

HRM, organisational performance and the role of firm size



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Coordinator: Dr. A. van Stel

Co-reader: Drs. P. van der Zwan



Erasmus School of Economics

Department of Entrepreneurship, Governance, Organisation & Strategy

Master Entrepreneurship, Strategy & Organisation Economics

Preface

Labour is often considered as a cost instead of a resource. This negative perspective is due to a lack of insight in the returns a company will receive from labour. Labour will only be accepted as a resource, which has to be maximized, if it can be reflected by indicators of employee performance that are linked to a company's operational and financial performance. Then, HR policy will be aimed at investments in employees in order to create value for an organisation. The high performance work system appears to be such an investment. This study examines how the HPWS will add value in an organisation but, even more important, if it applies for different types of organisations (in terms of firm size).

At last, a few words of appreciation to my coordinator and co-reader:

In het bijzonder ben ik dr. A. van Stel erkentelijk voor zijn inspirerende opmerkingen en onze gesprekken waarin ik mijn gedachten mede heb kunnen vormen en aanscherpen. Drs. P. van der Zwan bedank ik voor zijn bereidwilligheid om als meelezer op te treden.

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1. Introduction

Faems *et al.* (2005) notice that interest in the link between human resource management (HRM) and organisational performance has risen sharply over the past decade. Most research about this topic has been done in large companies. Many authors have therefore referred to the lack of attention given within the HRM literature to small and medium sized enterprises (SME) (Cassell *et al.*, 2002). Although studies about human resource management and organisational performance in SMEs are increasing nowadays, there is still much unclearness in the field of study (Faems *et al.*, 2005).

In general, there is a broad consensus about human resource management having a positive relationship with organisational performance (Wright *et al.*, 2005; Guest, 2001). Yet, few studies have addressed *how* a positive relationship occurs (Guthrie *et al.*, 2004). Some studies only measure human resource management and, subsequently, performance indicators (*e.g.* profit, productivity) in the hope to find a positive relationship. Other research studies try to explain causality by making a distinction between different *levels* of performance. These studies assume that HRM will directly stimulate employee performance, which in turn leads to a positive effect on *higher-levelled* organisational performance and, ultimately, on the *highest level* of organisational performance. Unfortunately, it often remains with examining only a few (and usually the same) variables of outcomes at the different levels in this causal link (*e.g.* *employee productivity, turnover* as employee performance; *firm productivity, quality* as the lower-levelled organisational performance; *profit, other financial performance* as the highest-levelled organisational performance). Moreover, most studies ignore employee behaviour while it is assumed to be the first part of the causal chain between HRM and organisational performance (De Kok & Den Hartog, 2006).

In addition, the underlying theories for the consensus are mostly developed and tested in large companies such that uncertainty exists about the extent to which the theories extend to smaller organisations (Heneman *et al.*, 2000). Little is known about the role of firm size in the relationship between HRM and organisational performance. Also, the relative few empirical studies done (compared to research done in larger companies) will keep the impact of human resource management on organisational performance in smaller enterprises still more questionable (Way, 2002).

It is important to get more understanding about this field of study. The idea of human resource management as stimulus to organisational performance is a legitimate argument to explore how a positive relationship exactly occurs. Furthermore, it is interesting to examine if this relationship will also hold in smaller firms. Several research studies have found a positive relationship between HRM and organisational performance in SMEs (Sels *et al.*, 2006; Faems *et al.*, 2005; Way, 2002). However, almost none investigate a potential difference in impact on organisational performance between larger and smaller companies. The theoretical field can be enhanced by using *firm size* as determining factor in order to find if a stimulating effect of human resource management on organisational performance is equally strong in larger and smaller companies. More insight herein will also help to determine if the underlying theories, which assume a positive relationship, are really suitable for smaller firms in the first place. It can be helpful in giving direction to future HR policies – especially in smaller firms. Smaller organisations are still the *jobs engine* of the economy in The Netherlands (De Kok & Tom, 2007).

The goal of this study is to examine if the effect of HRM on organisational performance is equally strong in smaller and larger companies. This can be summarized in the following problem statement:

Is the impact of human resource management on organisational performance depending on firm size (i.e. is the impact different for smaller compared to larger companies)?

The structure of this thesis is as follows. Based upon different HRM literature and research done in large companies, this study will start with a description on *how* human resource management can stimulate organisational performance. Chapter two will create a theoretical framework wherein a positive relationship between HRM and the *highest level* of organisational performance is narrowly analyzed. The framework reflects causal relationships with intermediate variables (of outcomes) and, ultimately, with financial performance. This study will use several variables to explore the relationship and, moreover, it emphasizes on the importance of employee behaviour therein. Chapter two will also explain what organisational performance actually means. It also discusses what will be the essence of human resource management – especially for this study.

The theoretical framework explains how a positive relationship between HRM and financial performance can occur in *large* companies, based upon theories and research done in those organisations. Chapter three will consider several characteristics that are specific for smaller firms. Those characteristics distinguish smaller from larger companies and they are therefore used to determine what the influence of firm size is on HRM's impact on the intermediate variables (of outcomes) and, ultimately, financial performance in the framework. In this chapter, a review on HRM studies in small and medium sized enterprises will suggest that human resource management can have a positive effect on organisational performance in smaller firms. The focus in chapter three will therefore be on a potential difference in the strength of the HRM effect, due to firm size. Adjustments in the framework will show the firm size effect (from a theoretical point of view) and, moreover, include a hypothesis regarding the problem statement at the same time.

The following research questions are guidelines for building a clear and plausible conclusion on the problem statement. Chapter two will provide answers to the first two research questions; its framework will give an explanation for the third research question. The answer to the fourth research question will be given in chapter three. The research questions are:

- What is organisational performance?
- What is the essence of human resource management?
- How can human resource management stimulate organisational performance?
- What characteristics distinguish smaller firms from larger companies that may influence the relationship between HRM and organisational performance?

Finally, this study adds value by testing hypotheses, derived from the theoretical framework (chapter 2) and adjustments in the theoretical framework (chapter 3), in an empirical research study. In order to find empirical support for the theoretical findings, the hypotheses will be tested in a sample with fifteen companies ranging in firm size from ten to 200 employees. In chapter four the research methodology will be discussed in more detail. This chapter will define the variables of interest that are subject to the empirical research. It also discusses the questionnaires which will be used as measuring instrument (in order to measure the variables of interest). At last, this chapter will discuss how the measuring data is collected. Chapter five will present the results of the empirical study while chapter six concludes.

2. Strategic HRM research

Strategic human resource management has been one of the most rapidly growing areas of research within human resources (Delery & Shaw, 2001). Unfortunately, there is no consensus about to what *strategic* specifically refers. Some authors address to research about the fit between strategies and human resource management systems (Chan *et al.*, 2004; Delery & Doty, 1996). More scholars investigate the effect of intensive HRM on organisational performance in large companies (Guthrie *et al.*, 2004; Hayton, 2003; Ichniowski *et al.*, 1997; Becker & Gerhart, 1996; Huselid, 1995; Arthur, 1994; Wright & McMahan, 1992). Those scholars at least suggest that human resource management can have a stimulating effect on organisational performance.

Based upon different strategic HRM literature and research done in large companies, this chapter will build a framework that explicitly describes how human resource management can stimulate organisational performance. Section 2.3 shows the theoretical framework that will emphasize a causal link between HRM and financial performance. Section 2.2 will discuss the essence of human resource management – especially for this study. First, section 2.1 will explain what organisational performance actually means.

2.1 Organisational performance

The absence of a general theory about *performance* makes it hard to define organisational performance (Guest, 1997). However, organisational performance can be defined by placing it in the context of an organisation. In the first place, organisational performance is an objective dominated by the company (Guest, 1997). The organisation directly controls the indicators of organisational performance. It differs from outcomes, because those can be considered as much broader. Outcomes are different objectives whereby it depends upon the different stakeholders of a company which ones to focus on (Guest, 1997). In brief, the focus is not only on a company-dominated objective then (*e.g.* job satisfaction, environmental issues, and profits). Secondly, organisational performance is based upon measures that reflect the performance of a work unit, business unit and/or firm as exclusive unit (Delery & Shaw, 2001; Becker & Gerhart, 1996). Becker & Gerhart (1996) notice that it is important to recognize the level of analysis when measuring outcomes. Organisational performance is created by (aggregated) measurements at an organisational level (Guthrie *et al.*, 2004).

As mentioned in the introductory chapter, organisational performance is often divided in *lower-* and *higher-levelled* performance. The first is reflected by operational performance. It is considered as performance that will be directly influenced by behavioural outcomes from a company's workforce (Delaney & Huselid, 1996). Moreover, operational performance is supposed to indicate how financial results have been achieved (Fey *et al.*, 2000). Operational indicators (*e.g.* firm productivity, product quality, absenteeism rate) are *mediators* for the higher-levelled financial performance. Guest *et al.* (2003) argue that „financial performance lies at the distant end of the chain”. Although financial measures can appear in several different forms (*e.g.* economic versus accounting values), the three most common financial indicators are profit margins, return on assets and return on equity (Tangen, 2003).

2.2 Human resource management

Briefly, human resource management is about managing the workforce of a company. For all firms, irrespective of their size, hold that human resource management includes activities to select, develop, motivate and retain employees with required characteristics (Compeer *et al.*, 2005; Jackson & Schuler, 1995; Deshpande & Golhar, 1994). These activities are the essence of human resource management and, moreover, considered as the driving force behind the stimulating effect on organisational performance. The activities are better known as *HR practices*.

Two particular issues with relation to HR practices are often discussed in strategic HRM literature (Wright & Boswell, 2002). In the first place, individual practices are assumed to have a limited effect on managing a workforce well. The reason is that some practices can enhance the impact of other practices (and *vice versa*) by a creation of synergy (Wright & Boswell, 2002; Dyer & Reeves, 1995). The *internal fit perspective* encloses the idea of some practices having a complementary status and the ability to reinforce the effectiveness of each other practices (Purcell, 1999). The perspective builds upon a bundle of practices that all fit into, create synergy and thereby manage a workforce even better „than the sum of the parts” (Becker & Gerhart, 1996). Unfortunately, there is still not much understanding about the nature of synergy. Even without it seems better to have more practices, because it means a completion of the concept HRM and more opportunities to manage a workforce well (Delery, 1998).

Obtaining internal fit is often associated with the *best practices approach* (Compeer *et al.*, 2005). The approach emphasizes a set of best practices that are universalistic or, in other words, appropriate and in general leading to value for every firm (Tzafrir, 2006). Best practices are bundled and integrated into one index; some of the integrated sets of best practices are defined as *high performance work systems* (HPWS). Scholars notice implicitly that practices in a high performance work system satisfy the internal fit principle (Faems *et al.*, 2005; Huselid, 1995). However, it is questionable if practices can be defined as best practices or whether, instead, „the efficacy of any practices can only be determined in the context of a particular firm's strategic and environmental contingencies” (Huselid, 1995). The *external fit perspective* implies that particular practices are not always the best practices for every company. This critic on the best practices approach is a common issue in the strategic HRM literature.

Despite of the critic there is a growing adoption of using a high performance work system in HR research. De Kok & Den Hartog (2006) argue that it is because of promising results about the effectiveness of those systems. The scholars recognize increased employees' output that ultimately will give a boost to financial performance. In addition, more researchers argue that the best practices approach and the external fit perspective can stand together (Compeer *et al.*, 2005; Youndt *et al.*, 1996). Both are working on a different level. The scholars see the best practices as a standardized resource to help managing a workforce well. At the same time, every firm can use those practices in a way that is most suitable according to its strategies and/or environmental contingencies. For example, *training* can be considered as an useful practice for every firm to manage (develop) its workforce. However, it is not unlikely that the content of the training will differ for employees working in innovative high-tech or traditional industries.

This study also continues using a high performance work system. The next paragraph will discuss the best practices in the high performance work system from Way (2002). These practices are thought to put a stimulating effect on financial performance into operation.

2.2.1 High performance work system (HPWS)

A high performance work system is a bundle of best practices that are integrated into one index. Unfortunately, there is little consistency in the chosen practices included within high performance work systems used in empirical studies (Gerhart *et al.*, 2000). Based upon an

examination of six exemplary empirical studies (Guthrie, 2001; Becker *et al.*, 1997; Ichniowski *et al.*, 1997; Huselid, 1995; MacDuffie, 1995; Arthur, 1994), Way (2002) has selected seven practices for a high performance work system. The scholar's practices are similar or, at least, categorized identical to the HR practices in those six highly-respected studies. More researchers have decided to use practices based upon one of those six studies (Guthrie *et al.*, 2004; Chan *et al.*, 2004). Other studies demonstrate practices that fit those of Way (2002) (*e.g.* Batt, 2002; Koch & McGrath, 1996). Using Way's (2002) high performance work system is interesting, because it can (partially) overcome the problem of inconsistency. Moreover, previous research has already indicated the practices as theoretically appropriate to select, develop, motivate and retain a workforce.

The first practice in the HPWS is the *extensiveness of staffing* what is referred to „the extent that a firm's staffing process uses information gathered from several selection devices (*e.g.* interviews, tests, work samples) to evaluate job candidates” (Way, 2002). Koch & McGrath (1996) also recognize selection mechanisms – like selection and screening tests – as ways of getting information about the appropriateness of job candidates.

The next practices are based upon employee compensation (Way, 2002). *Group-based performance pay* is expected to align desired goals of employees with those of the firm (*e.g.* to retain employees). Youndt *et al.* (1996) also have group performance pay as a practice in their human capital enhancing HR system that is linked to firm performance. The second practice in the high performance work system is *pay level* and, especially, the relative pay level (compared to the average pay level in the industry of the company) is focused on.

Cappelli & Neumark (2001) have *job rotation* as an aspect of HPWS in their research study. Job rotation implies that employees develop by rotating across jobs or tasks within teams, production processes and/or the complete organisation (Ichniowski *et al.*, 1997; MacDuffie, 1995). Way (2002) is also utilizing job rotation in his high performance work system.

The fifth practice in HPWS is *self-directed teams*. Development is the essence of employees who are highly participating in teams and team programs without a direct supervisory (Arthur, 1994). Batt (2002) also has self-directed teams as an aspect of her system index.

Again, development is considered as important in training employees. Way (2002) has added *formal training* to his high performance work system. Batt (2002) applies training as practice but the scholar distinguishes between formal training and on-the-job training. Although both represent a process by which employees acquire knowledge and skills related to their work requirements, the difference is how the acquisition of knowledge and skills takes place: during the job, or during an external, in-house training (Westhead & Storey, 1996).

The last practice included in Way's (2002) HPWS is *involvement in meetings discussing work-related issues*. A formal process wherein employees can share their opinions and views about work-related issues can motivate them in their jobs (Way, 2002; Cappelli & Neumark, 2001).

2.3 Theoretical framework

This section will develop a theoretical framework that explicitly describes how a positive relationship between HRM and the *highest-level* of organisational performance can occur. Financial performance is thought to be stimulated not directly by human resource management but, rather, through some causal relationships with intermediate variables of outcomes. It results in the following causal link:

HPWS → *employees' characteristics* → *behavioural outcomes* → *operational performance*
→ *financial performance*

The next paragraphs will give more insight in this causal link, starting in paragraph 2.3.1 with the relationship between the high performance work system and employees' characteristics.

2.3.1 Employees' characteristics

The *resource-based view* (Barney, 1991) is often used as the underlying argument for a positive relationship between the HPWS and financial performance. In brief, the view emphasizes that human resources can become a sustained competitive advantage what ultimately will result in a boost to the financial performance of a company (Way, 2002; Huselid, 1995). The high performance work system can create employees that will have the required characteristics to satisfy the conditions of the resource-based view in order to become a sustained competitive advantage. These conditions include four aspects. In the first place, employees add value to the effectiveness and/or efficacy in the production processes.

Secondly, the employees are *rare* compared to them from rival companies. In addition, the workers are not perfectly *imitable* by competitors. At last, the employees can not be replaced by substituted resources that also add value but then are either not rare or imitable. Two conditions will always be satisfied, considering that employees are anyhow hard and very costly to imitate because of their complex social structure (Becker & Gerhart, 1996), and that employees are not easy to substitute in a world with a continuing shift toward service industries (Huselid, 1995).

However, employees still need to have the required characteristics to satisfy the other two conditions. These characteristics include knowledge, skills, abilities and experience on one hand (Compeer *et al.*, 2005; Delery & Shaw, 2001). Those have been derived from Becker's (1964) *human capital theory*. By definition, employees are rare if their skills, knowledge *etc.* are of a high level (Wright & McMahan, 1992). Moreover, they have to differ in their skills, knowledge *etc.* (heterogeneous supply of labour) to become valuable for a company (Wright & McMahan, 1992). Thereby, the company is responsible for providing jobs that require different characteristics of employees (heterogeneous demand of labour). The practice *extensiveness of staffing* gathers information about the job applicants in terms of their skills, abilities *etc.* The information gathered will lead to less uncertainty about the capabilities of the job candidates (Koch & McGrath, 1996). It is used to manipulate the supply of future workers by choosing only employees who have a high level of characteristics and differ in them. A high (relative) *pay level* can achieve the same effect. Youndt & Snell (2001) found in competitive pay an important factor to distinguish between high levels of human capital. A competitive pay can also attract a larger applicant pool and, consequently, gives a firm the opportunity to find employees with different characteristics (Way, 2002). *Job rotation* will develop employees' skills, and broaden their knowledge and experience. It increases learning a variety of specific skills and employee understanding of other aspects of a firm's operations (Cappelli & Neumark, 2001). Job rotation can result in employees having a high level of characteristics, which they can align to the different needs of a company. Moreover, job rotation provides the context wherein employees with different characteristics can fulfil the different needs of the company. Participation in *self-directed teams* provides opportunities for continuous learning (Batt, 2002). Employees will feel more responsible, and also have to take the responsibility. It creates an environment wherein workers can grow to employees with high-levelled characteristics in order to meet their responsibility. *Formal training* will give employees the opportunity to acquire new knowledge and skills, which in turn they can use in

their working environment. The provision of training can create employees with high levels of characteristics. Those characteristics can also differ per employee by providing other training to different employees.

On the one hand, a workforce needs to have many high-quality and different skills, abilities, knowledge and experience to become a sustained competitive advantage for firms. The high performance work system can select and develop such a workforce. On the other hand, those employees also need other characteristics to become valuable for a company. Compeer *et al.* (2005) notice that an important aspect of running a successful organisation is to find, motivate and retain the right employees. The employees should be motivated to apply their many high-quality and different skills, abilities, knowledge and experience (MacDuffie, 1995). In addition, those employees should also have the motivation to stay with a company. *Group-based performance pay* is expected to align desired goals of employees to those of the firm (Way, 2002). It can have a stimulating effect on employee interaction and information sharing (Youndt *et al.*, 1996). Giving employees the opportunity to use their abilities and to make decisions in doing their jobs is another way to motivate those (Delery & Shaw, 2001). *Self-directed teams* will offer this opportunity. *Involvement in meetings discussing work-related issues* will motivate because of the opportunity to participate in deciding how to do the work tasks. Finally, the high performance work system can motivate employees to stay, due to the working conditions that the practices cause (empowerment, compensation and development opportunities).

2.3.2 Behavioural outcomes

The sustained competitive advantage is created by the idea that employees with the required characteristics (to satisfy the conditions of the advantage) can behave in a way that several preferred behavioural outcomes arise. Moreover, those employees are willing to behave in that particular way. In the first place, they are responsible for behaviour that ultimately solves problems. The employees have (multi-)skills, knowledge and experience which are required to identify problems, to generate possible solutions and, finally, to encounter the problems and solve them quickly (Coleman, 2006; Atuahene-Gima, 2003; MacDuffie, 1995).

Secondly, Clark *et al.* (2002) notice individual learning as an increase in the individual level of knowledge, skill or ability. Employees with the required characteristics have a noteworthy standard of individual learning. The scholars recognize individual learning as an important

component in the aggregation of knowledge to get an organisational learning climate. After all, the individuals will make up the collective (Clark *et al.*, 2002). However, individual learning is just the beginning of an organisational learning climate. Shipton *et al.* (2005) suggest that organisational learning is built upon the creation (*i.e.* individual learning), transfer and implementation of knowledge. The transfer of knowledge will occur when employees behave in a way that there is a shared understanding between them and work groups by using dialogues. Companies that provide the high performance work system do not only have employees with a high standard of individual learning, but also employees who are willing to apply their knowledge *etc.* They will behave in a way that their knowledge is shared – or transferred.

Furthermore, the working conditions (empowerment, compensation and development opportunities) will motivate the workforce to stay with an organisation. Employees tend to carry out commitment to their company. The psychological contract emphasizes this principle on the basis of an agreement between employer and employee. The agreement contains reciprocal obligations or commitments to certain behaviour and actions or, at least, mutual expectations (Schein, 1978).

Finally, satisfied behaviour is also due to the working conditions that have been provided by the high performance work system. Participation, for example, will result in job satisfaction among the involved employees (Cohen & Bailey, 1997). Halsted *et al.* (2000) define job satisfaction as „the state of mind that results from an individual’s needs or values being met by the job and its environment”. It is mainly through this job satisfaction that employees are willing to put a high level of effort in their work (Huselid, 1995).

2.3.3 Operational performance

The behavioural outcomes will stimulate organisational performance. Rather than directly stimulating financial performance, these outcomes will first stimulate intermediate operational performance indicators (Guthrie *et al.*, 2004; Delery & Shaw, 2001; Delaney & Huselid, 1996). Solving problems will help insure quality in the operations of a company (MacDuffie, 1995). The workforce is always able to identify problems in a firm’s operations, and to analyze their root causes. Subsequently, it can generate possible solutions, and solve the problems quickly. Quality in a firm’s operations will lead to a good quality of the finishing

goods of those operations. A firm's products will satisfy customers' quality and performance requirements (*i.e.* good product quality) (Atuahene-Gima, 2003).

Furthermore, the transfer of knowledge makes an organisational learning climate in a company possible. Shipton *et al.* (2005) have noticed that a supportive learning climate is good for organisational innovation. It is based upon the idea that innovation includes knowledge-intensive processes (Kanter, 1985). As mentioned before, organisational learning is based upon the creation, transfer and implementation of knowledge. It provides expertise to a workforce in order to recognize new opportunities in a company. A lack of this expertise in the first stadium of the innovation process is the reason for most innovation failures (Böhringer, 2004). Creativity is also an important aspect for innovation, but a factor to enhance creativity is again knowledge (Baer *et al.*, 2003; Amabile *et al.*, 1996).

Thirdly, Cotton & Tuttle (1986) conclude in their study that either commitment as well as satisfaction is an important factor to obtain low voluntary turnover rates in organisations. To reduce the turnover rate, an organisation should reduce employees' intentions to leave the firm or increase their commitment and satisfaction (McEvoy & Cascio, 1985). Satisfaction among employees is also resulting in low sickness absence rates in firms. Absenteeism is a classic indicator of satisfaction (Liouville & Bayad, 1998). Employees have less incentive to neglect their work duty if they are feeling right with their job.

The most common operational performance measure is probably firm productivity. Many authors in strategic HRM research have mentioned or used firm productivity (Tzafirir, 2006; Guthrie, 2001; Guest, 1999; Ichniowski *et al.*, 1997; Huselid, 1995; MacDuffie, 1995; Arthurs, 1994). In general, productivity is defined as the relation of output to input (*i.e.* used resources) (Tangen, 2003). A workforce with a high level of effort will produce a high level of output, given the same input. It will result in a high level of productivity *ceteris paribus*.

Finally, the aforementioned operational performance indicators can also stimulate firm productivity. Quality in a firm's operations will result in no waste of time and effort, because there is no need to re-do things (Tangen, 2003). A minimum of input resources (*e.g.* labour) is used to get a certain level of output. Additionally, good product quality can enhance the level of output. Innovation can create the same stimulating effect on productivity. Mumford (2000) notices that innovation accomplishes effectiveness and/or efficacy in a company. The first

will cause an increase in the level of output while the latter will result in a minimum of input resources. Instead, a high voluntary turnover rate will have a negative effect on productivity. Turnover means the loss of firm-specific human capital and lessens the productive capability of the workforce (Guthrie *et al.*, 2004). A high sickness absence rate will reduce the productive capacity of a company (Pransky *et al.*, 2006). Briefly, productivity will be hindered by high rates of voluntary turnover and sickness absence (Liouville & Bayad, 1998).

2.3.4 Financial performance

Becker *et al.* (1997) have mentioned that a HRM system will produce employee behaviours that focus on key business priorities, which in turn drive profits and ultimately market value. The high performance work system can create employees who are a sustained competitive advantage. Many scholars see it as a potential source of profitability that firms can capitalize (Chan *et al.*, 2004; Guthrie *et al.*, 2004; Guest *et al.*, 2003; Liouville & Bayad, 1998; Delaney & Huselid, 1996; Dyer & Reeves, 1995; Huselid, 1995).

Productivity is considered as the main direct driver behind the profits of a company. Some scholars argue that it is hard to find a direct relationship between innovation and profit ratio's (Oke *et al.*, 2007; Griffin, 1997). However, innovation can stimulate firm sales (Oke *et al.*, 2007). It might be an intermediate relationship between innovation and profitability. A similar discussion can be recognized for product quality. It is not unlikely to suggest that the sales of a firm will increase if its products satisfy customers' requirements. Other researchers notice that voluntary turnover indeed has a direct effect on firm profits (*e.g.* by replacement costs) but, however, that its main effect is via firm productivity (Batt, 2002; Huselid, 1995). At last, Pransky *et al.* (2006) suggest that the substantial cost of a high sickness absence rate is due to the loss in productivity.

An increased attention for the high performance work system may have its direct effect on the profits of a company (Fey *et al.*, 2000). Higher average wages and training expenditures, for example, are negatively associated with firm profitability. Yet, Guthrie *et al.* (2004) mention that a HR system and the existing human capital might enhance the market value of a company. As intangible assets, they perhaps increase the premium capital markets are willing to pay for a given portfolio of assets.

2.3.5 Theoretical framework

Figure 1 briefly summarizes the theoretical framework that is describing how a positive relationship between HRM and the *highest level* of organisational performance can occur. It shows the intermediate causal relationships with several variables of outcomes, as well as a direct relationship between the high performance work system and profitability (due to the costs of a HPWS). The signs describe if the variables are positively or negatively related to each other.

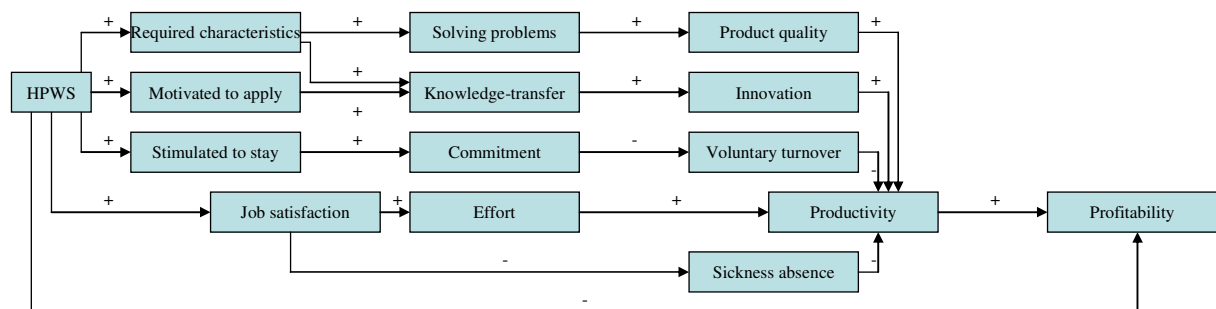


Figure 1: A framework describing how a positive relationship between HRM and organisational performance can occur.

3. The role of firm size

A lack of attention given within the HRM literature to small and medium sized enterprises makes that it is still questionable if a positive relationship between HRM and organisational performance can also occur in those organisations. Fortunately, HR studies that will focus on SMEs are increasing nowadays. Section 3.1 will discuss a literature review done on HRM studies in small and medium sized enterprises. This literature review suggests that a positive relationship indeed can occur in smaller firms (section 3.2). Finally, section 3.3 will determine several characteristics that are specific for smaller organisations and, moreover, it will describe what the influence of those characteristics (*i.e.* firm size effect) is on HRM's assumed positive effect on financial performance and the intermediate variables of outcomes in the theoretical framework from chapter two.

3.1 Literature review

Sels *et al.* (2006) examine the effect of intensive human resource management on organisational performance in a sample of small firms with ten up to 100 employees. The scholars conclude that HRM intensity is stimulating firm profit. King-Kauanui *et al.* (2006) find a significant positive effect on an index of organisational performance measures in a sample of 200 Vietnamese small and medium sized enterprises. The effect is caused by a set of HR domains, namely training, performance appraisal systems and incentive compensation. These findings indicate that there is a positive relationship between human resource management and organisational performance in smaller firms. The researchers do not focus on a difference in impact due to firm size. Sels *et al.* (2006) only investigate small businesses and, thus, control for firm size. King-Kauanui *et al.* (2006), however, refuse to take the opportunity to use firm size as determining factor in their sample of small and medium sized enterprises.

Devins & Johnson (2003) do research in the relationship between a formal training and development supportive program, called ESF O4, and the extent of activities in training and development in SMEs. The authors suggest that the program gives especially to small businesses the opportunity to expand training and development activities. Not doing training in the absence of ESF O4 decreases significantly with firm size, although most small firms participating in the program already seem to have commitment to formal training and development activities. Moreover, the scholars also recognize that the short-term effect of

ESF O4 on a range of business performance measures is fairly modest. The greatest perceived impact is on the small companies. Devins & Johnson (2003) notice, as a general rule, that the *hard* measures (*i.e.* financial and market performance) are perceived to be less impacted by the program than the *soft* measures are (*e.g.* confidence in the future, competitiveness, staff retention).

Unfortunately, the research does not provide an accurate description about how human resource practices can have a positive effect on organisational performance in the first place. In a sample of 4,637 small businesses Muse *et al.* (2005) investigate the effect of compensation, as reflection of organisational commitment to employees (OCE), on five performance measures: return on sales, return on assets, return on cash-flow, employee growth and employee productivity. Compensation is reflected by average salary, a healthcare program and a pension plan. The scholars find significant positive relationships between OCE and all five performance measures. The results mention little about how these relationships came to an achievement. It is not unlikely to suggest that these performance measures are mutual related, with *lower-levelled* predictors for *higher-levelled* performance measures. For example, employee productivity could be positively related to a higher-levelled financial performance measure (*e.g.* return on sales).

Sels *et al.* (2006) use productivity as important *mediator* between human resource management and financial performance in their research study. The findings show that intensive HRM enhances productivity (*i.e.* decreases the share of personnel costs in the value added *c.p.*) and, through that, has a positive effect on profitability, solvency and liquidity. Still, the total impact of intensive HRM on solvency and liquidity is nil because at the same time human resource management is causing higher personnel costs (thus increasing the share of personnel costs in the value added). The total impact on profitability remains positive and strong. A possible explanation is that other, intermediate and non-measured (operational) performance indicators are having a positive effect on profitability.

The performance index in King-Kauanui's *et al.* (2006) study contains financial performance measures (*e.g.* return on assets, operating profit) but also operational measures like productivity, innovation (new product development) and quality (product quality). It is not clear what measures are most responsible for the positive effect of the HR practices on the performance index figure. Neither can be concluded that, within the index, certain operational

performances are positive related to the *higher-levelled* financial performance indicators. But, a positive total effect can suggest positive relationships between the operational and financial performance measures.

3.2 Discussion

The findings in the literature review do suggest that human resource management can stimulate organisational performance in smaller firms too. The results, except for Sels *et al.* (2006), are from samples with small and medium sized enterprises. Unfortunately, the scholars have not examined the effect of firm size on these findings. It could be that the findings apply only for the small firms, or for the medium sized companies.

Secondly, there is again little attention for questioning *how* human resource management can stimulate organisational performance. The researchers assume that a positive relationship will exist, but they are not exploring the causal link between HRM and organisational performance in terms of variables at different levels. Sels *et al.* (2006) have done making the causal link more explicit. Their descriptive framework is highly based upon strategic HRM research done in large companies.

3.3 Firm size effect on framework

This section will consider characteristics of smaller firms that distinguish them from larger companies. These characteristics are used to determine the influence of firm size on the framework that has been developed in section 2.3. The framework describes the following causal relationship between HRM and the *highest level* of organisational performance in detail:

HPWS → *employees' characteristics* → *behavioural outcomes* → *operational performance*
→ *financial performance*

The descriptive framework is based upon literature and research, developed (for) and tested in large organisations. Additionally, the strength of causality has almost never been examined in the context of small against large companies or, even, small versus medium sized enterprises. In this section, the influence of firm size on the impact of the high performance work system on the intermediate variables (*i.e.* employees' characteristics, behavioural outcomes, operational performance) and, subsequently, financial performance will be examined. The

findings provide a theoretical conclusion on the problem statement. Paragraph 3.3.1 starts with describing the availability of a HRM system in smaller firms.

3.3.1 HR practices in smaller firms

A traditional view on smaller businesses is that they are much like large companies, except they have smaller sales, fewer employees and smaller assets (Cassell *et al.*, 2002). The view probably underlies the narrowest definition of the European Commission for SMEs. The European institute classifies micro, small and medium sized enterprises by a turnover less than respectively two, ten and fifty million euros (or by a balance sheet total less than respectively two, ten and forty-three million euros)¹. Moreover, the companies are supposed to have less than respectively ten, fifty and 250 employees². Although narrowly defined, the criteria could influence the strength of the positive effect of the high performance work system.

It is possible that fewer employees and lesser financial means bring the development and implementation of the high performance work system in smaller firms into danger (De Kok & Den Hartog, 2006; Kotey & Slade, 2005). A smaller workforce probably indicates that employees are more quickly one of the *key workers* of an organisation (*i.e.* important in the operations of an organisation). It could become a problem if practices claim valuable time and resources of those employees (like formal training). Furthermore, limited financial resources can result in a low priority for smaller firms to develop and implement the high performance work system. Investing in the high performance work system will often bring the need to extract additional funding. Smaller firms do not have the advantages of scale which make that they have lesser resources to cover the development costs (Nooteboom, 1993). A lack of benefits from economies of scale makes it harder for them to return the fixed costs of the high performance work system. It increases their (relative) costs to develop and implement the HR practices even more.

However, growing evidence shows that HR practices are not significantly different in smaller and larger companies (Sels *et al.*, 2006; Drummond & Stone, 2007; Golhar & Desphande, 1997). De Kok & Den Hartog (2006) also confirm that „it seems intuitively likely that HRM

¹ http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm

² http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm

will also matter in small firms...”. This study therefore assumes that the presence of a high performance work system will not significantly differ between larger and smaller companies.

3.3.2 *Employees’ characteristics in smaller firms*

The high performance work system can create employees with characteristics that will satisfy the conditions of a sustained competitive advantage. It can select and develop a workforce with a high level and variety of knowledge, skills, abilities and experience. The HPWS can also motivate this workforce to apply their skills *etc.* and, moreover, to stay with the company. It is due to the practices in the high performance work system. De Kok & Den Hartog (2006) notice however that the quality of implemented HR practices may increase with firm size.

In the first place, the resources of smaller firms remain scarcer. Limited resources could be a constraint resulting in a non-optimal usage of the practices in smaller organisations. A lack of sufficient financial resources may result in not offering the *formal training* that is most appropriate for the employees but also more expensive. A lack of sufficient labor force and/or time might cause that the *staffing* process is not executed accurately. Perhaps, not all selection devices are done by the applicants or only a few representatives of the company have been involved in the process. The information gathered about the job candidates is therefore limited and too subjective.

Secondly, smaller enterprises are characterized as more informal and operating in a flexible manner. It corresponds with the need to manage a workforce more systematically and efficient when the number of employees increases (De Kok & Uhlaner, 2001). Jobs in smaller firms usually contain more varied work roles and thereby are less narrowly defined, *i.e.* not defined independent of the person performing the job (Carroll *et al.*, 1999; Bacon *et al.*, 1996). *Job rotation* is maybe a less effective practice in a work environment with no well-defined jobs (De Kok & Den Hartog, 2006). It is hard to learn job specific skills and to get understanding of an organisation if jobs are not clearly defined. Furthermore, a more informal environment probably means that smaller firms often lack specialists familiar with formal HR practices (Heneman & Berkley, 1999). These HRM specialists can insure a qualitative usage of the high performance work system.

Another characteristic of smaller companies is that they usually do not have a middle-management. A larger workforce will enhance the span of control and that results in the employment of middle managers to take up the responsibility for daily operations and to supervise operational staff (Kotey & Slade, 2005). In smaller firms, however, there often is an owner-manager that has direct control on all activities in the organisation. Human resource management also remains the domain of the owner-manager. It is questionable if this situation is good for the quality of the high performance work system. Gatewood & Feild (1987) suggest that an owner's attitude towards HRM is not always stimulating the effectiveness of the practices. The (visible) presence of authority could undermine the practices *self-directed teams* and *involvement in meetings discussing work-related issues*. The effectiveness of these practices is highly depending upon the opportunity that involved workers get to share their opinions and to work without direct control. *Staffing* could also be undermined by a direct presence of the owner-manager. His personal judgement is usually playing a large role in the selection procedures (Kotey, 1999; Golhar & Deshpande, 1997). Job candidates are thought to be more often selected on competencies referred to beliefs and values rather than on knowledge, skills and abilities (Heneman *et al.*, 2000). It is even argued that good potential employees are not selected because they pose a threat to the valued independence of the owner-manager (Kotey & Sheridan, 2004).

At last, Cassell *et al.* (2002) refer to the importance of giving due attention to the external market of small and medium sized enterprises. In contrast with large companies, smaller firms are normally not characterized by a high exposure. Large companies are easier to recognize in the market than their smaller counterparts. Others draw attention to large enterprises more quickly because of their strong pull factors (tempting signals from larger and/or older firms). These pull factors can make that the high performance work system is less effective in smaller firms to retain employees (Sels *et al.*, 2006). For example, a high (relative) *pay level* in smaller businesses is probably hard to recognize for applicants because of the low exposure those firms face in a market with many competitors.

Aforementioned suggest that the high performance work system is less effective in smaller firms to select, develop, motivate and retain employees with the required characteristics. If so, the level of the preferred behavioural outcomes is also expected to be lower in smaller firms than in larger companies. It will be discussed in the next paragraph.

3.3.3 Behavioural outcomes in smaller firms

Due to a non-optimal use, it is indeed expected that the high performance work system in smaller firms has a less positive impact on the employees behaving in a way that will result in solving problems, knowledge-transfer, job satisfaction and a high level of effort. The level of these behavioural outcomes will consequently be lower than in larger companies. First, workers in smaller firms have lower-levelled characteristics (multi-skills, knowledge, and experience) to display the behaviour that will result in the same extent of problem-solving as in large companies. The employees feel more difficulties with identifying problems, finding solutions and solving the problems quickly than their colleagues in larger enterprises.

Secondly, the high performance work system will not only create a workforce with much knowledge, but it also motivates the employees to apply their knowledge in their working environment. This share of knowledge among employees is an important aspect in achieving an organisational learning climate. A less effective high performance work system, however, will result in less knowledge and knowledge-transferring in smaller firms. It makes that the organisational learning climate will not be as in larger companies.

Furthermore, the working conditions (empowerment, development and compensation opportunities) in smaller firms will not be exposed as well as in larger companies. The practices in the HPWS are less effective in their different purposes due to several elements that characterize smaller firms (*e.g.* presence of direct authority, informal structure). Employees in smaller firms can be less satisfied with their jobs and, consequently, will display less effort than their colleagues in larger companies.

A minor exposure should also affect the psychological contract principle. Employees do not value the mutual agreement with employers as high as when completely satisfied with the working conditions. It implies that workers' commitment to the organisation is less strong in smaller firms. However, it is argued that the psychological contract tends to be stronger in those companies (De Kok & Den Hartog, 2006). This indicates that there will be more commitment in smaller firms. A possible explanation lies in the typical labour-intensive character of smaller organisation (Miller, 1987). That can cause close relationships (with colleagues and/or the employer) in the working environment which may result in more commitment to the organisation. It seems that there are two different types of commitment here. Literature studies also recognize two dominating views of commitment. The first is

attitudinal commitment, considering commitment as a strong affiliation with the organisation (Chong & Eggleton, 2007; Porter *et al.*, 1974). Individuals identify with the enterprise and are motivated to pursue organisational interests without personal gain. The typical labour-intensive character of smaller firms will cause this type of commitment. The second view of commitment is *behavioural commitment*. This view notices commitment as consistent human behaviour caused by extraneous interests occurring with a consistent line of activity (Becker, 1960). In brief, an individual is bound to the organisation because that is in his or her self-interest (*e.g.* good working conditions). A mutual agreement based upon working conditions will cause this type of commitment. More commitment in smaller firms does suggest that attitudinal commitment is winning from behavioural commitment (because behavioural commitment will be higher in larger companies, then resulting in more overall commitment in those organisations compared to smaller firms).

3.3.4 Operational performance in smaller firms

Despite of a less effective high performance work system in smaller firms, its impact on the operational performance indicators is maybe even stronger than in larger companies. In general, smaller organisations are typified by a labour-intensive character (King-Kauanui *et al.*, 2006; Miller, 1987). Some scholars argue that employees in labour-intensive enterprises have a greater ability to significantly impact an organisation (Gatewood & Feild, 1987; Solomon, 1984). There are namely fewer restrictions caused by other resources than human capital (*e.g.* quality standards of equipment). Given the high performance work system, it suggests that a smaller firm's workforce – even with inferior behaviour to solve problems – can guarantee a better product quality than the workforce in larger companies. The behaviour of employees in smaller firms will simply impact the organisation more than the higher-scaled behaviour of employees in larger companies. However, smaller firms' labour-intense character does not change the idea that a workforce with less job satisfaction and, therefore, a lower level of effort will result in a higher sickness absence rate and a lower productivity.

As mentioned before, smaller firms are characterized by fewer employees in their workforce. This aspect can be advantageous in building innovation. De Kok & Den Hartog (2006) expect a stronger interaction effect between the high performance work system and innovation where a larger share of the total workforce is involved in innovative activities. A possible explanation is that more involved in the innovation process could make it easier to satisfy important conditions of the process: knowledge creation (expertise), knowledge-sharing,

commitment among the involved ones (to build coalitions in times of uncertainty about the benefits of the innovation) and support from policy-makers (Böhringer, 2004). Every individual involved in innovative activities in smaller firms will be a larger share of the total workforce than every involved individual in larger companies. It suggests that a higher level of innovation will occur in smaller firms than in larger companies – even with a high performance work system that is less effective in creating a high knowledge-level and more transfer of knowledge.

Despite of less job satisfaction and behavioural commitment among employees in smaller firms, it is still expected that the voluntary turnover rate in these organisations is lower than in larger companies. It is suggested that the psychological contract is stronger in smaller firms. Employees in smaller firms will stay longer with the organisation than their colleagues in larger enterprises. The assumption is that this effect is due to a higher level of attitudinal commitment in smaller firms, thereby implying that attitudinal commitment is having more impact on the voluntary turnover rate than behavioural commitment (and job satisfaction).

3.3.5 Financial performance in smaller firms

De Kok & Den Hartog (2006) have already noticed that investments in HPWS will be more profitable in case of larger firms. In the first place, scarcer financial resources and a lack of scale will probably make that the costs of developing and implementing a high performance work system are (relatively) higher in smaller firms (Sels *et al.*, 2006). It directly depresses the profits of smaller enterprises. Besides, it is expected that firm profits are also from the revenues side more stimulated in larger companies. The main driver behind the profits, *productivity*, will namely have a lower level in smaller businesses. And although an impulse in product quality and innovative activities could perhaps drive smaller firms' profits (through higher sales), it is doubtful if that is sufficient to rise above the created profitability in larger companies. It is namely questionable if sales can increase significantly in smaller firms. Many scholars have argued that smaller organisations pursue growth (*i.e.* sales growth), but constantly have to focus on survival opportunities (Heneman *et al.*, 2000; Binks & Ennew, 1996; Brock & Evans, 1989). These organisations are more likely confronted with restrictions as, for example, limited capacity or access to investment money. Sels *et al.* (2006) notice that not every small business therefore the ambition or desire has to grow.

3.3.6 Adjusted theoretical framework

Figure 2 briefly summarizes the influence of firm size on the theoretical framework developed in chapter two. It shows the influence of smaller firm characteristics on the impact that the high performance work system has on the intermediate variables and, subsequently, the financial performance in the causal link between HRM and organisational performance. In figure 2, the influence of firm size is reflected by the coloured frames – a green frame means a *higher level* of the concerning variable while a red frame means a *lower level*. Notice that the signs in this figure are the same as in figure 1. Moreover, commitment has been divided now in two types of commitment: behavioural and attitudinal commitment.

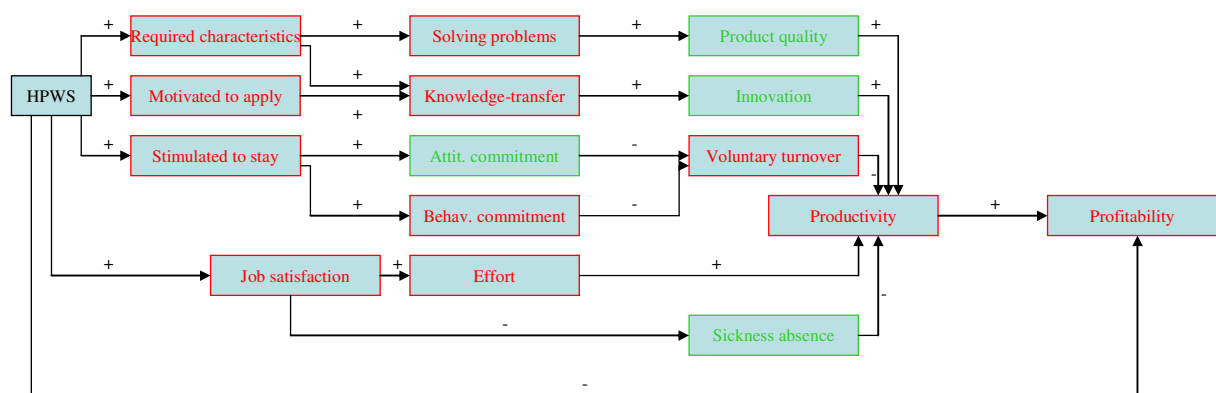


Figure 2: An adjusted framework describing how a positive relationship between HRM and organisational performance can occur. The adjustments are caused by the determining factor *firm size*. A red frame means a *lower level* in smaller firms (than in larger companies) of the variable in that particular frame. A green frame means a *higher level* in smaller firms (than in larger companies) of the variable in that particular frame.

4. Research methodology

From the adjusted theoretical framework it appeared to be that, given a presence of the high performance work system, the levels of problem-solving, knowledge-transfer, behavioural commitment, job satisfaction and effort in smaller firms keep behind the levels of those behavioural outcomes in larger companies. That is due to a stronger (*i.e.* more effective) stimulating effect of the high performance work system in larger enterprises. Consequently, the sickness absence rate and productivity are respectively lower and higher in larger organisations. Despite of all, however, the impact on product quality and innovation is larger in smaller firms. It results in a higher level of product quality and innovative activities in smaller businesses – moreover, in a lower voluntary turnover rate than in larger companies (due to more attitudinal commitment). But ultimately, the profits will be more driven in larger companies than in smaller firms in the presence of the high performance work system. Figure 3 summarizes these theoretical findings in a research framework.

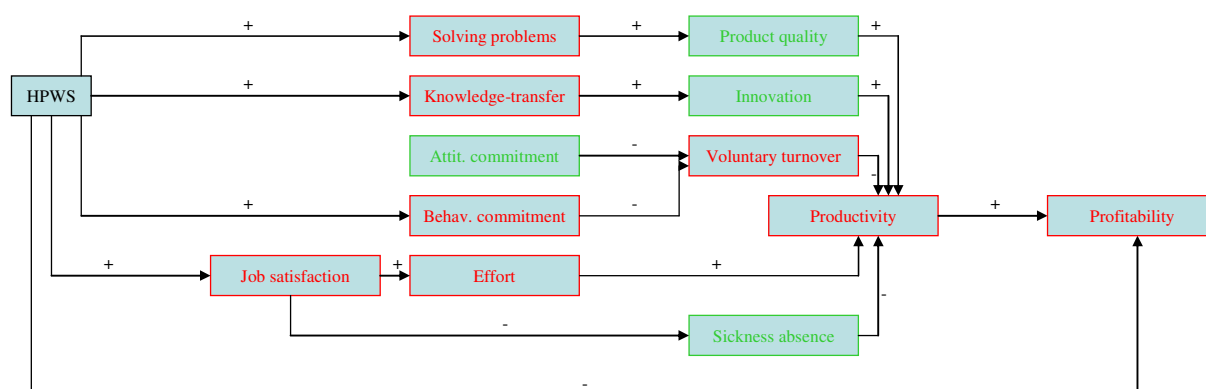


Figure 3: The research framework. A red frame means a *lower level* in smaller firms (than in larger companies) of the variable in that particular frame. A green frame means a *higher level* in smaller firms (than in larger companies) of the variable in that particular frame.

The theoretical findings in the research framework will lead in this chapter to hypotheses that will be tested empirically. Subsequently, the methods of the empirical research will be discussed in this chapter.

4.1 Preliminary remarks

First, it is striking that the intermediate relationships which involve the employee characteristics have been kept out of the research framework. The reason is that high-quality measures (in terms of *reliability* and *validity*) are hard to find for these characteristics, because they are not narrowly defined in this study. It is namely thought that the content of

knowledge, skill, ability and experience can differ among firms without losing their ability to stimulate the preferred behavioural outcomes.

Secondly, the research framework reflects the descriptive purpose of this study. It describes a positive relationship between a high performance work system and organisational performance in more detail. In addition, it also shows the influence of firm size on this causal link. The variables in the research framework are subject to the empirical research in order to test empirical support for a positive relationship and the firm size effect. Moreover, several questions, which answers indicate if the characteristics of smaller firms are indeed only present in smaller organisations, are also processed into three questionnaires that will be completed by the participants of this research. That is done in order to have the opportunity to assess if a potential less strong HPWS impact perhaps is associated with these characteristics (and thus with firm size).

At last, quantitative data will be used to measure the variables in the research framework. Quantitative data is in essence numerical data, and therefore easier to aggregate, compare or summarize than non-numerical (*i.e.* qualitative) data (Babbie, 2000). The research framework emphasizes that a comparison in the variables between smaller and larger companies has to be made in order to test a potential influence of firm size. Qualitative data (*i.e.* answers on these questions related to the proposed characteristics of smaller firms) will be used to interpret the quantitative information from the questionnaires.

4.2 Hypotheses

The research framework has given the context wherein the empirical study is moving. Next, specific hypotheses are drafted which, to support the research goal, will be tested on reliance in the empirical research. The research goal is to examine if the effect of human resource management on organisational performance is equally strong in smaller and larger companies.

4.2.1 Hypothesis 1

The theoretical findings have accepted that the high performance work system can stimulate organisational performance through several intermediate relationships – in both smaller and larger companies. Hypothesis 1 summarizes that.

Hypothesis 1

There is a positive relationship between the presence of the HPWS on the one hand, and preferred behavioural outcomes, operational performances (however: a negative relationship with the sickness absence rate and voluntary turnover rate), and financial performance on the other hand.

An important way in empirical research to examine causality is the principle of comparison. It is possible to distinguish in *degrees* of HPWS presence, based upon the extent that all seven practices are present in a company. It is not unlikely to suggest that a higher (lower) degree of HPWS presence will result in a higher (lower) level of the variables in the research framework (the reverse for the sickness absence and voluntary turnover rates).

4.2.2 Hypothesis 2

The research framework recognizes more attitudinal commitment in smaller firms than in larger companies. Attitudinal commitment occurs when employees have strong personal feelings with an organisation. It is not stimulated by the high performance work system, but nevertheless noticed because of its strong influence on the voluntary turnover rate.

Hypothesis 2

The level of attitudinal commitment is higher in smaller firms than in larger companies.

4.2.3 Hypotheses 3 – 6

The theoretical findings show that the impact of the high performance work system differs between larger and smaller companies. Some characteristics of smaller firms make that the HPWS is less effective in stimulating preferred behavioural outcomes in those organisations. On the contrary, other characteristics of smaller firms give the high performance work system the opportunity to have a stronger impact on a few operational performances. Hypotheses 3 – 6 emphasize these findings.

Hypothesis 3

For larger companies, a given degree of HPWS presence is associated with higher levels of five behavioural outcomes (i.e. problem-solving, knowledge-transfer, behavioural commitment, job satisfaction, employee effort) compared to smaller firms.

Hypothesis 4

For larger companies, a given degree of HPWS presence is associated with higher levels of two operational performances (i.e. productivity and voluntary turnover rate) compared to smaller firms.

Hypothesis 5

For smaller firms, a given degree of HPWS presence is associated with higher levels of three operational performances (i.e. product quality, innovation, and sickness absence rate) compared to larger companies.

Hypothesis 6

For larger companies, a given degree of HPWS presence is associated with a higher level of one financial performance (i.e. profits) compared to smaller firms.

4.3 Sample

The hypotheses will be tested in a sample of Dutch companies. A list of potential companies as units of analysis is created in the database REACH³. The creation of this list will occur by the use of some selection criteria that the companies have to satisfy. The first selection criterion used is the *type of industry* wherein the companies are operating. This study wants firms that have services-orientated businesses, *i.e.* operations in the tertiary area. The impact of the high performance work system seems especially well to examine in companies wherein the workforce is a dominating production factor. There are namely lesser restrictions by other, more dominating production factors (*e.g.* capital). It is not unlikely that employees play an important role in companies that are operating in the tertiary area. Fifteen sectors of industry have been selected in the database REACH – all having the word *services* in their short area description in common. It creates a list of 68,648 potential companies.

The second selection criterion used is the *age* of the companies (number of years since start-up). Although firm age often is taken as criterion to control for „any advantages associated with increased time for the evolution or adoption of HR practices or learning curve advantages in productivity” (Sels *et al.*, 2006), this study will use firm age to increase the opportunity that the companies in the sample do have some of the high performance work

³ <https://reach.bvdep.com>

system in their organisation. Therefore, firms have to be older than (an arbitrary chosen) five years. After this selection criterion, the list still consists of 58,358 potential companies.

The third selection criterion used is caused by practical implications. The most recent financial data in REACH (needed for measuring productivity and profit) is per 31st of December 2006. The financial statements in the database include additive data over the year 2006. However, data over the year 2006 is not provided for every company. For several companies only data over the year 2005 (or even earlier years) has been provided. It is not desirable to use these companies in the sample, because further in the past can create other problems in this empirical research study. Paragraph 4.4.2 will discuss this in more detail. So, the selection criterion used is the *availability of financial data over year 2006* in REACH. There remain 13,061 potential companies in the list.

The last selection criterion used is the *size* of the companies. Firm size is here based upon the number of employees working in the organisation, thereby assuming that companies with a smaller workforce also dispose the other mentioned characteristics of smaller firms. The companies are divided in four *firm size* groups, ranging from ten to fifty, fifty to 100, 100 to 150, and 150 to 200 employees. The first two ranges represent the smaller firms; the latter two reflect larger companies. This definition is not according to the European guidelines, but it is commonly accepted that Dutch small and medium sized enterprises have less than 100 employees (Brand & Bax, 2002; Holmes & Gibson, 2001; Hulshoff, 2001). Consequently, four lists of potential companies come into existence. The list with the smallest firms consists of 2,434 potential companies. The other lists contain – in increasing size – respectively 285, 114 and sixty-two potential companies.

Finally, 32 companies are *at random* selected out of the lists (eight per firm size group) in order to get involved in the empirical research study. Unfortunately, only fifteen of these companies agreed to participate (anonymously) as sample group in the research. Table 1 shows these companies, categorized by *firm size* against *sector of industry*. Table 2 shows the companies, categorized by *firm size* against *firm age*. It would have been better to obtain a sample that is more homogeneous in terms of firm age and sector of industry. Several scholars have namely suggested that different sectors of industry and firm ages can influence the results of research on HRM and organisational performance (Sels *et al.*, 2006; De Kok & Den Hartog, 2006; Guthrie *et al.*, 2004; Huselid, 1995). In a sample with more uniform

characteristics it will be easier to isolate external variables that can influence the research. It is making the conclusions of the empirical research study more reliable. However, it was impracticable to create a homogeneous sample in terms of firm age and sector of industry.

Table 1

Categorization of the sample by *firm size* against *sector of industry*

Sector of industry	Firm size (number of employees)				Total sector of industry
	10 - 50	50 - 100	100 - 150	150 - 200	
<i>Consultancy</i>	1	1	1	2	5
<i>Wholesale trade</i>	3		1		4
<i>Rental of transport</i>		1			1
<i>Inspection & control</i>	1				1
<i>Telecommunication</i>				1	1
<i>Private education</i>				1	1
<i>Services regarding sports</i>				1	1
<i>Automation</i>		1			1
Total firm size	5	3	2	5	15

Table 2

Categorization of the sample by *firm size* against *firm age*

Firm age	Firm size (number of employees)				Total firm age
	10 - 50	50 - 100	100 - 150	150 - 200	
<i>5 - 10</i>	2		1	3	6
<i>10 - 15</i>		1			1
<i>15 - 20</i>	1	1		2	4
<i>20 - 25</i>	1				1
<i>> 25</i>	1	1	1		3
Total firm size	5	3	2	5	15

4.4 Variables of interest

The variables in the research framework are subject to the empirical research in order to test empirical support for the theoretical findings. These variables of interest have been given in the hypotheses. The variables of interest need to be measured in order to test the empirical support for the hypotheses – and thus for the theoretical findings. Measurement can only occur when the subjects of measurement have been defined well.

The degree of the HPWS presence is defined by an unitary index created by summing the standardized scores of the seven equally weighted practices of this study's high performance work system (maximum score per practice is one), thereby following Way (2002). By using an additive approach, the maximum HPWS unitary index score is seven. Table 3 shows how the separated practices have been defined for measuring purposes. The definitions are similar to them in other research studies (De Kok & Den Hartog, 2006; Way, 2002).

Table 3

Variable of interest definitions

	Definitions
Components of HPWS	
<i>Extensiveness of staffing</i>	An additive score of the extent that the four selection devices are used to evaluate job candidates; each of the selection devices is on a 5-point scale. Score = (interviews + tests + work samples + references from previous employers) / 20. Maximum score = 1.
<i>Group-based performance pay</i>	One or more of the following compensations are offered to the operational workforce: profit-sharing, bonuses, share plans, and stock options. Yes = 1; No = 0.
<i>Pay level</i>	The level of base salary is compared to the level of base salary for identical functions in other companies. Below average = 0; Average = 0.5; Above average = 1.
<i>Job rotation</i>	Percent of employees that is involved in job rotation on a 0-100 point scale. Score = (0-100) / 100. Maximum score = 1.
<i>Self-directed teams</i>	Percent of employees that is involved in self-directed working teams, without direct supervisory, on a 0-100 point scale. Score = (0-100) / 100. Maximum score = 1.
<i>Formal training</i>	Percent of employees who receive formal, <i>out-of-office</i> training on a 0-100 point scale. Score = (0-100) / 100. Maximum score = 1.
<i>Involvement in meetings discussing work-related issues</i>	Percent of employees that is involved in regularly scheduled meetings to discuss work-related issues on a 0-100 point scale. Score = (0-100) / 100. Maximum score = 1.

The measurement of the behavioural outcome variables is based upon broadly-accepted definitions of these variables in prior research studies. Problem-solving is defined as an unitary index including six equally weighted items about two indicators of problem-solving, namely *solutions found* (3 items) and *speed of solving problems* (3 items) (Atuahene-Gima, 2003; Sheremata, 2000). The first reflects the ease with which a large number of alternative problem solutions are identified; the latter refers to the degree of speed associated with finding and implementing the solution (Atuahene-Gima, 2003). The maximum index score of problem-solving is six. Three equally weighted items shape the unitary index of knowledge-transfer. The three items reflect the extent that information about organisational problems and opportunities is acquired and distributed in the organisation (Goh & Richards, 1997). The

maximum index score of knowledge-transfer is six. Furthermore, attitudinal and behavioural commitment are both defined as an unitary index created by three equally weighted items that respectively reflect the extent that employees identify with their company and the extent that employees remain with their organisation because of a high personal sacrifice when leaving (McGee & Ford, 1987; Meyer & Allen, 1984). The maximum score of both indices is six. Job satisfaction is measured to control for its potential association with organisations' overall performances (Buzawa, 1984). Job satisfaction is defined as an unitary index created by six equally weighted items that represent two indicators of job satisfaction, namely *empowerment* (3 items) and *compensation* (3 items) (Halsted *et al.*, 2000; Wycoff & Skogan, 1994; Rosenbaum *et al.*, 1994). The maximum index score of job satisfaction is again six. At last, effort is also defined as an unitary index including five equally weighted items (maximum index score is six). Two items indicate the *time* employees commit to their jobs, and the other three items reflect with what *intensity* they do their work. Effort is seen as how hard people in organisations work to achieve goals, and that can be operationalized by the employee resources time and energy (Patterson *et al.*, 2005; Brown & Leigh, 1996; Blau, 1993). Table 4 summarizes previously discussed in more detail.

The measurement of the operational performance variables is also based upon broadly-accepted definitions of these variables in prior research studies. The ratio of *firm sales* to *number of employees* defines productivity (Guthrie *et al.*, 2004; Huselid, 1995). Much criticism has been aimed at the fact that this productivity ratio only considers one production factor (*i.e.* labour) and therefore becomes useless in modern manufacturing operations, since direct labour cost is becoming a smaller fraction of the total manufacturing cost (Tangen, 2003). Nevertheless, labour productivity is thought to be an appropriate performance measure for firm productivity in services-orientated firms, because these companies have a more labour-intensive character. Product quality is defined as an unitary index created by three equally weighted items. These items measure the extent that products (*services* in this sample) satisfy the quality and performance requirements of customers (Atuahene-Gima, 2003). The maximum index score is six. Moreover, quality can be derived from the productivity ratio if the assumption is made that *providing* (*i.e.* producing) services is closely related to *selling* services. High quality in a firm's operations results in no waste in employees' effort and working time. It makes that the employees are able to provide more services to the firm's customers (*i.e.* being able to sell more services to the customers). However, it is through the product quality that customers want to buy the firm's services.

Table 4

Variable of interest definitions

	Definitions
Components of behavioural outcomes	
<i>Problem-solving</i>	An additive score of the extent that solutions are found (3 items) and the degree of speed (3 items*); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3 + score item 4 + score item 5 + score item 6) / 6. Maximum score = 6.
<i>Knowledge-transfer</i>	A score of the extent that information about organisational problems and opportunities is acquired and distributed (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3) / 3. Maximum score = 6.
<i>Attitudinal commitment</i>	A score of the extent that employees identify with their organisation (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3) / 3. Maximum score = 6.
<i>Behavioural commitment</i>	A score of the extent that employees remain with their company because of high personal sacrifice when leaving (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3) / 3. Maximum score = 6.
<i>Job satisfaction</i>	An additive score of the extent that employees are empowered in their jobs (3 items) and that they are satisfied with their financial compensations (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3 + score item 4 + score item 5 + score item 6) / 6. Maximum score = 6.
<i>Effort</i>	An additive score of the extent that employees commit time to their jobs (2 items) and the degree of intensity with which they do their work (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3 + score item 4 + score item 5) / 5. Maximum score = 6.

* The results of these items are reverse-coded (1 = strongly agree; 2 = agree; 3 = sort of agree; 4 = sort of disagree; 5 = disagree; 6 = strongly disagree).

Furthermore, innovations are categorized in many different ways. Some scholars typify them as radical renewals or incremental improvements; others distinguish between innovations in products or production processes (Tidd *et al.*, 2001; Leifer *et al.*, 2000; Brockhoff *et al.*, 1999; Damanpour, 1991). This study defines innovation as an unitary index including three equally weighted items that reflect the extent that *incremental improvements* occur in an organisation's primarily work process (products, customer service, production processes) (Oke *et al.*, 2007). It is more likely that a high performance work system has impact on incremental improvements than on radical renewals. The latter is depending on many factors over a long period of time. The status of incremental improvements can also be derived from the productivity ratio. Griffin (1997) notices that innovation is associated with firm sales. For example, improvements in a firm's production process (*e.g.* reduced delivery time) can lead to more provided services by the same number of employees. In addition, improvements in the products (*e.g.* new features) will actually make customers want to buy those products. Table 5 summarizes previously discussed in more detail. Unfortunately, not all companies provide a voluntary turnover rate or, instead, use the same ratio to determine it. It is therefore hard to measure the voluntary turnover rate (De Kok & Den Hartog, 2006). This study offers a formula⁴ to overcome the problem. In brief, the formula defines voluntary turnover as the ratio of *total employees left* to *total workforce* (see appendix A). Finally, the sickness absence rate is provided by the firms and defined excluding maternity leave (De Kok & Den Hartog, 2006).

At last, accounting standards are used to measure profit as financial performance indicator. A standardized figure for profit is *EBIT* (*i.e.* earnings before interest and tax payments) *minus tax* (Brealey & Myers, 2000). It is assumed that firm profits will be driven by productivity, which can be modelled. In the first place, the net profit margin shows the proportion of sales that finds its way into profits (Brealey & Myers, 2000). The net profit margin is the ratio of *EBIT minus tax* to *firm sales*. Rebuilding this profitability ratio as follows and dividing by the number of employees emphasize the link between (labour) productivity and profit:

$$(\textit{EBIT minus tax}) / \textit{Employees} = (\textit{Firm sales} / \textit{Employees}) * \textit{Net profit margin}$$

⁴ <http://www.bna.com/surveys/index.html>

Given a constant net profit margin, an increase in (labour) productivity will result in an increase in profits (before interest payments) per employee.

Table 5

Variable of interest definitions

	Definitions
Components of operational performance	
<i>Productivity</i>	A ratio of firm sales to number of employees.
<i>Product quality</i>	A score of the extent that products satisfy the quality and performance requirements of the customer (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3) / 3. Maximum score = 6.
<i>Innovation</i>	A score of the extent that incremental improvements occur in an organisation's primarily work process (3 items); each of the items is on a 6-point scale. Score = (score item 1 + score item 2 + score item 3) / 3. Maximum score = 6.

4.5 Procedure

Now the variables of interest have been defined, it is possible to measure them. This section will describe the procedure behind the measurement of these variables of interest.

4.5.1 Measuring instrument

Two instruments are used to measure the variables of interest. The first is the database REACH which includes objective data. Objective data contains observable facts not involving opinion (Tangen, 2003). The measurement of productivity and the financial performance variables (for profit) is based upon information on certified (financial) statements in the database.

The second instrument is a questionnaire that will include the – in last section – mentioned items on the high performance work system, behavioural outcomes and operational performance. These items are shown in respectively appendices B, C, and D. The selection of these items is based upon prior research studies done by different scholars (Oke *et al.*, 2007; De Kok & Den Hartog, 2006; Atuahene-Gima, 2003; Way, 2002; Halsted *et al.*, 2000; Goh & Richards, 1997; Brown & Leigh, 1996; Meyer & Allen, 1984). A six-point Likert scale will

be used on the items (1 = strongly disagree; 2 = disagree; 3 = sort of disagree; 4 = sort of agree; 5 = agree; 6 = strongly agree). The scale on the speed of solving problems is reverse-coded, because the items have been formulated negatively. Although measuring theories have suggested that respondents generally do not make a sensible distinction between more than five different answer categories, this study has chosen for six categories in order to bring more nuances. In this way, there is more chance to find different answers between the different respondents.

The questionnaire will obtain subjective information from the participants. Subjective data contains perceptions or opinions (Tangen, 2003). The use of subjective data for measurements is often criticized because there is a risk that it includes unrealistic perceptions which cause measurement errors and biases. However, prior studies have determined that subjective measures correlate well with objective measures (Fey *et al.*, 2000; Starbuck & Mezias, 1996). Moreover, perceptual data plays an important role in both research and theories about behaviour (Starbuck & Mezias, 1996). It is thereby hard to get (even if available) objective information about a firm's sickness absence rate and voluntary turnover rate (De Kok & Den Hartog, 2006). That is also thought for product quality and incremental improvements. The high performance work system is measured by using subjective data, thereby following prior studies (Way, 2002; Ichniowski *et al.*, 1997; Huselid, 1995).

4.5.2 Measuring time

The research framework describes a positive relationship between the high performance work system and financial performance. Hypothesis 1 emphasizes this relationship. The best way to examine causality is to do a longitudinal study. A longitudinal study is designed to permit observations of the same phenomena over an extended period (Babbie, 2000). This kind of study is one of the two options in the design of research to deal with the issue of time. The other option is a cross-sectional study which involves observations of a sample, or cross section, of a population or phenomenon that are made at one point in time (Babbie, 2000). Cross-sectional studies are not suitable as a means to aim at understanding causal processes that occur over time, because those studies' conclusions are based on observations made at only one time (Babbie, 2000). However, practical implications of measuring the different variables at different points in time make that this study is cross-sectional. First, the most recent data for measuring the last part of the causal chain – financial performance – is per 31st of December, year 2006. The financial statements in REACH include additive data over the

year 2006. Then, the obtained data about the independent variable HPWS and the intermediate variables (behavioural outcomes and operational performance indicators) should be from before year 2006. This is not desirable, because it increases the opportunity that respondents will give useless or incomplete information due to unreliable perceptions they have about the past. Therefore, the measurement of the variables of interest is at a single time frame – taking a snap shot, so to speak, of the variables at a particular point in history (Babbie, 2000). The single time frame is year 2006.

4.5.3 Data collection

As mentioned before, thirty-two companies have been selected *at random* as sample group in this research study. These companies were called to ask if they want to participate in the research. The telephone call tried to persuade them to join by informing what the research includes, and why it can be advantageous for these companies to be involved in this research (*e.g.* to get more knowledge about possible effects of HRM). All thirty-two companies allowed me to send a standardized e-mail with information about the design of the research (appendix E), and which included three different questionnaires. This e-mail was in all thirty-two cases sent to a HR representative. Each of the questionnaires is meant for one target group of respondents in the selected companies (*see* respondents questionnaires, page 67). The choice for three target groups is based upon the questionnaire items from appendices B, C, and D. Some of these items are namely most appropriate to expose to employees; other items are more appropriate to expose to the chief executive officer (or a business manager) and, once again, other items are more appropriate to expose to a HRM specialist (from the HR department). Thus, the three questionnaires contain the items on the HPWS, behavioural outcomes and operational performances. Moreover, questions related to the proposed characteristics of smaller firms have also been processed in the questionnaires. The response on the e-mail was low, resulting in a telephone follow-up. Next, two more e-mails were sent in almost three weeks in order to ask (or remember) the selected companies again about if they want to participate in this empirical research study. Ultimately, fifteen companies agreed to participate (anonymously) in the research. The other seventeen firms were not interested to participate or had not completed the questionnaires.

Finally, fifteen companies have completed three different questionnaires. It means that there are forty-five different observations – the units of observation are three different respondents per firm (chief executive officer, HRM specialist, and employee). However, (only) one firm

has supplied completed questionnaires from five employees. Consequently, this study's total is forty-nine different observations. These observations are divided over the high performance work system (fifteen observations of the CEO or HRM specialist), behavioural outcomes *including* product quality (nineteen observations of the employees), and the operational performances *excluding* product quality and productivity (fifteen observations of the CEO or HRM specialist).

4.6 Reliability and validity

Important is to keep in mind the quality of the measuring process. The quality is often derived from two scientific standards: *reliability* and *validity*. Babbie (2000) defines reliability as „a matter of whether a particular technique, applied repeatedly to the same object, yields the same result each time”. This study's technique (*i.e.* questionnaires) gathers information about the variables of interest, but thereby obtains it from the respondents. Reliability problems can arise then. It is not unlikely that the respondents will give – at different times – different answers to the items in the questionnaires. Fortunately, there are several ways to check if measures are reliable – for example the *test-retest method* and *split-half method* (Babbie, 2000). The items, used in this study's questionnaires to measure the different variables of interest, have proven their reliability in previous research (Oke *et al.*, 2007; De Kok & Den Hartog, 2006; Atuahene-Gima, 2003; Way, 2002; Halsted *et al.*, 2000; Goh & Richards, 1997; Brown & Leigh, 1996; Meyer & Allen, 1984). It is another way to help insure reliability in getting information from people (Babbie, 2000). These prior studies have also shown that there is a broad agreement that the particular items adequately reflect the meaning of the variables of interest. Briefly, the measure items are considered valid. Validity refers „the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration” (Babbie, 2000).

5. Analyses and results

The fact that the different questionnaires have been completed for every firm in the sample (without missing values) will provide data about the state of the high performance work system, behavioural outcomes and operational performances in these organisations. Table 6 shows the values of one firm's item scores on the behavioural outcomes and product quality. These values are derived from the *employee* questionnaire that has been completed by five different employees (*i.e.* respondents) in this firm 9. The medians of these values are used to represent the state of the behavioural outcomes and product quality in firm 9. Chosen now for the median (instead of the mean) is in order to prevent for getting values for firm 9 that cannot be realized by the other firms in the sample. Tables 7-10 summarize the measured scores on respectively the HPWS plus the behavioural outcomes, attitudinal commitment, operational performance and financial performance for all fifteen companies (including firm 9). These scores are again based upon data from the completed questionnaires – except for the figures on productivity and the financial performance. Both are derived from information in the database REACH. Finally, the measured scores have been linked to the data on the firm characteristics *firm size*, *firm age*, and *sector of industry*.

These measuring results will be analyzed (*i.e.* quantitative analysis) in order to test the hypotheses on significance and, ultimately, to help formulating a conclusion on this study's problem statement. Before, section 5.1 will be involved in some *univariate analyses*.

5.1 Univariate analyses

The simplest form of quantitative analysis, *univariate analysis*, describes a case in terms of a single variable (Babbie, 2000). The most basic format for presenting univariate data is shown in the tables i-iv in appendix F. Those include descriptions of the number of times that the various values of the variables are observed in the sample, called *frequency distributions*. Table i shows the frequency distribution of the high performance work system. This distribution is also graphically described in classes by a histogram in figure i in appendix F. First to notice is that two values of the variable HPWS have both been measured twice in the sample (3.00 and 3.20), which means that there are two pairs of firms that have the same degree of HPWS presence in their organisation. However, it does not mean that their high performance work systems include the same composition of the seven HR practices. For example, table 11 summarizes the HPWS composition for the firms that have a 3.00 score.

Table 6

Median values of firm 9

Respondent	Behavioural outcome scores						Operational performance scores
	<i>Problem-solving</i>	<i>Knowledge-transfer</i>	<i>Behavioural commitment</i>	<i>Job satisfaction</i>	<i>Effort</i>	<i>Attitudinal commitment</i>	<i>Product quality</i>
1	4.00	3.33	3.67	3.50	3.00	1.33	5.00
2	3.50	3.67	1.33	3.83	3.80	3.33	4.33
3	3.83	3.67	3.33	3.33	4.40	2.33	5.00
4	4.33	5.67	1.33	5.17	4.00	5.67	5.67
5	3.33	2.67	2.00	2.50	3.80	3.33	3.67
Median	3.83	3.67	2.00	3.50	3.80	3.33	5.00

Table 7

Measured scores on the HPWS and behavioural outcomes for all companies in the sample

Firm	Firm size	Firm age	Sector of industry	HPWS score	Behavioural outcome scores				
					<i>Problem-solving</i>	<i>Knowledge-transfer</i>	<i>Behavioural commitment</i>	<i>Job satisfaction</i>	<i>Effort</i>
1	25	7	consultancy	3,00	4,00	4,00	4,00	5,00	4,00
2	32	16	wholesale trade	2,30	3,83	4,67	2,67	3,50	4,00
3	33	9	inspection & control	3,35	4,00	4,33	3,00	3,17	4,00
4	48	22	wholesale trade	3,00	4,83	4,00	2,00	3,50	3,80
5	48	53	wholesale trade	3,85	4,00	4,67	3,67	4,67	4,00
6	68	16	automation services	3,20	4,67	3,67	2,00	4,33	3,80
7	85	32	rental of transport	4,25	3,83	4,67	3,33	4,17	6,00
8	89	12	consultancy	3,15	5,00	5,00	2,33	4,00	3,40
9	119	7	consultancy	2,40	3,83	3,67	2,00	3,50	3,80
10	149	101	wholesale trade	3,05	4,17	3,67	3,33	5,00	4,60
11	152	19	consultancy	3,90	4,00	4,00	4,00	5,17	3,20
12	160	6	consultancy	3,20	4,33	4,33	3,00	4,50	4,60
13	161	9	services regarding sports	2,80	4,67	5,00	3,00	4,83	3,60
14	187	18	private education	3,65	3,83	3,33	2,33	5,17	3,80
15	199	7	telecommunication	4,10	4,50	4,00	3,00	4,00	3,40

Table 8

Measured scores on the attitudinal commitment for all companies in the sample

<i>Firm</i>	<i>Firm size</i>	<i>Firm age</i>	<i>Sector of industry</i>	Behavioural outcome scores <i>Attitudinal commitment</i>
1	25	7	consultancy	3.00
2	32	16	wholesale trade	3.67
3	33	9	inspection & control	3.67
4	48	22	wholesale trade	3.33
5	48	53	wholesale trade	4.00
6	68	16	automation services	3.00
7	85	32	rental of transport	4.67
8	89	12	consultancy	4.00
9	119	7	consultancy	3.33
10	149	101	wholesale trade	3.00
11	152	19	consultancy	5.00
12	160	6	consultancy	3.67
13	161	9	services regarding sports	4.33
14	187	18	private education	3.33
15	199	7	telecommunication	3.33

Table 9

Measured scores on the operational performance for all companies in the sample

<i>Firm</i>	<i>Firm size</i>	<i>Firm age</i>	<i>Sector of industry</i>	<i>HPWS degree</i>	<i>Product quality</i>	<i>Innovation</i>	<i>Operational performance scores</i>		
							<i>Sickness absence rate</i>	<i>Voluntary turnover rate</i>	<i>Productivity</i>
1	25	7	consultancy	3.00	5.00	5.33	less than 2	0.04	€ 641,440
2	32	16	wholesale trade	2.30	5.00	4.67	3 - less than 4	0.03	€ 180,625
3	33	9	inspection & control	3.35	6.00	4.33	4 - less than 5	0.09	€ 100,333
4	48	22	wholesale trade	3.00	4.67	4.67	3 - less than 4	0.04	€ 1,482,146
5	48	53	wholesale trade	3.85	6.00	4.33	4 - less than 5	0.10	€ 1,478,896
6	68	16	automation services	3.20	3.33	4.33	3 - less than 4	0.16	€ 64,338
7	85	32	rental of transport	4.25	5.33	4.33	less than 2	0.06	€ 609,459
8	89	12	consultancy	3.15	5.00	5.00	4 - less than 5	0.02	€ 117,056
9	119	7	consultancy	2.40	5.00	5.00	4 - less than 5	0.02	€ 75,613
10	149	101	wholesale trade	3.05	5.00	4.67	5 - less than 6	0.05	€ 309,940
11	152	19	consultancy	3.90	5.00	5.00	2 - less than 3	0.03	€ 82,572
12	160	6	consultancy	3.20	4.67	4.67	3 - less than 4	0.06	€ 57,231
13	161	9	services regarding sports	2.80	4.67	4.33	2 - less than 3	0.02	€ 108,534
14	187	18	private education	3.65	4.00	5.00	4 - less than 5	0.05	€ 59,604
15	199	7	telecommunication	4.10	5.00	4.67	4 - less than 5	0.04	€ 388,884

Table 10

Measured scores on the financial performance for all companies in the sample

<i>Firm</i>	<i>Firm size</i>	<i>Firm age</i>	<i>Sector of industry</i>	<i>HPWS degree</i>	<i>Financial performance</i>	
					<i>Net profit margin</i>	<i>(EBIT - tax) / employees</i>
1	25	7	consultancy	3.00	0.0197	€ 12,640
2	32	16	wholesale trade	2.30	-0.0393	-€ 7,094
3	33	9	inspection & control	3.35	0.0172	€ 1,727
4	48	22	wholesale trade	3.00	0.0345	€ 51,167
5	48	53	wholesale trade	3.85	0.0719	€ 106,292
6	68	16	automation services	3.20	0.0080	€ 515
7	85	32	rental of transport	4.25	0.1882	€ 114,682
8	89	12	consultancy	3.15	0.0263	€ 3,079
9	119	7	consultancy	2.40	0.0445	€ 3,368
10	149	101	wholesale trade	3.05	0.0396	€ 12,262
11	152	19	consultancy	3.90	0.0800	€ 6,605
12	160	6	consultancy	3.20	0.0040	€ 231
13	161	9	services regarding sports	2.80	0.0065	€ 708
14	187	18	private education	3.65	0.0905	€ 5,396
15	199	7	telecommunication	4.10	0.0655	€ 25,487

Table 11

Composition of the degree of HPWS presence in two firms

HPWS degree	<i>Extensiveness of staffing</i>	<i>Group-based performance pay</i>	HR practices				
			<i>Pay level</i>	<i>Job rotation</i>	<i>Self-directed teams</i>	<i>Formal training</i>	<i>Involvement in meetings</i>
3.00	0.40	1.00	0.50	0.20	0.00	0.20	0.70
3.00	0.50	1.00	0.50	0.10	0.00	0.10	0.80

The firms differ in the extent that four selection devices are used to evaluate job candidates in their organisation (0.40 against 0.50). Subsequently, both offer one or more compensation(s) to their operational staff (1.00) and, thereby, have an average pay level (0.50). Again, the firms differ in the percent of their workforce that is involved in job rotation (0.20 against 0.10), formal training (0.20 against 0.10), and regularly scheduled meetings to discuss work-related issues (0.70 against 0.80). Also, no employees in these two companies are working in self-directed teams without direct supervisory (0.00). Another notable aspect in the frequency distribution of the high performance work system is that the *degree of HPWS presence* scores range between 3.00 and 4.00 for two-third of the companies in the sample (66.7 percent). In addition, twenty percent has a score below 3.00 and only 13.3 percent scores higher than 4.00. Considering a maximum score of seven on the *degree of HPWS presence* scale, these results indicate that high performance work systems are not common in organisations. Presenting the univariate data in another form will result in an identical presumption. Table v (a) in appendix G shows two measures of central tendency – *mean* and *median* – and four indicators of dispersion (*i.e.* the way values are distributed around some central value; Babbie, 2000). Although the median is not an appropriate measure for a discrete (interval) variable like the *degree of HPWS presence*, its value does not really differ from the value of the mean (3.00 against 3.28). These values represent the *typical* score for the variable HPWS in the sample. In addition, the maximum score is only 4.25 while the minimum score is 2.30 in the sample.

Tables ii (a-f) reflect the frequency distributions of problem-solving, knowledge-transfer, behavioural and attitudinal commitment, job satisfaction and effort. In addition, table v (b) in appendix G shows the measures of central tendency and dispersion for these variables of interest. It comes true that 73.3 percent of the firms in the sample do, at least, a sort of agree with the statement that several solutions were always found – and on time – for problems encountered in their organisations. Moreover, the mean of the scores on problem-solving is 4.23 which means that, on average, the companies do a sort of agree with mentioned

statement. Most of these sample scores are also situated close to 4.23 – considering the low standard deviation. Again, 73.3 percent do, at least, a sort of agree with the statement that information about organisational problems and opportunities is acquired and distributed in the organisation. The mean is 4.20 and most of the scores are situated close to 4.20. By these outcomes it seems that problem-solving behaviour and knowledge-transfer will be present in most of the companies. Next, twenty percent of the firms in the sample disagree with personal sacrifice (when leaving) as the reason for their employees to stay with the organisation, and once more 66.7 percent cannot find, at least, a sort of agreement with this argument to remain in the organisation. The maximum score on behavioural commitment is just 4.00 while most of the scores are near 2.91. It does presume that the behavioural commitment is low in the organisations. Notable is that also 66.7 percent do not, at least, a sort of agree with the statement that their employees are identifying with the company. The mean of attitudinal commitment is only 3.69 and most of the scores are between 3.10 and 4.30. The attitudinal commitment in the companies is low but, however, it seems to be higher than the level of behavioural commitment. Furthermore, the results indicate that job satisfaction is present in most of the companies in the sample. A high percent (73.3 percent) do, at least, a sort of agree with the statement that their employees are satisfied with their empowerment opportunities and financial compensations. Even 26.7 percent just agree with this statement. Finally, the firms are divided by their opinions about the statement that their employees commit much time and energy in their work. More than fifty percent (53.3 percent) do a sort of disagree with this statement while 47.7 percent do, at least, a sort of agree with. One firm even strongly agrees with the statement. A high level of effort is not all recognizable for every company, which is also indicated by a high range (2.80).

Tables iii (a-d) show the frequency distributions of product quality, innovation, sickness absence rate and voluntary turnover rate. Because all values of productivity are unique observations, instead of describing a frequency distribution, a histogram will reflect the number of times that classes of productivity have been observed (figure iii). Table v (c) in appendix G presents the measures of tendency and dispersion for these variables of interest. In addition, table v (d) in appendix G shows the measures of tendency and dispersion for the financial performance. Moreover, figure iv includes a histogram that reflects classes of profit. It will be meaningful to discuss the variables *product quality* and *innovation* in more detail here. The product quality seems to be adequate in the companies from the sample, because 26.7 percent do a sort of agree with the statement that their products conform the quality and

performance requirements of their customers. Once more 66.7 percent agree or strongly agree with this statement. The mean of the scores on product quality is also high (4.91) and, moreover, most of these scores are between 4.25 and 5.57. At last, innovation seems to be also present in these companies – although its level, on average, is lower than the level for product quality (4.69 against 4.91). All firms do, at least, a sort of agree with the statement that incremental improvements often occur in their primary work process.

Univariate analyses describe the units of analysis of this study. For example, the percent of companies that have an adequate product quality is described. Yet, those analyses have to be showed in the right perspective. In the first place, the descriptive assumptions regarding the firms in the sample are mostly based upon scores that have been derived from observations of three different respondents per firm. It makes that the opinions of three employees will represent the situation in the organisation. Secondly, the descriptive assumptions are related to year 2006 which means that it is uncertain if those still weigh in the current situation of the companies. Moreover, it increases the opportunity that the respondents have given less useful or incomplete information due to less reliable perceptions they have about the past. Both remarks will also apply for further analyses. Finally, univariate analyses are not aimed at explanation.

5.2 Correlations

A single variable is involved in univariate analysis, but often two or more variables are involved in analyses that are aimed at simply descriptive, comparative or explanatory purposes. What variables will be involved in such analyses depends upon the assumptions made in the theoretical part. First, this study suggests relationships between the high performance work system on the one hand, and behavioural outcomes, operational performances and financial performance on the other hand. These main relationships are characterized by several intervening relationships between the variables of interest. This concept has been outlined previously in figure 3. Correlations between these variables of interest will give a first insight in their relationships. Notice that with that it is assumed that the relationships are *linear*. The *Pearson product-moment correlations* (r) are given in the correlation-matrix below. Thus, the matrix will show only the correlations between the variables of interest that are supposed to be related to each other (according to the theoretical framework). The information is based upon output from the statistical program SPSS.

Table 12

Correlation-matrix: correlations between the variables of interest

		<i>Firm size</i>	<i>HPWS</i>	<i>Effort</i>	<i>Product quality</i>	<i>Innovation</i>	<i>Vol. turnover rate</i>	<i>Sickn. absence rate</i>	<i>Productivity</i>
<i>Firm size</i>	correlation	1	.287						
	valid observations	15	15						
<i>HPWS</i>	correlation	.287	1	.221	.187	-.211	.264	-.121	.216
	valid observations	15	15	15	15	15	15	15	15
<i>Firm age</i>	correlation		.125						
	valid observations		15						
<i>Problem-solving</i>	correlation		-.093		-.348*				
	valid observations		15		15				
<i>Knowledge-transfer</i>	correlation		-.022			-.367*			
	valid observations		15			15			
<i>Behav. commitment</i>	correlation		.428*				-.086		
	valid observations		15				15		
<i>Att. commitment</i>	correlation	.115					-.251		
	valid observations	15					15		
<i>Job satisfaction</i>	correlation		.320*	-.020				-.217	
	valid observations		15	15				15	
<i>Productivity</i>	correlation		.216	.150	.352*	-.173	.114	-.077	1
	valid observations		15	15	15	15	15	15	15
<i>Profitability</i>	correlation		.585**						.752**
	valid observations		15						15

** Level of significance is $\alpha = 0.05$

* Level of significance is $\alpha = 0.25$

Moreover, the correlations between firm size and firm age on the one hand, and the high performance work system on the other hand are given in the matrix. In chapter three is namely suggested that no significant relationship will occur between firm size and any HPWS presence. Also, no companies operating less than five years have been selected for this study's sample group. It is to increase the opportunity that the companies in the sample do have some of the high performance work system in their organisation. It suggests a (restricted) relationship between firm age ($0 \leq \text{firm age} < 5$) and the degree of HPWS presence. However, the limiting value of five years has been chosen arbitrary. Perhaps there (also) is a relationship between firm age (≥ 5 years) and the degree of HPWS presence. At last, the correlation between firm size and attitudinal commitment is shown (hypothesis 2).

5.2.1 Interpretation of results

Two correlations appear to be significant at a significance level of 0.05. The correlation between the degree of HPWS presence and profitability equals $r = 0.585$, which indicates a positive association between both variables ($R\text{ Square} = 0.34$; the HPWS “explains” thirty-four percent of the variance in profit, or *vice versa*). The other correlation – between productivity and profitability – equals $r = 0.752$, which indicates a strong positive association between both variables. This is not surprisingly if the modelled relationship between *EBIT minus tax* and *firm sales* is considered in chapter four.

On second thoughts, by using a more liberal approach of the significance level because of the small sample size, more variables of interest might also be somehow related to each other. At a significance level of 0.25, as expected, a presence of the high performance work system is positively associated with behavioural commitment ($r = 0.428$) and job satisfaction ($r = 0.320$). In addition, product quality is positively associated with productivity. However, more surprisingly seem the negative associations between problem-solving and product quality ($r = -0.348$), and between knowledge-transfer and innovation ($r = -0.367$).

5.3 Firm size, firm age and HPWS

The correlation outcome already indicates that firm size is not significantly related to the high performance work system. Any presence of the HPWS will not significantly differ between smaller and larger companies. This study hypothesizes no relationship between firm size and the degree of HPWS presence. It is possible to describe the degrees per subgroups *smaller firms* (with ten up to 100 employees) and *larger firms* (with 100 up to 200 employees). The

average degree of HPWS presence between these two subgroups can also be compared. Table 13 shows that the average degree for larger companies is higher than the average degree for smaller firms. Like r at first sight, it implies an increase in firm size to be associated with a higher degree of HPWS presence.

Table 13

Average degree of HPWS presence in smaller and larger firms

Measures of dispersion	<i>Smaller firms</i>	<i>Larger firms</i>
<i>Median</i>	3,18	3,20
<i>Mean</i>	3,26	3,30

However, an *independent-samples t-test* will be done in order to test the assumption of no relationship between firm size and the degree of HPWS presence. It is testing the null hypothesis that there will be no significant difference in the average (*i.e.* means) degrees of HPWS presence as a result of firm size. One-hundred is used as the *cut-point* in SPSS to separate smaller firms from larger companies. The complete SPSS output of this t-test can be read in appendix H1; the most interesting outcomes are outlined in table 14.

Table 14

Outlined output of the independent-samples t-test

Dependent variable	<i>Levene's F-score</i>	<i>t-score</i>	<i>Significance</i>
<i>degree of HPWS presence</i>	0.226	0.121	0.906

Levene's test for equality of variances has been accomplished. The F-score is shown in the first column of the table. Next is the t-score. This outcome represents the deviation between the means of the two subgroups. At last, the level of significance of this deviation is shown in the last column.

Furthermore, the same t-test will also give insight in the question if there is a significant difference in the average (*i.e.* means) degrees of HPWS presence as a result of firm age. The correlation outcome indicates no significant relationship between the high performance work system and firm age. Ten*, fifteen** and thirty*** are respectively used as *cut-points* in SPSS to separate younger firms from older companies. This is to concede to the arbitrary of firm age. The complete SPSS output of the three tests is shown in appendix H1; the most

interesting outcomes are outlined in table 15. Levene's test for equality of variances has been accomplished again.

Table 15

Outlined output of the independent-samples t-test

Dependent variable	Levene's <i>F</i> -score	<i>t</i> -score	Significance
<i>degree of HPWS presence</i> *	0.173	0.745	0.469
<i>degree of HPWS presence</i> **	0.868	0.852	0.410
<i>degree of HPWS presence</i> ***	0.050	1.533	0.149*

* Level of significance is $\alpha = 0.25$

5.3.1 Interpretation of results

In short, any presence of the high performance work system in an organisation will not be depending upon the size of that organisation. The two-tailed probability $p = 0.906$ is far more than the significance levels of 0.05 or 0.25, which means that the null hypothesis will not be rejected. This study's previous assumption regarding no significant difference in the degree of HPWS presence between smaller and larger firms will hold here.

There is some reason to accept that the age of companies (≥ 5 years) could influence the presence of the high performance work system in organisations. The t-tests show that a difference in firm age is not leading to a significant difference in the degree of HPWS presence at a significance level of 0.05 (p -values are 0.469; 0.410; 0.149). However, it is interesting to notice that the p -values decline when the cut-point is becoming higher.

Considering a significance level of 0.25, this decline suggests that firm age will indeed play a role in the presence of the HPWS in the long run.

5.4 Analysis of hypotheses

Before starting with the final analyses that combine testing hypotheses 1 and 3 – 6, this section will first do a path analysis of the research framework. Because of its unique character hypothesis 2 will be analyzed at last.

5.4.1 Path analysis

Section 5.2 notices several intervening relationships between this study's variables of interest. Figure 3 demonstrates *paths* that reflect those relationships of independent (HPWS), intermediate (e.g. effort and innovation) and dependent (profitability) variables. According to

the theory these paths should explain *how* HRM will influence organisational performance. It is possible to test the significance of the paths by *partial* regressions. Partial regressions measure the extent of effect of one variable on another variable in the path model, thereby controlling for other prior variables⁵. It is another way to get an idea of potential stimulating effects of the variables of interest. Figure 4 presents the *path model* with its path coefficients (standardized regression coefficients – *betas*). Those coefficients reflect the extent of effect of the relationships in the model.

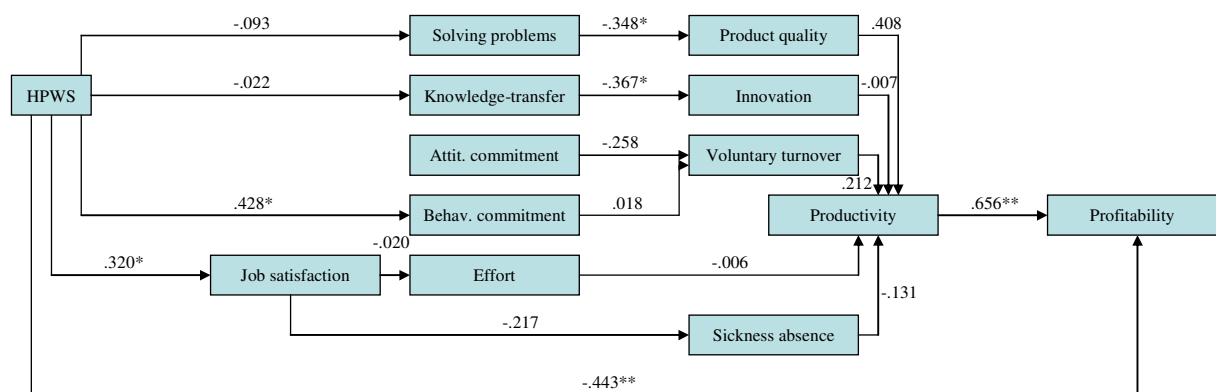


Figure 4: A path analysis of the research framework.

5.4.1.1 Interpretation of results

Notice that most part of the path analysis is done by bivariate regressions (a dependent variable and a single exogenous variable). This means that most standardized regression coefficients (betas) will be the same as the correlations from section 5.2. Yet, it is particularly interesting for those paths that have more than one exogenous variable:

(Path 1) $\text{Voluntaryturnover} = \beta_1 * \text{attitudinalcommitment} + \beta_2 * \text{behaviouralcommitment}$

(Path 2) $\text{Productivity} = \beta_3 * \text{productquality} + \beta_4 * \text{innovation} + \beta_5 * \text{voluntaryturnover} + \beta_6 * \text{effort} + \beta_7 * \text{sicknessabsence}$

(Path 3) $\text{Profitability} = \beta_8 * \text{productivity} + \beta_9 * \text{HPWS}$

The partial regression analysis of path 1 shows there is reason to accept the assumption made in paragraph 3.3.4 that attitudinal commitment is having more impact on the voluntary

⁵ <http://www2.chass.ncsu.edu/garson/pa765/path.htm>

turnover rate (*i.e.* lower rate) than behavioural commitment. The beta of attitudinal commitment indicates a negative relationship between the variable and voluntary turnover rate. However, the betas are not significant – thus no relationships between behavioural and attitudinal commitment on the one hand, and voluntary turnover on the other hand. The partial regression analysis of path 2 also shows no significant relationships between the four operational performance indicators and effort on the one hand, and productivity on the other hand. At last, the analysis of path 3 implies both productivity and HPWS to be positively related to profitability. Their betas – respectively $\beta_8 = 0.656$ and $\beta_9 = 0.443$ – are significant at a significance level of 0.05.

A limitation of path analysis is its sensitivity to model specification, because failure to include relevant causal variables or inclusion of extraneous variables often substantially affects the path coefficients⁶. This limitation needs to be recognized when drawing conclusions based upon path analyses.

5.4.2 Hypotheses 1 and 3 – 6

Hypothesis 1 explicitly suggests a relationship between the degree of HPWS presence on the one hand, and the behavioural outcomes, operational performances and financial performance on the other hand. The following *linear function* describes that relationship (sample estimation):

$$(1) Y_i = b_{0i} + b_{1i} * HPWS + e_i$$

whereby: Y_i = every i dependent variable
 b_{0i} = the intercept
 b_{1i} = the regression coefficient
 e_i = the residual

There are eleven ($i = 1, 2 \dots 11$) dependent variables of interest (five behavioural outcomes, five operational performances, and one financial performance). The model predicts the value of i dependent variable by knowing the value of the degree of HPWS presence. However, this model is not sufficient in order to reflect hypotheses 3 – 6. Those hypotheses suggest that firm size will change – *interact* – the relationships between the degree of HPWS presence and i dependent variables of interest. For example, the impact of the high performance work system

⁶ <http://www2.chass.ncsu.edu/garson/pa765/path.htm>

on the behavioural outcomes is expected to be stronger in larger companies than in smaller firms (hypothesis 3). An *interaction term* will therefore be added to the model to incorporate the joint effect of the two variables *degree of HPWS presence* and *firm size* on *i* dependent variables of interest. The interaction term is a cross-product of standardized variables. The degree of HPWS presence is considered to be already a standardized variable; firm size is standardized in SPSS by the *syntax command Rank firmsize / percent* (Ganzeboom, 2003). The model is as follows:

$$(2) Y_i = b_{0i} + b_{1i} * HPWS + b_{2i} * firmsize + b_{3i} * HPWS * firmsize + e_i$$

Rebuilding the model yields:

$$(2a) Y_i = b_{0i} + (b_{1i} + b_{3i} * firmsize) * HPWS + b_{2i} * firmsize + e_i$$

Based upon this model (2a) it is possible to do a multiple regression analysis for each of *i* dependent variables of interest (*i.e.* eleven regressions). The output regarding term $(b_{1i} + b_{3i} * firmsize)$ gives an indication of the effect of the HPWS on respectively the behavioural outcomes, operational performances and financial performance – which is interesting in testing hypothesis 1. In addition, parameter b_{3i} indicates the role of firm size in the strength of the HPWS impact – which is interesting in testing hypotheses 3 up to 6. The regression output produced by SPSS is outlined in table 16.

Table 16

Outlined output of regression analyses

i	Dependent variable of interest	Regression coefficient		
		b_{1i}	b_{2i}	b_{3i}
1	<i>Problem-solving</i>	-.685*	-.015*	.010*
2	<i>Knowledge-transfer</i>	-.292	-.012	.006
3	<i>Behav. commitment</i>	1.799**	.032**	-.021**
4	<i>Job satisfaction</i>	1.328**	.034**	-.018*
5	<i>Effort</i>	1.370*	.025*	-.018*
6	<i>Product quality</i>	.924*	.011	-.010
7	<i>Innovation</i>	-.086	.003	-.001
8	<i>Vol. turnover rate</i>	.034	.000	.000
9	<i>Sickn. absence rate</i>	-.757	-.003	.006
10	<i>Productivity</i>	349055.7	-3366.52	-618.611
11	<i>Profitability</i>	65654.976*	219.127	-312.494

** Level of significance is $\alpha = 0.05$

* Level of significance is $\alpha = 0.25$

5.4.2.1 Interpretation of results

Hypothesis 1 assumes that a higher (lower) degree of HPWS presence will result in a higher (lower) level of i dependent variables of interest (the reverse for the sickness absence and voluntary turnover rates) in both smaller and larger companies. The regression coefficients b_{1i} and b_{3i} together determine the extent and direction of the HPWS effect on the behavioural outcomes, operational performances and financial performance. Unfortunately, the regression analyses show that these parameters are not significant for knowledge-transfer, innovation, voluntary turnover, sickness absence and productivity. Those analyses will not support any presumption that the high performance work system is related to these outcomes. However, the coefficients for product quality and profitability (respectively $b_{16} = 0.924$ and $b_{111} = 65,654.976$) are significant at a significance level of 0.25. This indicates a positive relationship between the high performance work system on the one hand, and operational and financial performance on the other hand. In addition, the coefficients for problem-solving, behavioural commitment, job satisfaction and effort do suggest a significant relationship between the high performance work system on the one hand, and the behavioural outcomes on the other hand. Yet, problem-solving seems to be stimulated by the HPWS only in large companies while, instead, any presence of the high performance work system is negatively related to problem-solving in small firms. Finally, the other three behavioural outcomes seems to be stimulated by the HPWS only in small firms while, instead, any presence of the high performance work system is negatively related to behavioural commitment, job satisfaction and effort in large companies. In brief, hypothesis 1 is only supported for product quality and profitability.

Hypotheses 3 – 6 assume that the impact of the high performance work system on the behavioural outcomes, operational performances and financial performance will differ as a result of firm size. As mentioned before, the regression coefficient b_{3i} determines the extent and direction of the effect that firm size has on the HPWS impact. Hypothesis 3 assumes that the impact on the behavioural outcomes will be stronger in larger companies for any given degree of HPWS presence than in smaller firms. This hypothesis is partially supported. It seems that the HPWS impact on problem-solving is significant higher if the size of the organisation is growing (although the extent of this increasing impact is not high). However, it is surprising that the HPWS impact on behavioural commitment, job satisfaction and effort becomes significantly less strong in larger companies than in smaller firms. In brief, hypothesis 3 is only supported for problem-solving.

Hypothesis 4 assumes that the impact on productivity will be stronger in larger companies for any given degree of HPWS presence than in smaller firms. Moreover, it assesses a stronger positive impact on the voluntary turnover rate (*i.e.* a lower rate) in smaller firms than in larger companies. The coefficient for productivity is $b_{310} = -618.611$ which indicates, instead of an expected stronger impact in larger companies, an impact on productivity that will decrease when the firm is becoming larger. Yet, this interpretation cannot be accepted at a significance level of 0.25. Neither it is acceptable to believe that a positive HPWS impact on the voluntary turnover rate will be significantly stronger in smaller firms than in larger companies. The parameter for voluntary turnover does not even suggest any interacting firm size effect ($b_{38} = 0.000$). In brief, hypothesis 4 is rejected.

Hypothesis 5 assumes that the impact on product quality and innovation will be stronger in smaller firms for any given degree of HPWS presence than in larger companies. Moreover, it assesses a stronger positive impact on the sickness absence rate (*i.e.* a lower rate) in larger companies than in smaller firms. The coefficients for product quality and innovation are respectively $b_{36} = -0.010$ and $b_{37} = -0.001$ which indicate, as expected, an impact on these two operational performances that will decrease in strength when the firm is becoming larger. Again, this interpretation cannot be accepted at a significance level of 0.25. Neither it is acceptable to believe that a positive HPWS impact on the sickness absence rate will be stronger in larger companies. The parameter for sickness absence ($b_{39} = 0.006$) suggests otherwise but, anyhow, is not significant. In brief, hypothesis 5 is rejected.

Hypothesis 6 assumes that the impact on profitability will be stronger in larger companies for any given degree of HPWS presence than in smaller firms. The coefficient for profitability is $b_{311} = -312.494$ which indicates, instead of an expected stronger impact in larger companies, an impact on profitability that will decrease when the firm is becoming larger. Once again, this interpretation cannot be accepted at a significance level of 0.25. Either ways, hypothesis 6 is rejected.

Finally, there seems to be also a *main effect* between the independent variable *firm size* on the one hand, and several behavioural outcomes on the other hand. The coefficients for behavioural commitment, job satisfaction and effort (respectively $b_{23} = 0.032$; $b_{24} = 0.034$; $b_{25} = 0.025$) suggest a positive relationship between firm size and these three behavioural outcomes. The parameters are significant at a significance level of 0.05 (behavioural

commitment and job satisfaction) or 0.25 (effort). On the other hand, firm size is negatively associated with problem-solving. Its coefficient ($b_{21} = -0.015$) is significant at a significance level of 0.25.

5.4.3 Firm age and sector of industry in regressions

Several scholars have suggested that factors as *sector of industry* and *firm age* could play a determining role in research results on HRM and organisational performance. The role of both factors in this research study will be assessed by a change in *R Square* (R^2) when stepwise entering one of the variables to the regressions each time. R^2 represents the proportion of variance in i dependent variables of interest predictable from the independent variable(s) (Kirkpatrick & Feeney, 2003). Two *dummy* variables will reflect the sectors of industry that appear in the sample (*dummy1* = 1 if consultancy, 0 if otherwise; *dummy2* = 1 if wholesale trade, 0 if otherwise). There are always at least one fewer dummy variables than there are categories. Thus, the third category – *other sectors of industry* – is coded 0 on all the dummies. Firm age, *dummy1* and *dummy2* are stepwise entered in the regression analyses. This method can be modelled:

$$(3) Y_i = b_{0i} + (b_{1i} + b_{3i} * \text{firmsize}) * \text{HPWS} + b_{2i} * \text{firmsize} + b_{4i} * \text{firmage}$$

$$(4) Y_i = b_{0i} + (b_{1i} + b_{3i} * \text{firmsize}) * \text{HPWS} + b_{2i} * \text{firmsize} + b_{4i} * \text{firmage} + b_{4i} * \text{dummy1}$$

$$(5) Y_i = b_{0i} + (b_{1i} + b_{3i} * \text{firmsize}) * \text{HPWS} + b_{2i} * \text{firmsize} + b_{4i} * \text{firmage} + b_{4i} * \text{dummy1} + b_{5i} * \text{dummy2}$$

Table 17 presents the outlined regressions output. The columns 1 – 4 reflect the R^2 of respectively the original model (2a), that model including firm age (3), that model including *dummy1* (4), and that model including *dummy2* (5). The F-test is used to test the significance of the R Squares.

5.4.3.1 Interpretation of results

Table 17 shows that, by stepwise entering firm age, *dummy1* and *dummy2* in the regression model, the R Square for behavioural commitment only slightly increases. It means that those independent variables do not really have a substantial share in helping to *explain* the variance in behavioural commitment. Moreover, the model's significance is decreasing by stepwise

entering firm age, dummy1 and dummy2 (appendix H2). That also applies for job satisfaction and profitability.

Table 17

R Squares of stepwise regressions

i	Dependent variable of interest	R^2	incl. firm age R^2	incl. dummy1 R^2	incl. dummy2 R^2
1	<i>Problem-solving</i>	.206	.225	.254	.301
2	<i>Knowledge-transfer</i>	.122	.124	.128	.129
3	<i>Behav. commitment</i>	.482*	.492*	.508*	.571*
4	<i>Job satisfaction</i>	.466*	.466*	.476*	.477
5	<i>Effort</i>	.298	.308	.364	.368
6	<i>Product quality</i>	.247	.248	.257	.335
7	<i>Innovation</i>	.085	.155	.550*	.552
8	<i>Vol. turnover rate</i>	.240	.248	.353	.415
9	<i>Sickn. absence rate</i>	.098	.390*	.395	.401
10	<i>Productivity</i>	.319*	.424*	.424	.714*
11	<i>Profitability</i>	.541**	.597**	.604*	.665*

** Level of significance is $\alpha = 0.05$

* Level of significance is $\alpha = 0.25$

However, the R^2 for innovation will highly increase when dummy1 is entered in model (3). It indicates a significant share of this particular sector of industry (*i.e.* consultancy) in helping to *explain* the variance in innovation. Its regression coefficient ($b_{47} = 0.533$; significant at a significance level of 0.05) suggests a positive relationship between the consultancy sector and innovation (appendix H2). Furthermore, the R^2 for sickness absence will highly increase when firm age is entered in model (2). It indicates a significant share of firm age in helping to *explain* the variance in the sickness absence rate. Entering firm age makes all regression coefficients significant at a significance level of 0.25 (appendix H2). Model (3) will be as follows:

$$(3) \text{ Sickn. absence} = 9.436 + (-2.456 + 0.032 * \text{firm size}) * \text{HPWS} - 0.045 * \text{firm size} + 0.031 * \text{firm age}$$

This new model will not change the fact that hypotheses 1 and 5 are rejected. However, a lower sickness absence rate now seems to be stimulated by the HPWS in small firms, but this does not apply for large companies. Thus, hypothesis 1 remains rejected for the sickness absence rate. Also, the coefficient $b_{39} = 0.032$ suggests the reverse of what was expected,

namely a significant stronger impact on the sickness absence rate (*i.e.* a lower rate) in smaller firms than in larger companies. Hypothesis 5 still remains rejected.

The R^2 for productivity will highly increase when dummy2 is entered in model (4). It indicates a significant share of this particular sector of industry (*i.e.* wholesale trade) in helping to *explain* the variance in productivity. Entering dummy2 makes the regression coefficients of HPWS, firm age and dummy2 significant at a significance level of respectively 0.25, 0.25 and 0.05 (appendix H2). Model (5) will be as follows:

$$(5) \text{ Productivity} = -2,839,812 + 1,061,401 * \text{HPWS} - 12,647.50 * \text{firmage} + 1,180,260 * \text{dummy2}$$

This new model shows a positive relationship between the high performance work system and productivity for companies of all sizes. Hypothesis 1 will now be supported for productivity too. Notable is the significant negative relationship between firm age and productivity.

5.4.4 Hypothesis 2

Hypothesis 2 assumes that the level of attitudinal commitment will be higher in smaller firms than in larger companies. It is possible to describe the *attitudinal commitment* scores per subgroups *smaller firms* (with ten up to 100 employees) and *larger firms* (with 100 up to 200 employees). The *average* scores on attitudinal commitment between these two subgroups can also be compared. Table 18 shows that the average score for larger companies is higher than the average score for smaller firms. Like r at first sight, it implies an increase in firm size to be associated with more attitudinal commitment.

Table 18

Average scores of attitudinal commitment in smaller and larger firms

Measures of dispersion	<i>Smaller firms</i>	<i>Larger firms</i>
<i>Median</i>	2,84	3,00
<i>Mean</i>	2,88	2,95

However, the independent-samples t-test will give insight in the question if there is a significant difference in the (average) level of attitudinal commitment as a result of firm size. One-hundred is used as the *cut-point* in SPSS to separate smaller firms from larger

companies. The complete SPSS output of this t-test can be read in appendix H1; the most interesting outcomes are outlined in table 19.

Table 19

Outlined output of the independent-samples t-test

Dependent variable	Levene's F-score	t-score	Significance
Attitudinal commitment	0.441	0.138	0.892

Levene's test for equality of variances has been accomplished. The F-score is shown in the first column of the table. Next is the t-score. At last, the level of significance of this deviation is shown in the last column.

5.4.4.1 Interpretation of results

A significant higher level of attitudinal commitment was expected in smaller firms but, instead, it seems at first sight that there will be more attitudinal commitment in larger companies. Yet, there is no significant prove (at a significance level of 0.25) that the level of attitudinal commitment will actually differ as a result of firm size ($p = 0.892$). In brief, hypothesis 2 is rejected.

5.5 Summary of main results

The main results of last sections, derived from quantitative analyses, can be outlined graphically in figure 5:

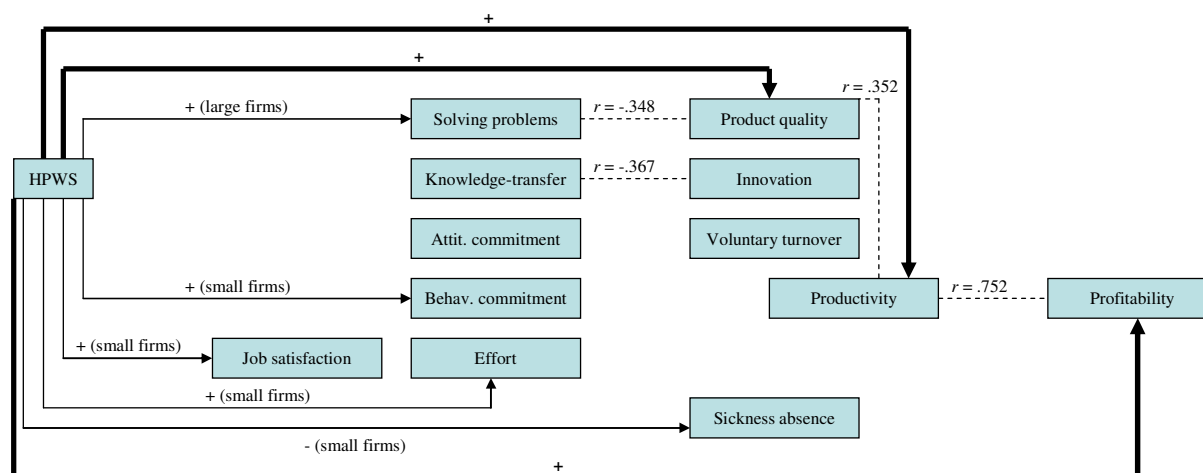


Figure 5: The main results after quantitative analyses.

The thick arrows represent relationships between two variables of interest that are not affected by firm size. The analyses have shown significant positive relationships between the high performance work system on the one hand, and product quality, productivity and profit on the other hand. Those hold for both smaller and larger companies. Moreover, there is found no significant difference in the HPWS impact on these organisational performances as a result of firm size.

Secondly, the normal (closed) arrows represent relationships between two variables of interest that are affected by firm size. The analyses have shown that the HPWS impact on respectively behavioural commitment, job satisfaction and effort is significantly stronger in smaller firms than in larger companies. More specifically, a positive impact seems to occur in small firms while, instead, a positive impact on these behavioural outcomes is slowing down in large companies. The HPWS impact on the sickness absence rate is also significantly stronger (*i.e.* lower rate) in smaller firms than in larger companies (*i.e.* higher rate). Furthermore, the HPWS impact on problem-solving is significantly stronger in larger companies than in smaller firms. A positive impact seems to occur in large companies while, instead, a positive impact on this behavioural outcome is slowing down in small firms.

No significant relationships are found between the high performance work system on the one hand, and knowledge-transfer, innovation and the voluntary turnover rate on the other hand. Also, firm size is not significantly related to attitudinal commitment. In the case of voluntary turnover, more scholars were troubled by a lack of evidence that HRM is related to this operational performance (Sels *et al.*, 2006). However, others have found evidence (Guthrie *et al.*, 2004). The stepwise regression analyses do suggest that a company's level of innovation is more depending upon the sector of industry wherein that organisation is operating. At last, no relationship with knowledge-transfer implies that the high performance work system cannot motivate employees to apply their knowledge. Perhaps, the compositions of the high performance work system (of the firms in the sample) are not suitable in motivating knowledge-transfer.

Finally, a significant correlation between product quality and productivity (dotted arrow) perhaps indicates a relationship between both variables of interest. A positive relationship is assumed in the theoretical part of this study. That also applies for productivity and profit, which show a significant high correlation. However, a negative correlation between problem-

solving and product quality was not expected, and neither between knowledge-transfer and innovation. A possible explanation is a time lag (any activity of problem-solving and knowledge-transfer in period 1 will lead to respectively product quality and innovation in period 2, 3...n).

5.5.1 Discussion

In chapter three, several characteristics have been named that are assumed to be representative for smaller firms (*e.g.* limited resources, more informal, no middle-management and many competitors). Moreover, these characteristics are expected to lead to less effective practices in the high performance work system of smaller firms, resulting in a lower level of the behavioural outcomes (compared to larger companies which are expected not to have these *negative* characteristics). The questionnaires include questions which answers will indicate if these characteristics are present in the companies from the sample. That is done in order to have the opportunity to assess if a potential lower level of behavioural outcomes is associated with the characteristics. Not only was expected that smaller firms will have lower levels of behavioural outcomes (given a certain degree of HPWS presence), but also that only those firms will have the mentioned characteristics. However, the main results have shown that the high performance work system is perhaps more effective in smaller firms in stimulating some behavioural outcomes (effort, behavioural commitment and job satisfaction). Now, the question is if the mentioned characteristics are indeed only present in smaller firms.

Because of their assumed limited resources it was expected that on the question, *how many people are involved into the selection process of job applicants*, the average for smaller firms would be below the average for larger companies. Indeed, the average for smaller firms was below the average for larger companies. It was also expected that costs are the most important consideration for smaller firms in adapting a particular formal training. However, none of the companies gave those as reason. Furthermore, no HR department was expected in smaller firms because of their more informal character. Yet, the question, *was there a HR department in the organisation*, was confirmed by all companies. Another question, *do the most jobs consist of concretely defined work tasks*, also indicates the extent of informality. This question was negatively answered by three companies. It was expected that no well-defined jobs mostly occur in smaller firms. Indeed, those three companies were all smaller organisations. Nine companies gave an affirmative answer on the question *if a middle-management is responsible for the daily operations*. As expected, mostly larger companies agreed that a

middle-management is present in the organisation. If not present, it is expected that the owner is a direct supervisor of the employees (which is considered as negative for the effectiveness of the high performance work system). On the question, *if the owner is a direct supervisor of the employees*, eight companies gave an affirmative answer. As expected, most were smaller firms. At last, twelve companies agreed on the question *if there are many competitors in the market of the company*. Those were both smaller and larger organisations.

In brief, these results could suggest that a lack of middle-management, an informal work structure and limited resources is more characteristic of smaller firms. It may explain the less strong HPWS impact on problem-solving in smaller firms. However, there is no significant evidence for these suggestions. Moreover, if these potential characteristics are present only in smaller firms it does not explain the stronger HPWS impact on behavioural commitment, job satisfaction and effort in smaller firms.

6. Conclusion

Interest in the share of human resource management in organisational performance has risen sharply over the past decade. In the beginning, most research studies about the effect of human resource management on organisational performance were done in large companies. Nowadays, more attention is given to small and medium sized enterprises in examining effects of HRM on operational and/or financial performance. However, much unclearness remains in this field of study.

In general, *how* will HRM stimulate organisational performance? Many studies have agreed a positive relationship between human resource management and performance, but only few have addressed how this relationship exactly will occur – thereby including employee behaviour. Secondly, is the impact of HRM on organisational performance depending on *firm size*? It is the central question of this research study. A high performance work system has been involved in answering this question. There is namely a growing adoption to approach high performance work systems as essential in HRM. In this way, this research study is an expansion of prior research about the relationship between high performance work systems and organisational performance.

The conclusions regarding this study's goal will be presented first, before recommendations will be done for future research.

6.1 Conclusions

A stepwise approach (reflected by the research questions) has helped guiding this study to an answer on the central question. In the first place, organisational performance has been defined as an objective dominated by the company and created by (aggregated) measurements at an organisational level. Moreover, it can be divided in the *lower-levelled* operational performance and the *higher-levelled* financial performance.

Secondly, the essence of human resource management has been defined as activities to select, develop, motivate and retain employees with required characteristics. The high performance work system includes these activities, also called *HR practices*. The HR practices together in the system have been considered as the driving force behind the stimulating effect of HRM on organisational performance (operational and financial).

Furthermore, a developed theoretical framework (based upon theories and research done in large companies) assumes that a positive relationship between HRM and organisational performance will occur through several intermediate causal relationships. The high performance work system will stimulate employees' behavioural outcomes, which in turn have a positive effect on operational performance. Subsequently, operational performance will stimulate financial performance.

At last, the following characteristics – *limited resources, informal work structure, lack of middle-management, many direct competitors* – have been assumed as characteristic of smaller firms. These characteristics will distinguish smaller from larger companies and, therefore, can be used to determine the firm size effect on the impact of HRM on organisational performance. In theory, the firm size effect has been determined by considering the influences of those mentioned characteristics on the (intermediate) relationships in the theoretical framework.

Empirical research has shown that a difference in the impact of human resource management on organisational performance can occur as a result of firm size. The multiple regression analysis for *sickness absence rate* indicates a relationship between the high performance work system and this operational performance variable. In addition, the analysis also suggests that a given degree of HPWS presence will result in a lower voluntary turnover rate in smaller firms than in larger companies.

Other multiple regression analyses have found no further significant firm size effect that will influence the HPWS impact on other organisational performance indicators. The high performance work system seems to stimulate the operational performances *product quality* and *productivity* but, however, no difference in this effect has been found between smaller and larger companies. The high performance work system is also positively related to the financial performance *profit* but, again, no evidence of a firm size effect has been found here.

It is not unlikely that HPWS' stimulating effect on profit is mainly caused by its positive impact on productivity. Productivity is considered as the main driver behind profit. Empirical research has shown that productivity is highly associated with profitability in this study ($r = 0.752$). The path analysis presents a significant positive relationship between the performance indicators. Moreover, product quality could be an intervening variable in the positive

relationship between the high performance work system and productivity. A good product quality is assumed to help achieving a higher productivity by its efficiency outcomes (no waste of time and effort). The correlation between both organisational performances is significant ($r = 0.352$).

It was also expected that the operational performance indicators sickness absence, *innovation* and *voluntary turnover* would act as intervening variables in the positive relationship between the HPWS and productivity. But, instead, no significant associations have been found between these two performances and productivity. Neither a significant association was found between innovation and productivity.

The significant association between *knowledge-transfer* and innovation might confirm the presumption that this behavioural outcome is an intervening variable in a relationship between the high performance work system and innovation. However, a stepwise regression analysis has found no relationship between the HPWS and innovation but, instead, a company's level of innovation seems to be more depending upon the sector of industry wherein the organisation is operating. Also, a negative correlation ($r = -0.367$) is not conform the expectation that knowledge-transfer is stimulating innovation. A time lag could be a possible explanation for this phenomenon (knowledge-transfer in period 1 will lead to innovation in period 2, 3...n). It could also be the reason for the negative correlation found between *problem-solving* and product quality ($r = -0.348$). This behavioural outcome perhaps is an intervening variable in the positive relationship between the HPWS and product quality, because it requires abilities (identifying problems, generating solutions, quickly solving) that might increase the product quality in the long run.

The analyses have shown no significant relationships between the other behavioural outcomes on the one hand, and some operational performances on the other hand. No association was found between *effort* and productivity. Furthermore, *job satisfaction* was expected to stimulate a low sickness absence rate and, moreover, a high level of effort. Again, no associations were found here. It also applies for *behavioural commitment* and *attitudinal commitment*, which were expected to stimulate a low voluntary turnover rate. The first should act as an intervening variable in the positive impact of the high performance work system on voluntary turnover (*i.e.* low rate). However, no significant relationship was found between the HPWS and voluntary turnover.

The mentioned behavioural outcomes were considered as the intermediate variables in the relationship between HRM (*i.e.* HPWS) and organisational performance (*i.e.* operational and financial performance). However, the analyses have shown that only for problem-solving such an intervening role can be suggested. This behavioural outcome is not only significantly associated with product quality but also with the high performance work system.

The multiple regression analysis indicates a relationship between the high performance work system and problem-solving. In addition, the impact of a given degree of HPWS presence on problem-solving seems to be stronger in larger companies than in smaller firms. Although not proven, this result might indicate the negative influence of the assumed characteristics of smaller firms on the effectiveness of the HR practices in the high performance work system. Output from the questionnaires does suggest that limited resources, an informal work structure and a lack of middle-management are more characteristic of smaller firms. Yet, no significant prove has been obtained for this suggestion.

A potential presence of those characteristics in smaller firms does not seem to affect the HPWS impact on behavioural commitment, job satisfaction and effort. The multiple regression analyses show that firm size is having a determining role in the strength of the HPWS impact on these behavioural outcomes. However, the impact of a given HPWS presence is significant stronger in smaller firms than in larger companies (instead of an expected less strong impact). No significant relationship was found between the HPWS and knowledge-transfer.

In brief, the firm size effect has been tested for six dependent organisational performance indicators. This study has found a firm size effect for one (operational) performance indicator, namely sickness absence. The conclusion is that the impact of HRM on organisational performance depends to a limited extent on firm size. The firm size effect has also been tested for five dependent behavioural outcomes. This study has found a firm size effect for four behavioural outcomes, namely problem-solving, behavioural commitment, job satisfaction and effort. It can be concluded that the impact of HRM on employee performance (*i.e.* behavioural outcomes) depends to a large extent on firm size.

6.2 Limitations

It is important to notice that the conclusions are based upon an empirical research study with a sample group of only 15 companies. A large sampling error can occur when using a small sample size. There is a chance that the measured associations are *only* due to sampling error (also because a significance level of 0.25 is used). Therefore, it cannot be said if the measured results of this study are representative outcomes. Nevertheless, the results do give a first indication about the relationship between HRM and organisational performance – and the role of firm size herein.

Secondly, a high performance work system with seven particular HR practices represents human resource management in this study. The choice for these *standardized* practices is based upon prior research studies. However, it is possible that a combination of other practices will result in other conclusions on the problem statement. The quality (effectiveness) of those HR practices is perhaps more depending upon firm size, resulting in differences in the impact of HRM on organisational performance as a result of firm size.

6.3 Future research

It is important that future research studies will give more attention to the question „*how will HRM influence organisational performance?*“. Little is known about the *paths* HRM takes to become valuable in achieving organisational performance. More research will result in completing the puzzle of a phenomenon that now is still indicated as a *black box*. Although with prudence, this study's conclusions can be used to solve the *black box* in future research.

It is important for two reasons. First, insight in the phenomenon can help giving direction to future HR policy in organisations. Companies will use high performance work systems or HR practices more effectively for particular performance indicators. Secondly, explanations for differences in HRM impact on organisational performance as a result of firm size (or other factors) can only be given if one knows the structure of such impact. Only if the *paths* between HRM and organisational performance are known, differences on these *paths* can be signalled and, subsequently, linked to factors as firm size.

Appendices

A) Voluntary turnover formula

$$\frac{\text{Total worker separations}^*}{\text{Number of employees}^{**}} = \dots\dots \text{(Rate)}$$

* Include all permanent terminations of regular employees, voluntary, that occurred during a given period. Do not include involuntary terminations (*e.g.* retirement, discharge, death, job eliminations). Do also not include departures of temporary staff.

** Include all full- and part-time employees on the active payroll who worked at least 20 hours per week during the given period. Do not include temporary staff and employees on layoff during the selected period.

B) Items on HPWS practices

Extensiveness of staffing

To what extent is each of the following four selection devices used in this company to evaluate job candidates? Please indicate for every selection device on a five-point scale (1=never; 2=sometimes; 3=average; 4=often; 5=always):

- | | | | | | |
|--------------------------------------|---|---|---|---|---|
| • Interviews | 1 | 2 | 3 | 4 | 5 |
| • Tests | 1 | 2 | 3 | 4 | 5 |
| • Work samples | 1 | 2 | 3 | 4 | 5 |
| • References from previous employers | 1 | 2 | 3 | 4 | 5 |

Group-based performance pay

Please AGREE or DISAGREE with the following statement: „One or more of the four benefits below is/are offered to operational staff in this company.”

- Profit-sharing
- Bonuses
- Share plans
- Stock options

The answer is: AGREE / DISAGREE (please blot out what does **not** apply).

Pay level

Compare the level of base salary offered in this company with the level of base salary for identical operational jobs in other companies. The base salary offered in this company is (please mark what does apply):

- Below average
- Average
- Above average

Job rotation

What percentage of the employees in this company is involved in job rotation (*i.e.* varying different jobs and/or tasks within the organisation)?

I assess percent (please fill in on a scale from 0 to 100).

Self-directed teams

What percentage of the employees in this company is involved in self-managed teams (*i.e.* in working teams without direct supervisory)?

I assess percent (please fill in on a scale from 0 to 100).

Formal training

What percentage of the employees in this company receives formal, out-of-firm training?

I assess percent (please fill in on a scale from 0 to 100).

Involvement in meetings discussing work-related issues

What percentage of the employees in this company is involved in regularly scheduled meetings to discuss work-related issues?

I assess percent (please fill in on a scale from 0 to 100).

C) Items on behavioural outcome variables

Problem-solving: solutions found

Focusing on problems that you encountered during your work, to what extent do you AGREE or DISAGREE with the following statements? Please indicate for every statement on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I identified several alternative solutions for each problem encountered.

1 2 3 4 5 6

- I seemed to always come up with solutions to problems encountered.

1 2 3 4 5 6

- It was always easy to identify new solutions to the problems.

1 2 3 4 5 6

Problem-solving: speed of solving problems

Focusing on problems that you encountered during your work, to what extent do you AGREE or DISAGREE with the following statements? Please indicate for every statement on a six-point scale (6=strongly disagree; 5=disagree; 4=sort of disagree; 3=sort of agree; 2=agree; 1=strongly agree):

- Solutions found for problems I faced were not timely.

1 2 3 4 5 6

- I was very slow in finding and implementing solutions to the problems I encountered.

1 2 3 4 5 6

- Ideas for solving the problems encountered were discovered rather late to be implemented successfully.

1 2 3 4 5 6

Knowledge-transfer

Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I often have an opportunity to talk to other employees in this organisation about successful work activities in order to understand why they succeed.
1 2 3 4 5 6
- Failures are almost always constructively discussed in this organisation.
1 2 3 4 5 6
- New work processes that may be useful to the organisation as a whole are usually shared with all employees.
1 2 3 4 5 6

Behavioural commitment

Consider your working conditions (*i.e.* compensation, development and independency opportunities) in this organisation. Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- One of the major reasons I continue to work for this company is that leaving would require considerable personal sacrifice – another company may not match the overall benefits I have now.
1 2 3 4 5 6
- It will be very hard for me to leave this organisation right now, even if I want to.
1 2 3 4 5 6
- Too much in my life will be disrupted if I decide that I want to leave this organisation now.
1 2 3 4 5 6

Attitudinal commitment

Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I do feel “emotionally attached” to this organisation.

1 2 3 4 5 6

- This organization has a great deal of personal meaning to me.

1 2 3 4 5 6

- I do feel like “part of the family” at this organisation.

1 2 3 4 5 6

Job satisfaction: empowerment

Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- My job gives me many chances to use my personal initiative or judgement in carrying out the work.

1 2 3 4 5 6

- My job gives me considerable opportunity for independence and freedom in how to do the work.

1 2 3 4 5 6

- My job gives me many opportunities to do a variety of tasks which utilize many of my skills.

1 2 3 4 5 6

Job satisfaction: compensation

Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I feel I am being paid an adequate amount for the work I do.

1 2 3 4 5 6

- I am satisfied with the benefits I receive in my job.

1 2 3 4 5 6

- I feel satisfied with my chances for salary increases.

1 2 3 4 5 6

Effort: time

Consider your work in this organisation. Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- Other people know me by the long hours I keep.

1 2 3 4 5 6

- Few people put in more hours weekly than I do.

1 2 3 4 5 6

Effort: work intensity

Consider your work in this organisation. Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I work at my full capacity in all my job duties.

1 2 3 4 5 6

- I strive as hard as I can to be successful in my work.

1 2 3 4 5 6

- When there is a job to be done, I devote all my energy to getting it done.

1 2 3 4 5 6

D) Items on operational performance variables

Product quality

Please indicate what measure on a six-point scale is related to the following statements

(1=never; 2=sometimes; 3=regular; 4=often; 5=almost always; 6=always):

- This company's products conform to performance specifications required by its customers.

1 2 3 4 5 6

- This company's products performances meet the requirements of its customers.

1 2 3 4 5 6

- The design of this company's products meets the quality standards expected by its customers.

1 2 3 4 5 6

Innovation

Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- It often occurs that minor or major improvements are done to the products that this company offers to its customers.

1 2 3 4 5 6

- It often occurs that minor or major improvements are done in the services this company offers to its customers.

1 2 3 4 5 6

- It often occurs that minor or major improvements are done in the ways this company achieves its products.

1 2 3 4 5 6

Voluntary turnover

Please give the figure of all permanent terminations of regular employees, voluntary, that occurred during a given period. Do not include involuntary terminations (*e.g.* retirement, discharge, death, job eliminations). Do also not include departures of temporary staff.

The figure is: employees (please fill in).

Please give the figure of all full- and part-time employees on the active payroll who worked at least 20 hours per week during the given period. Do not include temporary staff and employees on layoff during the selected period.

The figure is: employees (please fill in).

Sickness absence rate

In which class did the sickness absence rate (*excluding* maternity leave) of this company fall (please mark what does apply)?

- 0 percent
- Less than 2 percent
- 2 – less than 3 percent
- 3 – less than 4 percent
- 4 – less than 5 percent
- 5 – less than 6 percent
- 6 – less than 7 percent
- 7 percent and more

E) Content of first e-mail

Dear Sir/Madam,

Referring to our telephone conversation on (DATE), I am sending you three questionnaires that belong to research on the impact of certain human resource practices on employees' behaviour and operational performance in companies. The research is on behalf of my final thesis for the master Business & Economics at the Erasmus University Rotterdam.

I would like to ask your company to participate in this research study by completing the attached questionnaires. The completion of every questionnaire will take only five to ten minutes. The questionnaire, called "Respondent CEO", has to be completed by the company's chief executive officer (alternatively: a business manager). The questionnaire, called "HR department", has to be completed by an employee from the HR department. If this department was not present in the firm in year 2006, I would like to ask the chief executive officer also to complete this questionnaire. The questionnaire, called "Questionnaire employee", has to be completed by – preferably – one to three (three to five for larger companies) employees who have an operational function related to the core business of the firm.

Finally, if desirable you can send the completed questionnaires (in Microsoft Word) directly to my e-mail address: fons.kortekaas@gmail.com. If otherwise, I can collect the questionnaires at the time you have completed them.

Hopefully your company will participate in this research study. If there are questions and/or comments, please do not hesitate to contact me. I would like to thank you in advance for your cooperation.

Best regards,

Fons Kortekaas
Student Business & Economics
Erasmus University Rotterdam

F) Frequency distributions

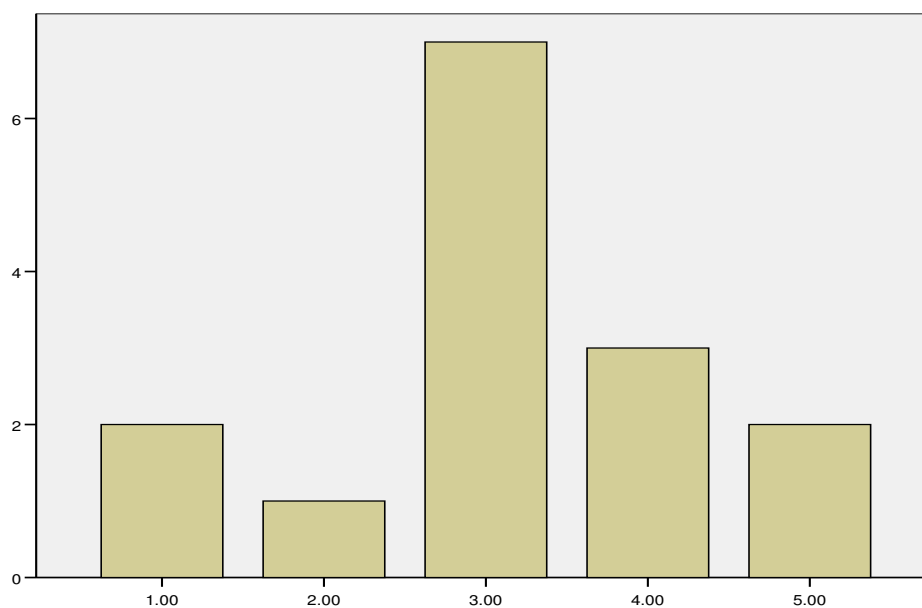
Table i

Frequency distribution of high performance work system

Value	HPWS		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
2.30	1	6.7	6.7
2.40	1	6.7	13.3
2.80	1	6.7	20.0
3.00	2	13.3	33.3
3.05	1	6.7	40.0
3.15	1	6.7	46.7
3.20	2	13.3	60.0
3.35	1	6.7	66.7
3.65	1	6.7	73.3
3.85	1	6.7	80.0
3.90	1	6.7	86.7
4.10	1	6.7	93.3
4.25	1	6.7	100.0
Total	15	100.0	100.0

Figure i

Histogram of high performance work system



1 = HPWS scores between 2.00 – 2.50

2 = HPWS scores between 2.50 – 3.00

3 = HPWS scores between 3.00 – 3.50

4 = HPWS scores between 3.50 – 4.00

5 = HPWS scores between 4.00 – 4.50

Table ii (a)

Frequency distribution of problem-solving

Value	Problem-solving		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
3.83	4	26.7	26.7
4.00	4	26.7	53.3
4.17	1	6.7	60.0
4.33	1	6.7	66.7
4.50	1	6.7	73.3
4.67	2	13.3	86.7
4.83	1	6.7	93.3
5.00	1	6.7	100.0
Total	15	100.0	100.0

Table ii (b)

Frequency distribution of knowledge-transfer

Value	Knowledge-transfer		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
3.33	1	6.7	6.7
3.67	3	20.0	26.7
4.00	4	26.7	53.3
4.33	2	13.3	66.7
4.67	3	20.0	86.7
5.00	2	13.3	100.0
Total	15	100.0	100.0

Table ii (c)

Frequency distribution of behavioural commitment

Value	Behavioural commitment		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
2.00	3	20.0	20.0
2.33	2	13.3	33.3
2.67	1	6.7	40.0
3.00	4	26.7	66.7
3.33	2	13.3	80.0
3.67	1	6.7	86.7
4.00	2	13.3	100.0
Total	15	100.0	100.0

Table ii (d)

Frequency distribution of attitudinal commitment

Value	Attitudinal commitment		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
3.00	3	20.0	20.0
3.33	4	26.7	46.7
3.67	3	20.0	66.7
4.00	2	13.3	80.0
4.33	1	6.7	86.7
4.67	1	6.7	93.3
5.00	1	6.7	100.0
Total	15	100.0	100.0

Table ii (e)

Frequency distribution of job satisfaction

Value	Job satisfaction		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
3.17	1	6.7	6.7
3.50	3	20.0	26.7
4.00	2	13.3	40.0
4.17	1	6.7	46.7
4.33	1	6.7	53.3
4.50	1	6.7	60.0
4.67	1	6.7	66.7
4.83	1	6.7	73.3
5.00	2	13.3	86.7
5.17	2	13.3	100.0
Total	15	100.0	100.0

Table ii (f)

Frequency distribution of effort

Value	Effort		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
3.20	1	6.7	6.7
3.40	2	13.3	20.0
3.60	1	6.7	26.7
3.80	4	26.7	53.3
4.00	4	26.7	80.0
4.60	2	13.3	93.3
6.00	1	6.7	100.0
Total	15	100.0	100.0

Table iii (a)

Frequency distribution of product quality

Value	Product quality		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
3.33	1	6.7	6.7
4.00	1	6.7	13.3
4.67	3	20.0	33.3
5.00	7	46.7	80.0
5.33	1	6.7	86.7
6.00	2	13.3	100.0
Total	15	100.0	100.0

Table iii (b)

Frequency distribution of innovation

Value	Innovation		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
4.33	5	33.3	33.3
4.67	5	33.3	66.7
5.00	4	26.7	93.3
5.33	1	6.7	100.0
Total	15	100.0	100.0

Table iii (c)

Frequency distribution of voluntary turnover rate

Value	Voluntary turnover rate		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
0.02	3	20.0	20.0
0.03	2	13.3	33.3
0.04	3	20.0	53.3
0.05	2	13.3	66.7
0.06	2	13.3	80.0
0.09	1	6.7	86.7
0.10	1	6.7	93.3
0.16	1	6.7	100.0
Total	15	100.0	100.0

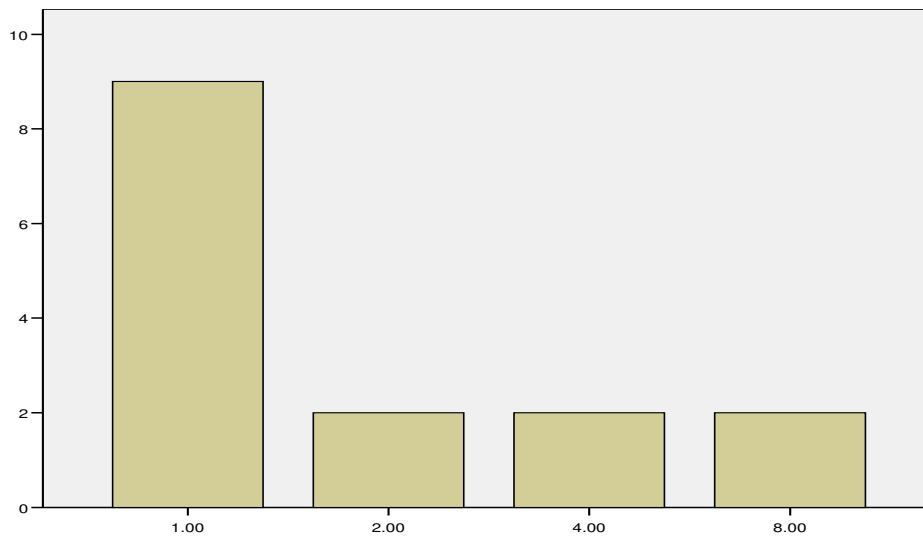
Table iii (d)

Frequency distribution of sickness absence rate

Value	Sickness absence rate		
	<i>Frequency</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
<i>less than 2</i>	2	13.3	13.3
<i>2 - less than 3</i>	2	13.3	26.7
<i>3 - less than 4</i>	4	26.7	53.3
<i>4 - less than 5</i>	6	40.0	93.3
<i>5 - less than 6</i>	1	6.7	100.0
Total	15	100.0	100.0

Figure iii

Histogram of productivity



1 = productivity € 0.00 – € 200,000

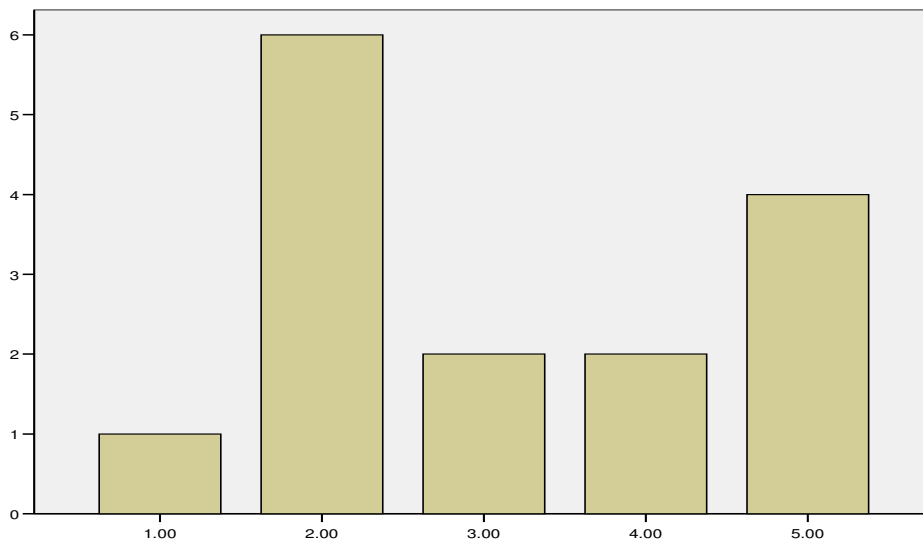
2 = productivity € 200,000 – € 400,000

4 = productivity € 600,000 – € 800,000

8 = productivity € 1,400,000 – € 1,600,000

Figure iv

Histogram of profitability



1 = (EBIT minus tax) / employees € less than 0.00

2 = (EBIT minus tax) / employees € 0.00 – € 5,000

3 = (EBIT minus tax) / employees € 5,000 – € 10,000

4 = (EBIT minus tax) / employees € 10,000 – € 15,000

5 = (EBIT minus tax) / employees € more than 15,000

G) Measures of central tendency and dispersion

Table v (a)

Central tendency and dispersion of high performance work system

Descriptive statistics	<i>HPWS score</i>
<i>N</i> Valid	15
Missing	0
Mean	3.28
Median	3.20
Std. deviation	0.57749
Range	1.95
Minimum	2.30
Maximum	4.25

Table v (b)

Central tendency and dispersion of behavioural outcomes

Descriptive statistics	Behavioural outcomes					
	<i>Problem-solving</i>	<i>Knowledge-transfer</i>	<i>Behavioural commitment</i>	<i>Attitudinal commitment</i>	<i>Job satisfaction</i>	<i>Effort</i>
<i>N</i> Valid	15	15	15	15	15	15
Missing	0	0	0	0	0	0
Mean	4.23	4.20	2.91	3.69	4.30	4.00
Median	4.00	4.00	3.00	3.67	4.33	3.80
Std. deviation	0.40339	0.51659	0.68419	0.61098	0.67328	0.67612
Range	1.17	1.67	2.00	2.00	2.00	2.80
Minimum	3.83	3.33	2.00	3.00	3.17	3.20
Maximum	5.00	5.00	4.00	5.00	5.17	6.00

Table v (c)

Central tendency and dispersion of operational performance

Descriptive statistics	Operational performance				
	<i>Product quality</i>	<i>Innovation</i>	<i>Sickness absence rate</i>	<i>Voluntary turnover rate</i>	<i>Productivity</i>
<i>N</i> <i>Valid</i>	15	15	15	15	15
<i>Missing</i>	0	0	0	0	0
<i>Mean</i>	4.91	4.69	3.63	0.054	€ 383,778
<i>Median</i>	5.00	4.67	3.00	0.04	€ 117,056
<i>Std. deviation</i>	0.66044	0.32116	1.18723	0.03776	€ 485,244
<i>Range</i>	2.67	1.00	4.00	0.14	€ 1,424,915
<i>Minimum</i>	3.33	4.33	1.00	0.02	€ 57,231
<i>Maximum</i>	6.00	5.33	5.00	0.16	€ 1,482,146

* Special adjustment: mean = $\sum (\text{frequency} * \text{lowest value of sickness absence class}) + 0.5$. The value 1 is used as lowest value of the sickness absence class *less than two*.

Table v (d)

Central tendency and dispersion of financial performance

Descriptive statistics	Financial performance	
	<i>Net profit margin</i>	<i>EBIT minus tax</i>
<i>N</i> <i>Valid</i>	15	15
<i>Missing</i>	0	0
<i>Mean</i>	0.0438	€ 22,471
<i>Median</i>	0.0345	€ 5,396
<i>Std. deviation</i>	0.05242	€ 38,360
<i>Range</i>	0.23	€ 121,776
<i>Minimum</i>	-0.04	-€ 7,094
<i>Maximum</i>	0.19	€ 114,682

H1) SPSS output of t-tests

Group Statistics

firmsize		N	Mean	Std. Deviation	Std. Error Mean
HPWS	>= 100.00	7	3.3000	.61305	.23171
	< 100.00	8	3.2625	.58661	.20740

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
HPWS	Equal variances assumed	.226	.643	.121	13	.906	.03750	.30999	-.63219	.70719
	Equal variances not assumed			.121	12.557	.906	.03750	.31097	-.63673	.71173

Group Statistics

firmage		N	Mean	Std. Deviation	Std. Error Mean
HPWS	>= 10.00	9	3.3722	.59430	.19810
	< 10.00	6	3.1417	.57482	.23467

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
HPWS	Equal variances assumed	.173	.685	.745	13	.469	.23056	.30932	-.43768	.89879
	Equal variances not assumed			.751	11.132	.468	.23056	.30710	-.44440	.90551

Group Statistics

firmage	N	Mean	Std. Deviation	Std. Error Mean
HPWS >= 15.00	8	3.4000	.62906	.22241
HPWS < 15.00	7	3.1429	.52474	.19833

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
HPWS	Equal variances assumed	.868	.369	.852	13	.410	.25714	.30185	-.39497	.90926
	Equal variances not assumed			.863	12.982	.404	.25714	.29800	-.38673	.90101

Group Statistics

	firmage	N	Mean	Std. Deviation	Std. Error Mean
HPWS	>= 30.00	3	3.7167	.61101	.35277
	< 30.00	12	3.1708	.53997	.15588

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
HPWS	Equal variances assumed	.050	.827	1.533	13	.149	.54583	.35599	-.22324	1.31490
	Equal variances not assumed			1.415	2.838	.257	.54583	.38567	-.72226	1.81393

Group Statistics

	firmsize	N	Mean	Std. Deviation	Std. Error Mean
attitcommit	>= 100.00	7	3.7129	.70561	.26670
	< 100.00	8	3.6675	.56457	.19960

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
attitcommit	Equal variances assumed	.441	.518	.138	13	.892	.04536	.32791	-.66305	.75376
	Equal variances not assumed			.136	11.509	.894	.04536	.33312	-.68390	.77461

H2) SPSS output of stepwise regressions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.694 ^a	.482	.341	.55546	.482	3.414	3	11	.057

a. Predictors: (Constant), hpwsfirmsize, hpws, firmsize

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.702 ^a	.492	.289	.57683	.492	2.424	4	10	.117

a. Predictors: (Constant), firmage, hpwsfirmsize, hpws, firmsize

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.713 ^a	.508	.235	.59832	.508	1.861	5	9	.197

a. Predictors: (Constant), dummyconsultancy, hpwsfirmsize, firmage, hpws, firmsize

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.756 ^a	.571	.249	.59296	.571	1.773	6	8	.222

a. Predictors: (Constant), dummywholesale, hpws, firmsize, dummyconsultancy, firmage, hpwsfirmsize

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.391	1.068		5.050	.001
	hpws	-.323	.376	-.581	-.861	.412
	firmsize	-.007	.010	-1.241	-.671	.519
	hpwsfirmsize	.004	.006	1.557	.737	.480
	firmage	.003	.004	.220	.655	.529
	dummyconsultancy	.533	.190	.809	2.809	.020

a. Dependent Variable: innovation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.436	4.047		2.331	.042
	hpws	-2.456	1.378	-1.195	-1.783	.105
	firmsize	-.045	.034	-2.298	-1.337	.211
	hpwsfirmsize	.032	.021	3.013	1.523	.159
	firmage	.031	.014	.663	2.188	.054

a. Dependent Variable: sicknessabsence

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2839812	1863448		-1.524	.166
	hpws	1061401	620241.1	1.263	1.711	.125
	firmsize	12629.331	15467.309	1.578	.817	.438
	hpwsfirmsize	-8940.329	9234.109	-2.075	-.968	.361
	firmage	-12647.5	8986.920	-.652	-1.407	.197
	dummyconsultancy	27587.322	242538.4	.028	.114	.912
	dummywholesale	1180260	413953.7	1.113	2.851	.021

a. Dependent Variable: productivity

Respondents Questionnaires

I. Questionnaire Chief Executive Officer

Question 1:

Are you the (associate-) owner of this company? YES / NO (please blot out what does **not** apply).

Question 2:

Please answer the following question with a YES or NO: „Was a HR department with specialized HRM employees present in this company in year 2006?“

The answer is: YES / NO (please blot out what does **not** apply).

If **NO**, I would like to ask you also to complete the questionnaire called “HR department” after you have completed this questionnaire.

If there was no HR department, please answer the following question: „Who was/were responsible for this company’s human resource management in year 2006?“

.....
.....

(Please fill in)

Question 3:

What percentage of the employees in this company was in year 2006 involved in job rotation (*i.e.* varying different jobs and/or tasks within the organisation)?

I assess percent (please fill in on a scale from 0 to 100).

Question 4:

Please answer the following statement with an AGREE or DISAGREE: „Most jobs in this company in year 2006 did consist of concretely defined work tasks such that job descriptions were easy to make.

The answer is: AGREE / DISAGREE (please blot out what does **not** apply).

Question 5:

What percentage of the employees in this company was in year 2006 involved in self-managed teams (*i.e.* in working teams without direct supervisory)?

I assess percent (please fill in on a scale from 0 to 100).

Question 6:

What percentage of the employees in this company was in year 2006 involved in regularly scheduled meetings to discuss work-related issues?

I assess percent (please fill in on a scale from 0 to 100).

Was an executive member always involved in these meetings? YES / OR (please blot out what does **not** apply).

Question 7:

Considering year 2006, please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- It often occurred that minor or major improvements were done to the products that this company offered to its customers.
1 2 3 4 5 6

- It often occurred that minor or major improvements were done in the services this company offered to its customers.
1 2 3 4 5 6

- It often occurred that minor or major improvements were done in the ways this company achieved its products.
1 2 3 4 5 6

Question 8:

Please answer the following question with a YES or NO: „In year 2006, there was a middle-management responsible for the daily operations in this company?“

The answer is: YES / NO (please blot out what does **not** apply).

Question 9:

Please answer the following question with a YES or NO: „In year 2006, there were many direct competitors in the market wherein this company was operating?“

The answer is: YES / NO (please blot out what does **not** apply).

II. Questionnaire HR department

Question 1:

Since when do you work in this company? Since years (please fill in).

Question 2:

To what extent was each of the following four selection devices used in year 2006 in this company to evaluate job candidates? Please indicate for every selection device on a five-point scale (1=never; 2=sometimes; 3=average; 4=often; 5=always):

- | | | | | | |
|--------------------------------------|---|---|---|---|---|
| • Interviews | 1 | 2 | 3 | 4 | 5 |
| • Tests | 1 | 2 | 3 | 4 | 5 |
| • Work samples | 1 | 2 | 3 | 4 | 5 |
| • References from previous employers | 1 | 2 | 3 | 4 | 5 |

Question 3:

How many people, on average, were in year 2006 involved into the selection process of job applicants?

The answer is: persons (please fill in).

Question 4:

Compare the level of base salary offered in year 2006 in this company with the level of base salary for identical operational jobs in other companies. The base salary offered in this company is (please mark what does apply):

- Below average
- Average
- Above average

Question 5:

Please AGREE or DISAGREE with the following statement: „One or more of the four benefits below was/were offered in year 2006 to operational staff in this company.”

- Profit-sharing
- Bonuses
- Share plans
- Stock options

The answer is: AGREE / DISAGREE (please blot out what does **not** apply).

Question 6:

What percentage of the employees in this company received in year 2006 formal, out-of-firm training?

I assess percent (please fill in on a scale from 0 to 100).

Question 7:

Please give the most important reasons for why this company has chosen in year 2006 for this particular training (in a decreasing measure of importance, with 1=most important)?

- 1.....
- 2.....
- 3.....
- 4.....

(Please fill in)

Question 8:

Please give the figure of all permanent terminations of regular employees, voluntary, that occurred during year 2006. Do not include involuntary terminations (*e.g.* retirement, discharge, death, job eliminations). Do also not include departures of temporary staff.

The figure is: employees (please fill in).

Question 9:

Please give the figure of all full- and part-time employees on the active payroll who worked at least 20 hours per week during year 2006. Do not include temporary staff and employees on layoff during the selected period.

The figure is: employees (please fill in).

Question 10:

In which class did the sickness absence rate (*excluding* maternity leave) of this company fall in year 2006 (please mark what does apply)?

- 0 percent
- Less than 2 percent
- 2 – less than 3 percent
- 3 – less than 4 percent
- 4 – less than 5 percent
- 5 – less than 6 percent
- 6 – less than 7 percent
- 7 percent and more

III. Questionnaire Employee

Question 1:

Since when do you work in this company? Since years (please fill in).

Question 2:

Focusing on problems that you encountered during your work in year 2006, to what extent do you AGREE or DISAGREE with the following statements? Please indicate for every statement on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I identified several alternative solutions for each problem encountered.

1 2 3 4 5 6

- I seemed to always come up with solutions to problems encountered.

1 2 3 4 5 6

- It was always easy to identify new solutions to the problems.

1 2 3 4 5 6

Question 3:

Focusing on problems that you encountered during your work in year 2006, to what extent do you AGREE or DISAGREE with the following statements? Please indicate for every statement on a six-point scale (6=strongly disagree; 5=disagree; 4=sort of disagree; 3=sort of agree; 2=agree; 1=strongly agree):

- Solutions found for problems I faced were not timely.

1 2 3 4 5 6

- I was very slow in finding and implementing solutions to the problems I encountered.

1 2 3 4 5 6

- Ideas for solving the problems encountered were discovered rather late to be implemented successfully.

1 2 3 4 5 6

Question 4:

Considering year 2006, please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I often had an opportunity to talk to other employees in this organisation about successful work activities in order to understand why they succeed.

1 2 3 4 5 6

- Failures were almost always constructively discussed in this organisation.

1 2 3 4 5 6

- New work processes that may be useful to the organisation as a whole were usually shared with all employees.

1 2 3 4 5 6

Question 5:

Consider your working conditions (*i.e.* compensation, development and independency opportunities) in this organisation over year 2006. Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- One of the major reasons I continued to work for this company is that leaving would have required considerable personal sacrifice – another company may not have matched the overall benefits I had now.

1 2 3 4 5 6

- It would have been very hard for me to leave this organisation, even if I wanted to.

1 2 3 4 5 6

- Too much in my life would have been disrupted if I decided that I wanted to leave this organisation.

1 2 3 4 5 6

Question 6:

Considering year 2006, please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I did feel “emotionally attached” to this organisation.

1 2 3 4 5 6

- This organization had a great deal of personal meaning to me.

1 2 3 4 5 6

- I did feel like “part of the family” at this organisation.

1 2 3 4 5 6

Question 7:

Considering year 2006, please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- My job gave me many chances to use my personal initiative or judgement in carrying out the work.

1 2 3 4 5 6

- My job gave me considerable opportunity for independence and freedom in how to do the work.

1 2 3 4 5 6

- My job gave me many opportunities to do a variety of tasks which utilize many of my skills.

1 2 3 4 5 6

Question 8:

Considering year 2006, please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I felt I was being paid an adequate amount for the work I did.

1 2 3 4 5 6

- I was satisfied with the benefits I received in my job.

1 2 3 4 5 6

- I felt satisfied with my chances for salary increases.

1 2 3 4 5 6

Question 9:

Consider your work in this organisation in year 2006. Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- Other people knew me by the long hours I kept.

1 2 3 4 5 6

- Few people put in more hours weekly than I did.

1 2 3 4 5 6

Question 10:

Consider your work in this organisation in year 2006. Please indicate to what extent you AGREE or DISAGREE with the following statements on a six-point scale (1=strongly disagree; 2=disagree; 3=sort of disagree; 4=sort of agree; 5=agree; 6=strongly agree):

- I worked at my full capacity in all my job duties.

1 2 3 4 5 6

- I strived as hard as I could to be successful in my work.

1 2 3 4 5 6

- When there was a job to be done, I devoted all my energy to getting it done.

1 2 3 4 5 6

Question 11:

Considering year 2006, please indicate what measure on a six-point scale is related to the following statements (1=never; 2=sometimes; 3=regular; 4=often; 5=almost always; 6=always):

- This company's products conformed to performance specifications required by its customers.

1 2 3 4 5 6

- This company's products performances met the requirements of its customers.

1 2 3 4 5 6

- The design of this company's products met the quality standards expected by its customers.

1 2 3 4 5 6

Question 12:

Please answer the following question with a YES or NO: „Was/were this company’s owner(s) a direct supervisor of you and your colleagues in year 2006?“

The answer is: YES / NO (please blot out what does **not** apply).

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