to its competitors company B is cheaper. The company is dependent on the development of the hardware sector, because they build this hardware into its products. This market changes very quickly and the company has to respond to this changes. The company tries to seek for niches and tries to choose its customers strategically by building an countercyclical portfolio.

Company C is also a family business as the father of the current director founded it. In 1975 another company was acquired and from that moment on the company has two locations. The culture of the company is traditional. In 2009 the whole corporate culture was changed. Before that it was very hierarchical and management was top-down. Nowadays it is expected that employees come up with new ideas and they get more responsibilities. By this cultural change job satisfaction has increased and absenteeism has decreased. America and Germany are the most important markets in this case. The company distinguishes itself by very strict delivery times. There is strong competition within the market, although there are limited other players within the Netherlands. There are a few factors from outside the company has to deal with. The influence of oil prices is extensive because plastic is an important raw material and the same can be applied for jute. The economic crisis is also a factor that affects the company.

Company D was founded by its current director as a spin-off company of the University of Twente. First of all the culture is innovative.

"When it comes to employees, it is full of opportunities but independently. You can make your own function here. I'm too busy and too small to do in micro-management. Open, friendly, but you have to make it yourself. That will also change a bit when we go to standard production. At this time the employees are very highly educated. Where we'll soon come out is that we get MBO graduates who will just test the products and put them in a box. Then you need a different way of control".

The company is very much internationally oriented, 98% of total revenue will be gained abroad. There is only one other player in this specific market, so competition is very limited. *"Our strength lies in doing things that others cannot. We have deliberately chosen not to do the bulk production".* The company delivers its products mostly to research institutes, what makes them independent of the crisis. Companies and education institutes don't cut their expenses on their R&D. A factor that does influence the company is the savings of the government on subsidies. This limits the opportunities to develop new products.

Company E was founded in 2007 by the current director. The company focuses on growth, there are now 3 locations and it is planned to open 6 more locations in Germany. About the corporate culture: "We have a culture that is characterized by the slogan 'one for all and all for one.

"We have a transparent organization, the organogram is also fairly straightforward".

The market the organization operates on is gigantic and they sell their products on the Dutch and German market.

"We have no illusion that we are the market leader and we also don't want to be. We want to become the McDonalds of the metal industry".

According to the HR manager there is no competition:

"We have no competitors because our concept is unique. There are a lot of laser cutting companies in the Netherlands, but our ordering method is unique. If the customer chooses to do it the traditional way, be my guest, we will sell anyway".

Factors that influence the company from outside are the availability of well-educated technical personnel and subsidies of the government that make innovation possible.

Company F was founded in 1900 in Amsterdam and moved later to the Achterhoek. The organization is very flat. The culture is described as open, social and people dare to say what they think. About 70% of total revenue is gained in the Netherlands and the rest mostly in Germany. The company is market leader. There is competition, but there are no competitors that deliver the same complete package as this company. They are, however, the most expensive. The target group of the company, namely the elderly and disabled, is increasing, but the resources to pay for the products like subsidies are decreasing.

Company G is like company D founded as a spin-off company of the University of Twente. A few PhD's invented the technology and they built the first machine. The corporate culture can be described as informal, flat and with a lot of freedom for the employees. The company is active worldwide. There is not much notice of competition. Sales occur through the network, it's a small world. In the past the company was dependent on subsidies of the government that make innovation possible. The economic crisis doesn't affect the organization, because the main customers are Universities and other research institutes.

4.1.2 Strategy

Strategy within this section includes the overall strategy of the companies, their adaptability and their operational strategies. In this order the strategy topic is discussed. As there are not much differences between the companies, they will be discussed at once.

In table 4.1 the information about the general strategies of the companies and their focus on new or existing products and market is summarized.

| | Strategy | Strategic focus |
|-----------|---|--|
| Company A | "We try to distinguish ourselves by our speed, completeness of delivery and delivery without damage." | As a trendfollower the company focuses on existing markets and products. |
| Company B | "Becoming a leading player in the Netherlands and Germany, with our own distinctive concepts, so ideas on how to make a product. Mostly we want to do this with our own products and some with partners or with customers, with an increasing focus on sustainability." | The focus is mostly on existing markets and products, but the market itself develops quickly what means that different sizes and materials are required. |
| Company C | "We try to build stable relationships with our customers." | The focus is on both existing and new markets and products. This new markets and products are, however, not unique to the company, but are developed by the sector as a whole. |
| Company D | "The strategy is to set up a volume- and quality-controlled production, as that is what our customers need" This is not available now because the focus was more on innovation and the production rate was very low. | The company was founded because a new product was available, nowadays it is more about improving this product and finding new applications for it. the focus is on existing markets. |
| Company E | "Expanding our concept." | The focus is on existing products and mostly on existing markets. Because of the unique concept the company is, however, able to serve a part of the market that competitors can't. |
| Company F | "In the Netherlands we especially want to remain the market leader and we want to offer the whole package and abroad we want to be the specialist." | The focus is mainly on existing markets and products but the company has a small playground where new products for new markets are developed. |
| Company G | "We do not want to become much bigger. This is manageable and the market will not be much bigger. We are working on a new product, because at one point, everyone has a machine like we build now, and then we have to come up with something new." | The machine the company brought to the market was new and this machine is still improving. The market already existed. |

Table 4.1 Strategy

All interviewees replied their adaptability is very high, because the companies are small and therefore flexible and their focus is on innovation. Also level of education of employees is called as a factor that improves the ability to respond to market changes.

Companies A, B, C, E and F make use of agencies for temporary employees. For companies D and G, both companies located at the University, the focus is more on product development and the production process is too complicated what makes it impossible to let the work do by temporary employees. For the other companies temporary employees make it possible to be more flexible as an organization, to catch up peaks or to fill up places of fixed employees that are on vacation. At company A the project leader replied that he is fine about working with temporary employees, but that it is difficult sometimes, because fixed personnel will get more responsibilities and tasks, because the temporary employees can't do the same as a fixed employee.

4.1.3 Human resource management

To the question whether the company has formulated an HR strategy, 4 of the seven interviewees answered this question negatively. One of them was company E of which the HR manager responded that she knows it is important for her successors that the strategy not only lives in her head, but also on paper and so she wants to develop it on paper soon. The others were companies B, D and G. Company A responded that there is an HR strategy, but by this he means their handbook:

“the handbook includes all the house rules, for example how to deal with office equipment, private work and work on Sundays and public holidays, as well as rules of conduct and the like. We find it very important that people interact as colleagues with each other and respect each other as human beings. Everyone has received this handbook as part of their contract”.

For company F the HR strategy includes the following:

“we think it's very important that our people are flexible, that they are all-round. A few years ago we formed a number of core competencies of which we thought the people that work for us should meet”.

The interviewees are asked what tasks are included in HRM for their company and it was striking that the tasks they mentioned were mostly very administrative like making contracts, payroll, absence management and managing vacation days and the like. Besides that recruitment and selection, appraisals and handling problems with employees are called by most companies.

4.1.4 HR practices

4.1.4.1 Recruitment and selection

The recruitment and selection process appears to be quite similar. Companies A, B, C and F make use of agencies for their production personnel. People are employed at the agency at first and if an employee functions well for a while, he will be taken over by the company itself. Company G makes use of recruitment and selection agencies that are specialized in more highly educated employees. The company doesn't need uneducated production personnel, because the whole production process is automated. Only higher educated personnel is required to supervise the process. The same applies to office personnel. Company E recruits production employees through the company's

network. The HR manager puts a note on the notice-board of the company or she places a message on LinkedIn or Facebook and that is enough to find good people. Company D uses its network for all employees, this can for example be through the University or through conferences. For all other companies than company D and G, recruitment and selection for office personnel is very different. Company A places a vacancy in the local paper:

“we always think locally, also if it comes to employees. We think there are many motivated guys in De Achterhoek. We do it ourselves, because we don’t want to be dependent on agencies if it comes to higher educated personnel. I would say that we select them on gut feeling. Our product is not that complicated, so we look mostly at how they present themselves and whether they fit within the organization”.

Company B also recruits and selects its office personnel itself if possible:

“when there is a vacancy we make a profile. We will check first if there are people from inside the company that have the ambition to get ahead. If there is no potential internal candidate, we start a procedure and depending on what we need an external party is involved”.

Company C recruits its office personnel in association with agencies. Company E responded as follows:

“Office staff will be recruited by the management team. There will be established where the function will take place, there are the job requirements identified, there is a feature profile created, which is approved by the team. That process, we do it all ourselves. We have the arrogance that we can do that best. We are looking for partners who clearly go along with that pattern. In Germany this is very different, in Bremen for example, we use a recruitment agency, but we have selected it very strictly”.

At company E people are recruited mainly on base of their personality. Enneagrams are used to form teams together. The company is convinced that a team can only function optimal if there is a balance between the personalities of the team members. The fact that this works is measured by the absenteeism that is only 0,4%.

4.1.4.2 Training and development

Training and development of employee is an HR practice all 7 companies deal with. Most companies really stimulate their employees to develop themselves through training and education, others, in this case company B, D and G, allow people who wish to train or acquire an education to do so. At every company training and education will be paid for by the company if the education is contributable to the company. According to company B the motivation of employees to train or acquire an education is very low, despite the opportunities there are. Employees that work in the factory are poorly educated, most of them work for the company for a long time and they are satisfied with the low-complex job they perform. Company E on the other hand goes very far in training and development of its people. The HR manager is developing an own training for the company in association with the nearest educational institution. Company A finds it difficult to find suitable education, because there is no specific training for its industry. For company C training is very important and until the week before the interview took place, the government stimulated it a lot by subsidizing the time the employees were involved in training and education. The company

made heavy use of this subsidy and the question now is how this will be financed in the future if the government deletes this subsidy. Company F looks organization-wide what training and education will be useful for the employees. Their goal for now is to qualify the educational level of all the employees.

4.1.4.3 Appraisals

Appraisals are very common for all companies, except for company B:

“Until a few years ago we had appraisals, until it appeared that very few people actually had a need for it. If it went well they knew it and if it didn’t went well too. If there is a problem, there will directly be responded to it and we don’t wait until a certain moment to talk about it”.

Employees of company A have two appraisals a year, one about the functioning and one about salary. The other companies only have one appraisal a year. Company C makes use of mirror reviews:

“The advantage of a mirror review is that the colleagues say something about you, about how they look at you. They may choose themselves which colleague will assess them. In the beginning they thought it was weird and confrontational; there were very afraid. Meanwhile it is accepted as a standard part of the mirror assessment”.

Company D as the only company doesn’t make use of checklists or the like during the appraisals. Multiple companies say it is important that the functioning of an employee is not only discussed during the appraisals, because it is only one or two times a year. If there are problems, that can be from both sides, they need to be discussed immediately.

4.1.4.4 Staff rewards

For all companies the base is to pay their employees a fixed monthly salary. This is remarkable as, according to the literature explained in chapter two, performance related pay is very important in order to stimulate innovation. All companies, except for company D, are attached to a collective agreement where minimum salaries for all functions are determined. This gives the companies very little room set salaries for their own. Some companies wield their own salaries, but these are higher than the salaries according to the collective agreement. Companies B, C, F and G never make use of performance bonuses or the like, others make use of them occasionally. Not much secondary employment conditions are apparent. If needed people receive a car, a laptop or a phone and for company A applies that employees are allowed to make use of the machinery and to buy materials with reduction. Company F knew the same rules, but as the factory grew this was not to oversee anymore.

4.1.4.5 Promotion

Opportunities for promotion are limited, especially for the smallest companies. Organization structures are very flat and the amount of positions are limited. What the companies try to do is giving employees more tasks and responsibilities within their current position. In the case of company G, that is a fast-growing company, people grow along with the organization. In that case functions become more substantive and challenging. Some companies do give the production employees the opportunity to apply for a job at the office, but they only get the job if they are really

suitable for it. Company D expressed its concern about this. As promotion opportunities are limited the company risks to lose its good people. Company G agrees with that.

4.1.4.6 Communication

Communication between the management and the employees is often informal and ad hoc. Company C and E make use of newsletters to inform employees about what is happening within the organization. At company D a meeting with all staff is planned once every two weeks. Company G has this meeting once every two or three months, but they noticed that because there are more people now not every topic is equally interesting for everyone, so for the future these meetings will be more like a presentation of the management team instead of a discussion by all employees. Both the assistant controller and the HR and finance director think communication is very good. Companies B and F schedules meetings only four or five times a year. In between the employees are kept informed through the e-mail or the bulletin board. At company C a meeting with the whole staff where employees will be informed about the performance of the company and the like is only planned once a year, before the Christmas party. Within this area there are differences between the first and the second interview within two companies. At company A the operational direction thinks the communication is very good, but the opinion of the project leader is a slightly different:

“Communication may in some respects be more direct. Of course, when decisions are taken, it will mostly be told to the group, but there are decisions made, for example, a new machine is purchased and then you hear through the grapevine that a new machine is purchased. If this is reflected back then the group called together and we are told what has been decided. Partly things are communicated to the group but there are also many things that go through the back door, and that I regret. This is probably because I am involved in the business for long, then you would like to know everything”.

The software engineer of company E responded quite the same, while the director said communication is very transparent and employees know what is going on.

4.1.4.7 Participation

How much employees participate in making decisions within the company differs. For company B participation is very important:

“How things have to happen should to be determined by the people, because I'm not the one who walks around in the factory all day. So when they identify problems and propose to solve these bottlenecks they are already challenged to think. If new machines or tools are needed, the people are given the opportunity to speak out about that as well. The decision is ultimately of course with the person who is responsible for that”. Unknowingly, at company D participation is also extensive: “I've never really thought about it. I suppose one could argue that I decide everything. On micromanagement I do very little. Some of the decisions they take all by themselves, without consulting me. If it's about really important stuff, I make the decision, but always in consultation with the employees. There will always be asked for their opinion as I think it is important. I think the staff knows, or at least sees that I think from their position. It's all very transparent”.

The interviewees of companies E, F and G also think participation is very extensive at their companies, because the employees are allowed to spread their ideas at the corporate meetings. At company C all decisions are made by the Board, but in many cases this will be agreed in advance with the employees.

4.1.5 Innovation

The companies that participated in this study were among other things selected because they are innovative. How innovative, in what way they are innovative and how they deal with it defers a lot however. The cases will be discussed here one by one on base of the results of the questions on innovation.

Company A follows the trend:

"We look at what the customer wants or what the architect invents and we try to adapt. If we notice that a particular question is being asked often, and we are not able to make it or we have to do it a bit clumsy, we will standardize it. So we are continuously working on innovation, but we don't have a department that focusses specifically on product development".

Product and process innovation go hand in hand. The company is constantly occupied with improving the primary process. Innovation comes from the people that work directly with the machinery, not from above. This is not specifically stimulated by direct incentives or the like, but as the people are well educated and they are selected on the fact that they are critical, the ideas come naturally. Besides that, communication is very open and the board welcomes new ideas.

At company B it is all about product innovation. A large amount of the production process is outsourced, so process innovation is not important. The company works according to concrete assignments of customers and according to signals from the market. They have made several prototypes and looked what the market was interested in. Eventually the company always reacts on the market, this can be through concrete assignments, developments in the market or vague signals from the market. The market itself develops all the time, as the company is dependent on the technology development of tablets, notebooks and printers. Three days a week a product developer works at the company. Employees are stimulated to seek for improvements and to come up with new ideas by discussing and brainstorming about the last assignment.

"We have started this at the beginning of this year and now a bit of interaction begins to come. In the beginning everyone was a bit, which fits the culture of the Achterhoek, reluctant. Most people here are also called the "say what should be done, I'll do that." What I always say is that I'm willing to say what should be done, but that they should consider how they will do it".

Company C focuses more on process innovation than on product innovation:

"The government has targeted for the industry to save 25% on energy in 15 years. Extensive research is needed to accomplish that. Since this is done at our company, we are the first company to benefit from this saving. The company itself has invested a lot of time into the implementation of a new control system. The government has put a lot of time and money

particularly in the analysis process of it. Condition was that the results had to be shared with the sector, so that everyone eventually can benefit”.

Product development stems from concrete assignments by the company's customers. The company has employed a product developer that is responsible for this. Employees are allowed to come up with new ideas and make use of that. In former times employees didn't do that, this has to do with the cultural change the company has made. It is often about small changes and adaptations. Big changes will be initiated by the management or the product developer. Suppliers of machinery are also asked sometimes to think about improvements.

For company D the goal is to develop new products and sometimes process innovation is needed to achieve this so the one is not more important than the other. The company was founded in 2003, because the founder invented a specific product that wasn't available on the market at that time. From that moment on the company kept developing new products and the production rate is low. About half of the budget is spent on innovation and three of the nine employees are the real innovators within the company and the others facilitate the standard production. Sometimes the innovation is driven by market pull and sometimes by technology push.

About the product company E produces is nothing new to the market. The whole production process, however, is. Innovation within the company is focused completely on process innovation. The whole production process is automated what makes it possible to accept very small orders of customers and to make it possible for customers to place orders 24 hours a day, 365 days a year. There is no competitor that can achieve this high level of service. The company wants to be an early-adaptor and for that several million euro a year is spent on innovation. The company works together with different education institutes to achieve this and several subsidies made it possible to finance the innovation.

For company F the goal is product innovation, but process innovation also receives a lot of attention. Process innovation is not specifically needed in order to develop new products, the process innovation projects are focused on efficiency of the production process, for example through Lean manufacturing. The companies receives subsidies for innovation and with that, about 3,5% of total revenue will be spent on innovation. Innovation is driven by the market. Sometimes as a direct request of a customer and sometimes as a respond to signals from the market. The R&D department consists of five employees that draw and design new products. Sharing ideas is stimulated by scheduling meetings where this is possible and the company has its own “playground” where people can work on less conventional projects. New products are promoted through social media and at fairs.

For company G the goal is also to develop new products, every request of a customer is different, so basically for every product a piece of innovation is needed. The company knows three kinds of projects, namely commercial projects which include direct orders from customers, grant projects and R&D projects which include mostly adaptations and improvements to current projects that are thought up by the employees themselves. The technical director decides what R&D projects are to be carried out. Employees aren't specifically stimulated to think about improvements and other innovations, but if they do come up with ideas, there will be listened to and if it's a good idea it will be carried out.

4.2 Data-analysis: Case comparison and relationships

Within this section the data will be analyzed in a way that relationships between variables can be discovered. It will be subdivided in three different paragraphs that include strategy and context, HRM itself and innovation. That topics will be related to each other. This study focusses on SMEs, but this is still a large group. In chapter two it was pointed out that there are three categories within SMEs according to their size. Micro-organizations have less than 10 employees, small organizations employ between 10 and 49 employees and medium organizations employ less than 250 employees. Brandl and Pohler (2010) pointed out that the organization of HRM differs between these categories. Because of that the cases will be also compared based on their size.

4.2.1 Strategy and context as determinants of HRM

Table 4.1 summarizes the strategy of the companies. Table 4.2 summarizes the context and the remaining questions about strategy in order of company size. In the next section in table 4.3 the HR practices of the cases are summarized. In section 4.1 the strategy and context are described more extensive, here the focus is on the relationships.

| Company | D | G | B | A | C | E | F |
|---------------------------------|---|---|---|--|--|---|---|
| Employees | 10 | 15 | 17 | 35 | 67 | 87 | 90 |
| FTE | 10 | 10 | 14 | 29 | 59,5 | 84 | 77 |
| Foundation | Spin-off University of Twente | Spin-off University of Twente | Family business started as tannery | Family business | Family business | Founded by current director | Family business |
| Corporate culture | Innovative, open, friendly, high autonomy | Informal, flat, high autonomy | Informal, flat reliable, committed | Informal, flat, high autonomy, open | Traditional, at first very hierarchical | Transparent, simple | Flat, open, social |
| Market | Worldwide, mostly outside Europe | Worldwide | International, especially Germany | Dutch market | International, mostly Germany and America | All customers within 200 km | 70% Dutch market, the rest within Europe |
| Market position | Strong, only 2 players, very innovative | Strong, only 2 or 3 big players | Limited amount of players | Strong, because of speed and trendiness | distinctive by speed of delivery | Very strong | Marketleader |
| Competition | For production it is hard, there- fore partnering | Limited, it's a small world | Limited, cheaper, but less qualitative | Product is not unique, long- term relations | Extensive, but also collaborative | None, because uniqueness of concept | Limited, only competitors with partial overlap |
| External context | No economic factors, less subsidies | Dependence on subsidies, no economic factors | Market development, technology focus on niches | Investments, availability of technical personnel | Oil prices, har- vest of raw materials, economic crisis | Acceptance of innovation, subsidies | Target group increases, but less subsidies |
| Adaptability | High, because of high flexibility | High, every product is custom-made | High, because of high flexibility | High, informal org. and highly educated personnel | High, adjusting production capacity and personnel | Not dependent on market changes | High, because of availability of professionals inhouse |
| Use of tempo- rary employees | Only a few students, for oth- ers too complex | Not possible, because of complexity | Yes, as part of high flexibility | Yes, to catch peaks | A lot, because sales are seasonal | Yes, but as limited as possible | Only in the summer, to catch holidays |

Table 4.2: Context and strategy

Companies D and G are both spin-off companies of the University of Twente that brought a new product to the market. They both focus on the research market of Universities and other institutions. Company D, however, wants to focus more in the future on production for the industry. There are more opportunities for growth there than in the research market. The corporate cultures are comparable and because production is not (yet) standardized it is impossible to make use of temporary employees. Within the research market both companies experience very little

competition. The strategies of both companies differ as company D wants to focus on production and company G on developing a new product, but both companies are at a point where they realize the organization has to become more structured. The HR practices are also quite the same. Company B also falls into the category of a small business and also focusses more on developing and assembling than on the production process itself. The strategy of company B is to become the market leader in the Netherlands and Germany. The culture is comparable to that of company D and G, although autonomy is less important. This may be caused by the fact that the average education level is lower and most people are fine with the relatively simple job they have. The HR practices of company B are also very comparable, the only difference is the amount of meetings with the whole staff. This may also be caused by the lower educational level and a sharper separation between office and production personnel. Then there is not so much to discuss that is relevant for every employee. Although company A employs twice as much employees than company B it is also a small organization. Its strategy is to distinguish by speed, completeness of delivery and delivery without damage. This company is much more focused on the production process itself. The product is not unique so the company has to distinguish itself from its competitors in another way. Also, the context and the market the company has to deal with differ. The HR practices, however, are very comparable with the prior three companies, so this different focus, strategy and context do not lead to different HR practices. The only difference according to HR is that all the rules are formalized, but it would be more logical to explain that by the size of the company.

The last three companies fall into the category of medium-sized companies, starting with company C. According to corporate culture this company differs a lot from the other cases. Where all other cases know a very open, flat and informal culture, this one is very traditional, despite the cultural changes since 2009. Contrary to all other cases, participation is low. According to market position and strategy this company is very comparable to company A as both their products are not unique and therefore they focus on delivery speed and building long-term relationships with their customers. Because company C knows more hierarchy than the other cases, opportunities for promotion are more extensive. Training and development is much more important than it is to the prior cases and an HR strategy is available, but that also counts for company E and F. The strategy of company E is all about expanding, where that of company F is to remain the market leader. This difference can be logically explained by the company age as company F is a much older, more established company, while company E is a very young company that started small and is growing very fast. For company E the unique and innovative concept is the motive of this growth. For company F the focus is on producing existing products, improving them and for a small part developing new products.

The results do not show a clear relationship between strategy and HRM and context and HRM. For context there seem to be much different factors that influence HRM, like subsidies for training and development and the commitment to collective agreement. Despite the fact that strategies and context differ a lot between the cases, the HR practices do not differ much. According to HR practices there seems to be a pattern in company size, this pattern will be discussed within the next section. The results do indicate that the context and the uniqueness of the product or concept influence strategy. For companies A and C the competition is extensive, because the product is not unique and competitors can deliver the same products. They have to distinguish themselves by something else and they both decided to do that by their speed. This requires high flexibility and therefore the companies make use of temporary employees, what is made possible by the relatively simple production tasks. Companies D and G on the other hand have to deal with much less competition,

because of the uniqueness of the product. That companies are also much younger and smaller. Their strategies are more about innovation and building a structured organization. All interviewees responded their market position is strong, because there are limited players or because the company distinguishes itself from its competitors. Adaptability is also high at every organization, whether because of its flexibility, whether because of its professionals/educational level. As there are no differences discovered on this parts, the influence of it on other parts cannot be measured.

4.2.2 Human resource management within high-tech SMEs

Within this paragraph the HR practices of the cases are summarized according to their size in table 4.3 and according to their age in table 4.4.

| Company | D | G | B | A | C | E | F |
|------------------------|-------------------------------|-------------------------------|---|---------------------------------|--|-----------------------------|---------------------------------------|
| Employees | 10 | 15 | 17 | 35 | 67 | 87 | 90 |
| FTE | 10 | 10 | 14 | 29 | 59,5 | 84 | 77 |
| HR strategy | No | No | No | Handbook for employees | Yes | Not on paper yet | Yes |
| Recruitment/selection* | Network | Agencies for highly educated | P=agencies O=in-house | P=agencies O=local paper | P=agencies O= with help of agencies | P=network O= MT | P=agencies O=advertisement |
| Training/development | Not specifically stimulated | Not specifically stimulated | Not specifically stimulated | If needed and if relevant | Very important | Building own academy | Goals set by management |
| Performance appraisal | Once a year without checklist | Once a year, with checklist | No appraisals | 2 times a year, with checklist | Once a year, with checklist | Once a year, with checklist | Once a year, with checklist |
| Compensation | Fixed salary | Fixed salary | Fixed salary | Fixed salary | Fixed salary | Fixed salary | Fixed salary |
| Promotion | Very limited | Very limited | Limited, only extension of responsibilities | Limited, but also no motivation | Possible, if it fits the appraisal | Limited, flat organization | Possible through internal application |
| Communication | Meeting once every 2 weeks | Meeting once every 2/3 months | Meeting 4/5 times a year | Informal/ad hoc | Newsletter Meeting once a year | Newsletter | Meeting 4/5 times a year |
| Participation | Extensive | Extensive | Extensive | Unknown | Decisions taken by the Board | Extensive | Extensive |

Table 4.3: HRM to company size

* P includes the recruitment and selection process of production personnel, O of office personnel

It can be concluded from the data that company size has no influence on participation, compensation and performance appraisal. Also for the recruitment and selection process no pattern can be found according to company size. Looking at HR strategy it can be concluded that the small organizations have no HR strategy and the medium-sized organizations do or are working on it. According to this data training and development becomes more important as a company grows bigger. All companies do compensate training and development if it is relevant for the function, but at the smallest organizations it is not particularly stimulated or obliged. Employees have to ask for it. At the three largest companies this is different as the management team decides what training and development is needed for the employees. Opportunities for promotion are limited at every organization, but the medium-sized organizations do offer opportunities sometimes. For the small organizations,

promotion is more about extending tasks and responsibilities and growing with the company. It is remarkable that as company size increases, the amount of meetings with the whole staff decreases.

For company age the same table can be used, but in order of foundation date. Table 4.4 shows that for none of the HR practices a pattern can be discovered based on the foundation date of the companies.

| Company | F | B | C | A | G | D | E |
|------------------------|---------------------------------------|---|---------------------------------------|---------------------------------|-------------------------------|-------------------------------|-----------------------------|
| Employees | 90 | 17 | 67 | 35 | 15 | 10 | 87 |
| Foundation date | 1900 | 1919 | 1959 | 1994 | 1900 | 1900 | 1900 |
| HR strategy | Yes | No | Yes | Handbook for employees | No | No | Not on paper yet |
| Recruitment/selection* | P=agencies O=advertisement | P=agencies O=in-house | P=agencies O=with help of agencies | P=agencies O=local paper | Agencies for highly educated | Network | P=network O= MT |
| Training/development | Goals set by management | Not specifically stimulated | Very important | If needed and if relevant | Not specifically stimulated | Not specifically stimulated | Building own academy |
| Performance appraisal | Once a year, with checklist | No appraisals | Once a year, with checklist | 2 times a year, with checklist | Once a year, with checklist | Once a year without checklist | Once a year, with checklist |
| Compensation | Fixed salary | Fixed salary | Fixed salary | Fixed salary | Fixed salary | Fixed salary | Fixed salary |
| Promotion | Possible through internal application | Limited, only extension of responsibilities | Possible, if it fits the appraisal | Limited, but also no motivation | Very limited | Very limited | Limited, flat organization |
| Communication | Meeting 4/5 times a year | Meeting 4/5 times a year | Newsletter Meeting once a year | Informal/ ad hoc | Meeting once every 2/3 months | Meeting once every 2 weeks | Newsletter |
| Participation | Extensive | Extensive | Decisions taken by the Board | Unknown | Extensive | Extensive | Extensive |

Table 4.4: HRM to company age

* P includes the recruitment and selection process of production personnel, O of office personnel

4.2.3 HRM and innovation

According to the conceptual model it is expected that HRM influences innovation. Table 4.5 summarizes the information about the innovativeness of the cases. This information can be compared to the HR practices as summarized in table 4.3.

The results presented in section 4.2.2 indicate that most differences in HR can be found between case D, G, B and A on the one hand and C, E and F on the other. At the last three companies HRM is more formalized, opportunities for promotion are more extensive and training and development is more important in the sense that the management influences it, while at the other companies the employees have to ask for it.

Companies D and G are the companies that have brought a whole new product with a new technology to the market. Product development and improving the current products is the main focus of that companies. At company G all employees focus on innovation, while at company D that number is 30%, but the other 70% are also engaged in that process, but more in a supporting role.

The participation of the employees in the innovative process is very high. Besides that, the employees receive much autonomy, so they are able to work with their ideas in their own way. This autonomy is certainly created by the fact that the organization is not very structured with strict policies and procedures. According to the literature described in chapter 2, training and development is very important in order to stimulate innovation. It is therefore remarkable that companies D and G do not stimulate that. On the other hand, the educational level of the employees is already very high, what is very important to enhance innovation. Both company D and G do not specifically stimulate employees to engage in innovation, but they argue that they are open for ideas and because the employees are highly educated they seek challenges for themselves and extra stimulation is not necessary.

Company E is also very innovative, but that company focusses purely on process innovation. This innovation is mainly achieved in cooperation with external institutes. This means the employees itself doesn't have to be very creative, but they do have to be willing to work in a changing, innovative environment. Training and development of employees is therefore very important. Because the uniqueness of the concept, the company even wants to develop its own academy, so employees will be specifically educated to work with that concept. These three companies can be regarded as most innovative and they are also the youngest companies of all cases.

The other four companies are more established and focus mainly on incremental innovation. They improve their current products or develop new variants on their current products, the core business, however, is producing/assembling existing products. Company C focusses besides that also a lot on process innovation in cooperation with external institutes, because the industry as a whole has set the goal to reduce the use of energy. Company A argues, just like D and G, that the fact that higher educated personnel is hired employees come up with new ideas themselves. Employees receive high autonomy at company A. Hiring critical personnel is also a manner for company A to enhance innovativeness. At the other three companies meetings are planned where employees can come up with new ideas in order to stimulate innovation.

| Company | D | G | B | A | C | E | F |
|-----------------------------|-----------------------------|-------------------------------|---|--|----------------------------|--------------------------------------|--------------------------------------|
| Employees | 10 | 15 | 17 | 35 | 67 | 87 | 90 |
| FTE | 10 | 10 | 14 | 29 | 59,5 | 84 | 77 |
| Innovative-ness | Very high | Very high | High | Trend-follower | Relatively high | Early adapter, so very high | High |
| product/process | Focus on product innovation | Both, but product is the core | Focus on product innovation | Both, but incremental | Both, but mostly process | Process | Both, but product is the core |
| R&D expenditure | About half of the budget | € 10.000 for R&D only | Unknown | No fixed amount, what's needed | Unknown | Several million euro of annual sales | 3,5% of sales including subsidies |
| Market pull/technology push | Both ways | Market pull | Market pull | Market pull | Market pull and industry | There is no new product | Market pull |
| Responsibility | 30% of all employees | All employees | Product engineer and modelmaker | Everyone | one product developer | In cooperation with institutes | 5 people on R&D |
| Stimulation of employees | Highly educated employees | Highly educated employees | Discussing and brainstorming afterwards | open communication and hiring critical personnel | Yes, since cultural change | Not specifically | Meetings where ideas can be proposed |

Table 4.5: Innovation

The recruitment and selection of companies D, G and A are focused on highly educated employees. This educational level seems to correlate with high autonomy. Also, at all three companies, all employees are engaged in the innovation process, there are no specific people that are hired to develop new products, while that is the case at the other companies.

According to the literature performance-related pay is an important stimulator of innovation, it is therefore remarkable that all companies pay their employees a fixed amount. Company C responded that they would like to introduce this, but that the wages that are set in the collective agreement are too high. It would be too expensive to pay employees that perform 'better' even more than that. Non-financial rewards are also hardly used.

Appraising is also seen as a stimulator of innovation if it emphasizes results criteria, use longer-term criteria, encourage high employee participation, and recognize the accomplishments of groups of individuals. All companies, except for company B, have appraisals at least once a year. Except for company D a checklist is used during the appraisal where employees are assessed based on goals and their job requirements.

From the results on innovation it can be concluded that employees are not engaged in radical process innovation, external institutions will be hired to develop and implement this. For incremental process innovations especially the production staff is stimulated during meetings to come up with ideas of improvement. Product innovation is mostly performed by people that are specifically hired for product development of R&D, except for the companies that hire highly educated personnel.

5. Discussion and conclusion

This chapter starts with a discussion of the results of this thesis, including limitations and directions for further research. The chapter ends with a final conclusion of the thesis.

5.1 Discussion

This section discusses the results and describes the limitations of this research and the directions for further research.

5.1.1 Conceptual model

This research was partly based on literature research. The variables that emerged from literature have been used to build the conceptual model that was used for the qualitative part of the research. At the end of the theoretical chapter, chapter 2, the next conceptual model was formulated according to the findings of existing literature:

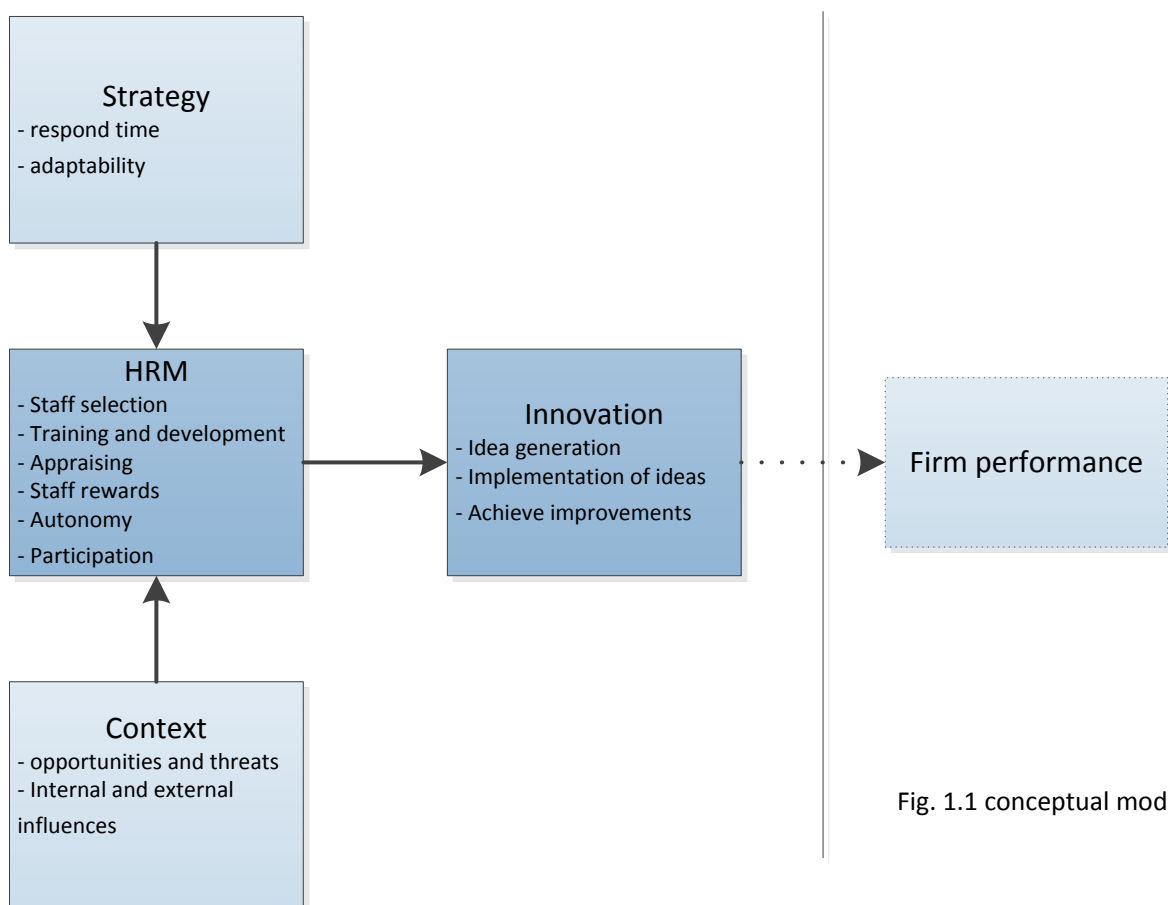


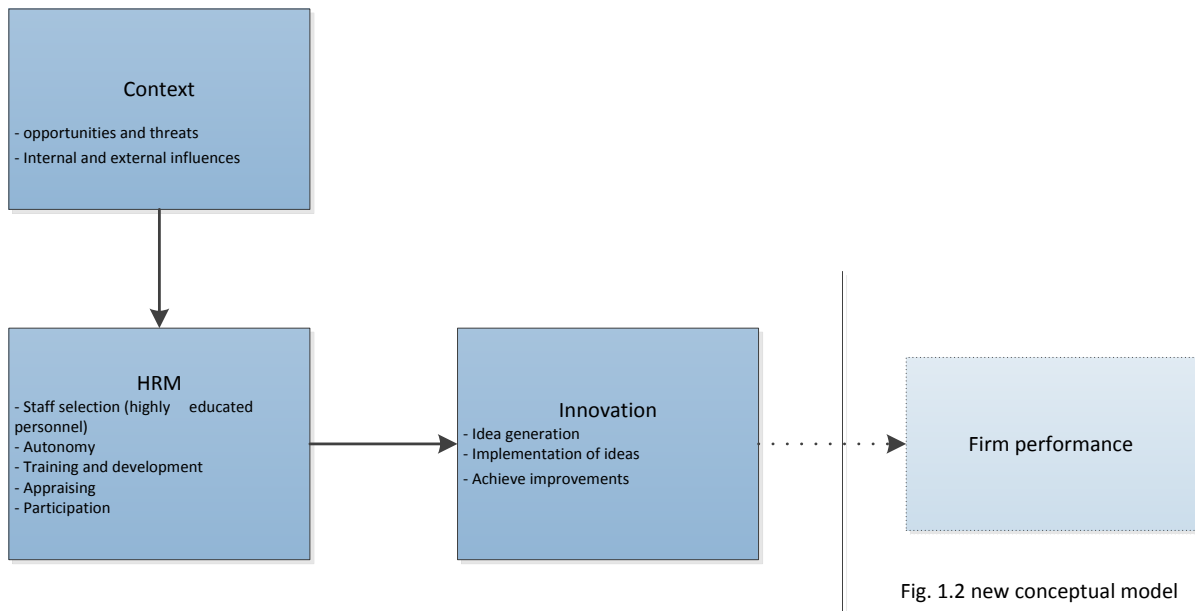
Fig. 1.1 conceptual model

From the beginning of this thesis it was chosen to focus solely on strategy and context as determinants of HRM, but it is possible that within SMEs there are other determinants that influence HRM. It should therefore be kept in mind that the conceptual model may not be complete. Leadership, for example, could also influence HRM and the way in which HRM is translated to employees. Context is a very broad concept that includes lots of different factors from legislation to the organizational culture. That makes it hard to go in detail on that topic. It would have been interesting, for example, to gain more information about the effects of subsidies on HRM, because many interviewees mentioned their dependence on subsidies and they mentioned the changes in availability of subsidies. Within this study, a very diverse relationship is found between context and

HRM. The interviewees mentioned different external factors that influence HRM, like subsidies for training and development and the commitment to collective agreements. No relationship is found between strategy and HRM. In most cases, strategy was not formulated explicitly and it was not clear if a certain organizational strategy was communicated to the employees. At the small companies also no HR strategy was formulated explicitly. At the medium-sized companies an HR strategy is specifically formulated, but there seems no relationship between the general organizational strategy and the HR strategy. This indicates a more best-practice approach instead of a best-fit approach.

The existing literature studied in chapter 2 has provided evidence for certain HR practices that should enhance innovation. These HR practices were included in the conceptual model. The results of this study, however, has not found support for all these practices. No support was found for staff rewards, employees are in most cases paid on base of a collective agreement. For training and development only actions were taken in the medium-sized organizations. Staff selection, autonomy, participation and appraising were apparent in the studied organizations.

After analyzing the results of this study, the next model can be formulated where no determinants of HRM are identified and where different HR practices are included:



5.1.2 Methodology

In order to gather data for this study semi-structured interviews were used at 7 different companies. The limitation of that methodology is that data is subjective. Only one or two persons are interviewed per company and it is possible that the interviewees proposed the situation more positive than it is in reality. For example, every interviewee responded that adaptability is very high and the market position is strong. Also, the interviewees did not have much knowledge about all topics. It may be the case that an HR manager cannot appoint all external factors that influence the organization as it is not his or her task to analyze and deal with all external factors.

The interview questions were open and the interviewer let the interviewees answer the questions freely, without much steering in order to gather as much information as possible. This can also be seen as a limitation, because it is more difficult to compare cases to each other. The one interviewee interprets a question differently from another one. It would have been better if there was more time

for the interviews, because in that case the topics could have been discussed more deeply. Especially on the questions about the HR practices. For example about staff selection criteria, questions about the development of this criteria could have been studied. This also counts for training and development: why is certain training and development important? For further research it can be interesting to find companies that are willing to find more time for the interviews.

To study the relationship between HRM and innovation the best way would be to conduct a longitudinal study at multiple high-tech innovative SMEs and implement different HR practices in order to see what the effect is on the behavior of the employees. Off course, because of limited time for this thesis it was not possible to conduct that kind of research. Besides that, the results of HRM are always difficult to measure, because it is hard to exclude other factors that may also influence the situation. To gather more objective data it would be better to complement the study with observations and documentation instead of interviews only. In order to receive more reliable results a longitudinal study as described here can be interesting for further research.

5.1.3 Results and data-analysis

Not all practices that are identified by literature as HR practices that can enhance innovation could be analyzed in this study, because the differences between the cases are limited. Compensation, for example, is the same at every organization: employees get paid by a fixed amount. It cannot be analyzed therefore if it enhances innovation. As mentioned before, measuring the results of HRM is very difficult because other factors can hardly be excluded. Therefore the results only give indications and no hard evidence. A much more extensive research is needed in order to provide this evidence on this specific group of organizations.

For future research it may be useful to focus on innovative work behavior instead of innovation, because IWB focusses on individual behavior instead of innovation output. De Jong and Den Hartog (2008) define innovative work behavior as an individual's behavior that aims to achieve the initiation and intentional introduction (within a work role, group or organization) of new and useful ideas, processes, products or procedures. IWB does not only include idea generation, but also behaviors needed to implement ideas and achieve improvements that will enhance personal and/or business performance. The idea that actions of individual employees are of crucial importance for continuous innovation and improvement is not just found in academic literature on innovation, but also stressed in work on several other popular management principles, such as total quality management and corporate entrepreneurship (de Jong & Den Hartog, 2008). For most employees innovative job performance is a voluntary and discretionary behavior that is generally not prescribed in formal job descriptions (Abstein & Spieth, 2014). Existing literature has provided evidence for specific HR practices that influence IWB. These practices include staff selection (Yuan & Woodman, 2010), appraising (Abstein & Spieth, 2014), staff rewards (Ramamoorthy, Flood, Slattery, & Sardesai, 2005), autonomy (De Spiegelaere, Van Gyes, De Witte, Niesen, & Van Hootegem, 2014) and self-efficacy (Dörner, Gassmann, & Morhart, 2011).

5.1.4 Theoretical implications

As explained in section 5.1.1 the conceptual model that was formulated according to existing literature differs from the model that can be drawn after the research conducted within this thesis. Strategy could not be identified as determinants of HRM, for context a very diverse relationship is found and HR practices that enhance innovation differ. High autonomy, staff selection and appraising

are according to existing literature as well as according to this study seen as HR practices that increase innovation. Training and development is according to this study only important and better organized for medium-sized companies and not for small ones. No case within this study did something with performance related pay or other financial incentives, while staff rewards are seen as an important motivator by existing literature. Participation is also very important for high-tech innovative manufacturing SMEs.

5.1.5 Practical implications

HRM can positively affect the innovativeness of an organization, by applying certain HR practices. According to existing literature, these HR practices include staff selection, high autonomy, staff rewards, training and development and appraising.. This study indicated the relationship between HRM and innovation also counts for high-tech innovative manufacturing SMEs, but has not provided evidence for all HR practices identified by existing literature. In order to enhance innovativeness through HRM, the following HR practices can be applied:

- High autonomy, achieved by less formalized policies and procedures.
- Appraisals focused on results and longer-term criteria.
- Training and development that is ongoing, less standardized and focusses on individual knowledge requirements.
- Participation through good communication and being open to ideas.
- Recruitment and selection of highly educated personnel.

5.1.6 Summary of limitations

The limitations of this study and the suggestions for further research are explained already in section 5.1.1, 5.1.2, and 5.1.3 and they will be summarized here.

- Determinants of HRM are not studied very much in-depth because of the extensiveness of the factors.
- Not all possible determinants of HRM are studied, only context and strategy are included in this research.
- Results are subjective, because only one or two employees per company were interviewed and interviews are the only source of information, besides the company website.
- Due to limited differences between the cases, not all HR practices could be analyzed well.

5.1.7 Summary of suggestions for further research

- Conducting a longitudinal research including interviews, observations and analysis of documentation in order to gain more objective information.
- The conceptual model as proposed in this study could be extended by a research that focusses specifically on the determinants of HRM. In-depth interviews could be conducted at high-tech innovative SMEs where the focus is on the base for the HR strategy. The question is then why the HR strategy in an organization is what it is.
- Focusing on the relationship between HRM and innovative work behavior instead of innovation.

5.2 Conclusion

The main research question that was formulated in chapter one was formulated as follows: “How can HR practices within innovative high-tech manufacturing SMEs enhance innovation?”

In order to be able to give an answer to the main research question, a few sub questions were formulated.

- What HR practices do high-tech innovative manufacturing SMEs use?
- What is the effect of strategy on HR practices in high-tech innovative SMEs?
- What is the effect of organizational context on HR practices in high-tech innovative SMEs?
- What is the relationship between HR practices and innovation in high-tech innovative SMEs?

Applying a literature review together with qualitative research at 7 different companies are used to answer the research questions.

According to the literature, SMEs can be divided into three categories: micro-organizations, small-organizations and medium-sized organizations. Because of limited time and financial resources, SMEs lack sophisticated HR practices. The literature also states that when a company grows from a small- to a medium-sized organization HR systems and instruments will get more formalized. That trend is confirmed by the results of this research. Where small firms don't have an HR strategy, hardly stimulate training and development and provide none or very little opportunities for promotion, this is different in medium-sized organizations. Despite the fact that the medium-sized firms of this study make more use of HRM, it is still limited. Only company E employs an HR professional that has actually studied HRM and uses all her time at the office for HRM. At other companies the person that is responsible for HRM also has tasks in another field like finance.

According to the Harvard model and the conceptual model that follows by the literature review of this thesis, strategy and context are determinants of HRM. Strategy includes the overall business strategy and context includes corporate culture, the macro-environment and the competition. The results of this thesis do not show a clear relationship between strategy and HRM and context and HRM. For context and HRM different factors of influence are mentioned. Despite the fact that strategies and context differ a lot between the cases, the HR practices do not differ much. The results do indicate that the context and the uniqueness of the product or concept influence strategy.

According to the literature HRM can positively affect innovation. Literature has identified different HR practices that would enhance this innovation. The first is selecting highly qualified people that are creative and proactive. Training and development is the next one, because it encourages employee participation and creativity. Within an innovative work environment job demands and technologies are changing what suggests a need for training that is ongoing, less standardized and focusses on individual knowledge requirements. Appraising practices that emphasize results criteria, use longer-term criteria, encourage high employee participation, and recognize the accomplishments of groups of individuals also increase innovation. Staff rewards, whether financial or non-financial that are related to results is another HR practice that can be used to enhance innovation. By reducing policies and procedures, autonomy is increased and that will also positively affect innovation. According to this study the companies with high autonomy are the companies where the highest educated personnel is hired and where every employee engages in the innovative process. This includes product development and incremental process innovations. One of the cases focusses solely on process innovation. That innovations are not developed and implemented by the employees themselves, but they do work in an innovative and changing environment, what makes training and

development of employees very important. Pay isn't used at any company to enhance innovation, mostly because wages are determined by the collective agreement.

The conceptual model that was proposed at the end of the theoretical framework was not fully supported by the results of the interviews. The relationship between strategy and HRM could not be found. The facts that SMEs lack sophisticated HR practices and that differences can be found between small- and medium-sized organizations is confirmed by the results of this study. According to the literature several HR practices can be used to enhance innovation. High autonomy and highly educated personnel seems to enhance innovation according to the results. Participation is very important at almost all companies. Training and development is also important, but more for process innovation in the medium-sized organizations.

6. References

6.1 Websites

CBS. (2011) Minder bedrijven met omzetgroei. Retrieved July 12, 2014, from <http://www.cbs.nl/nl-NL/menu/themas/bedrijven/publicaties/artikelen/archief/2011/2011-stijgersdalers-2011-art.htm>

Europa. (2003) Definitie van kleine en middelgrote ondernemingen, (MKB). Retrieved June 3, 2014, from http://europa.eu/legislation_summaries/other/n26001_nl.htm

6.2 References

- Abstein, A., & Spieth, P. (2014). Exploring HRM Meta-Features that Foster Employees' Innovative Work Behaviour in Times of Increasing Work–Life Conflict. *Creativity and Innovation Management*, 23(2), 211-225.
- Bacon, N., & Hoque, K. (2005). HRM in the SME sector: valuable employees and coercive networks. [Article]. *International Journal of Human Resource Management*, 16(11), 1976-1999.
- Beer, M., Spector, B., Lawrence, P. R., Mills, D. Q., & Walton, R. E. (1984). A conceptual view of HRM. *Managing Human Assets Free Press, New York Chap.2*.
- Beugelsdijk, S. (2008). Strategic Human Resource Practices and Product Innovation. *Organization Studies*, 29(6), 821-847.
- Boselie, P. (2010). *Strategic human resource management: A balanced approach*. London: McGraw-Hill.
- Bowen, D. E., & Ostroff, C. (2004). Understanding HRM-firm performance linkages: The role of the "strength of the HRM system. *Academy of Management Review*, 29(2), 203-221.
- Brandl, J., & Pohler, D. (2010). The human resource department's role and conditions that affect its development: Explanations from Austrian CEOs. [Article]. *Human Resource Management*, 49(6), 1025-1046.
- Camisón, C., & Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research*, 67(1), 2891-2902.
- Ceylan, C. (2012). Commitment-based HR practices, different types of innovation activities and firm innovation performance. *The International Journal of Human Resource Management*, 24(1), 208-226. doi: 10.1080/09585192.2012.680601
- Chen, C.-J., & Huang, J.-W. (2009). Strategic human resource practices and innovation performance — The mediating role of knowledge management capacity. *Journal of Business Research*, 62(1), 104-114.
- Cunha, R. C. e., & Cunha, M. P. e. (2004). Impact of strategy, HRM Strength and HRM bundles on innovation performance and organizational performance: Universidade Nova de Lisboa, Faculdade de Economia.
- Davis-Blake, A., Broschak, J. P., & George, E. (2003). Happy Together? How Using Nonstandard Workers Affects Exit, Voice, and Loyalty Among Standard Employees. *Hong Kong University of Science & Technology Business School Research Paper; Academy of Management Journal*, 46(4), 475-485.
- de Jong, J., & Den Hartog, D. (2008). Innovative Work Behavior: Measurement and Validation. Zoetermeer: Scientific Analysis of Entrepreneurship and SMEs.
- de Leede, J., & Looise, J.-K. (2005). Innovation and HRM: Towards an Integrated Framework. *Creativity and Innovation Management*, 14 (2). pp. 108-117.
- De Spiegelaere, S., Van Gyes, G., De Witte, H., Niesen, W., & Van Hootegeem, G. (2014). On the Relation of Job Insecurity, Job Autonomy, Innovative Work Behaviour and the Mediating Effect of Work Engagement. *Creativity and Innovation Management*, 23(3), 318-330.

- De Winne, S., & Sels, L. (2010). Interrelationships between human capital, HRM and innovation in Belgian start-ups aiming at an innovation strategy. *International Journal of Human Resource Management*, 21(11), 1863-1883.
- Delery, J. E., & Doty, D. H. (1996). Modes of theorizing in strategic human resource management: Tests of universalistic, contingency, and configurations. Performance predictions. *Academy of Management Journal*, 39(4), 802-835.
- Dörner, N., Gassmann, O., & Morhart, F. (2011). *Innovative Work Behavior: The Roles of Innovative Self-Efficacy and Transformational Leadership*. Paper presented at the 18th International Product Development Management Conference, Delft, Netherlands.
- Farndale, E., & Paauwe, J. (2007). Uncovering competitive and institutional drivers of HRM practices in multinational corporations. *Human Resource Management Journal*, 17(4), 355-375.
- Golhar, D. Y., & Deshpande, S. P. (1997). HRM Practices of Large and Small Canadian Manufacturing Firms. [Article]. *Journal of Small Business Management*, 35(3), 30-38.
- Gómez-Mejía, L. R., Balkin, D. B., & Cardy, R. L. (2010). *Managing Human Resources*. New Jersey: Pearson Education Inc.
- Hoffman, K., Parejo, M., Bessant, J., & Perren, L. (1998). Small firms, R&D, technology and innovation in the UK: a literature review. *Technovation*, 18(1), 39-55.
- Holman, D., Totterdell, P., Axtell, C., Stride, C., Port, R., Svensson, R., & Zibarras, L. (2012). Job Design and the Employee Innovation Process: The Mediating Role of Learning Strategies. *Journal of Business and Psychology*, 27(2), 177-191.
- Jiang, J. W., Wang, S. O., & Zhao, S. M. (2012). Does HRM facilitate employee creativity and organizational innovation? A study of Chinese firms. *International Journal of Human Resource Management*, 23(19), 4025-4047.
- Johnson, G., Whittington, R., & Scholes, K. (2011). *Exploring strategy*. Essex: Pearson education limited.
- Karami, A., Jones, B. M., & Kakabadse, N. (2008). Does strategic human resource management matter in high-tech sector? Some learning points for SME managers. *Corporate Governance*, Vol. 8, p.7 - 17.
- Katou, A. A., & Budhwar, P. S. (2010). Causal relationship between HRM policies and organisational performance: Evidence from the Greek manufacturing sector. *European Management Journal*, 28(1), 25-39.
- Kemp, R. G. M., Folkeringa, M., Jong, J. P. J. d., & Wubben, E. F. M. (2003). Innovation and firm performance. *EIM Business and Policy Research*.
- Knol, H. (2013). *Effectief personeelsbeleid in het kleine MKB. Een studie naar de effecten van verticale en horizontale afstemming van personeelsbeleid in kleine bedrijven*. Enschede: Gildeprint.
- Lau, C. M., & Ngo, H. Y. (2004). The HR system, organizational culture, and product innovation. *International Business Review*, 13(6), 685-703.
- Markham, S. K. (2002). Moving technologies from lab to market. *Research Technology Management*, 45(6), 30.
- Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, 86(1), 78-93.
- Ramamoorthy, N., Flood, P., Slattery, T., & Sardesai, R. (2005). Determinants of Innovative Work Behaviour: Development and Test of an Integrated Model. *Creativity and Innovation Management*, Vol. 14(No. 2), pp. 142-150.
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Essex: Pearson Education Limited.
- Schmelter, R., Mauer, R., Börsch, C., & Brettel, M. (2010). Boosting corporate entrepreneurship through HRM practices: Evidence from German SMEs. *Human Resource Management*, 49(4), 715-741.
- Schuler, R. S. (1986). Fostering and Facilitating Entrepreneurship in Organizations: Implications for Organization Structure and Human Resource Management Practices. *Human Resource Management*.

- Sels, L., De Winne, S., Delmotte, J., Maes, J., Faems, D., & Forrier, A. (2006). Linking HRM and small business performance: An examination of the impact of HRM intensity on the productivity and financial performance of small businesses. [Review]. *Small Business Economics*, 26(1), 83-101.
- Sels, L., Winne, S., Delmotte, J., Maes, J., Faems, D., & Forrier, A. (2006). Linking HRM and Small Business Performance: An Examination of the Impact of HRM Intensity on the Productivity and Financial Performance of Small Businesses. *Small Business Economics*, 26(1), 83-101.
- Tidd, J., & Bessant, J. (2009). *Managing innovation*. West Sussex: John Wiley & Sons Ltd.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. [Article]. *Academy of Management Journal*, 44(5), 996-1004. doi: 10.2307/3069443
- Van Riemsdijk, M., & De Leede, J. (2001). Flexible Labour Strategy in the Dutch Automotive Industry. *Creativity and Innovation Management*, 10(4), 243-250.
- Wang, C. L., & Ahmed, P. K. (2004). The development and validation of the organisational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management*, 7(4), 303-313.
- Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, 9(1), 31-51.
- Way, S. A., Lepak, D. P., Fay, C. H., & Thacker, J. W. (2010). Contingent workers' impact on standard employee withdrawal behaviors: Does what you use them for matter? *Human Resource Management*, 49(1), 109-138.
- Yeo, W., Kim, S., Coh, B. Y., & Kang, J. (2013). A quantitative approach to recommend promising technologies for SME innovation: a case study on knowledge arbitrage from LCD to solar cell. *Scientometrics*, 96(2), 589-604.
- Yuan, F., & Woodman, R. W. (2010). Innovative behavior in the workplace: The role of performance and image outcome expectations. [Article]. *Academy of Management Journal*, 53(2), 323-342.
- Zheng, C., O'Neill, G., & Morrison, M. (2009). Enhancing Chinese SME performance through innovative HR practices. *Personnel Review*, 38(1-2), 175-194.