Managing potential and realized absorptive capacity: The impact of Human Resource Management on absorptive capacity of organizations

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Abstract

To what extent do HRM tools influence potential and realized absorptive capacities?

To survive selection pressures, firms need to recognize new external knowledge, assimilate it, and apply it to commercial ends (Jansen, van den Bosch and Volberda 2005). This ability is referred to as absorptive capacity (Cohen and Levinthal 1990). According to Zahra and George (2002) there are four dimensions of absorptive capacity, namely acquisition, assimilation, transformation and exploitation. Acquisition and assimilation are part of potential absorptive capacity (Zahra and George 2002). Transformation and exploitation are part of realized absorptive capacity (Zahra and George 2002).

It is commonly accepted that organizational learning, and therefore absorptive capacity, is closely linked to how an organization manages its human resources (Lado and Wilson 1994). In spite of this fact antecedents of knowledge transfer and absorptive capacity have mostly been treated as exogenous to organizational processes and arrangements (Foss and Pedersen 2002). Existing literature predominantly focuses on absorptive capacity on the level of the international joint venture (Lyles and Salk 1996), on the dyad level or on the organizational level (Lane en Lubatkin 1998). As a response to this Minbaeva et al. (2003) introduces the concepts employees’ motivation and employees’ ability as important components of absorptive capacity and points out that the role of individuals has been neglected, i.e. absorptive capacity is internal to the organization and should focus on the individual level.

The underlying study will expand the research of Jansen, van den Bosch and Volberda (2005) as well as the study of Minbaeva et al. (2003) in that it examines the influence of the HRM tools that make up the concepts employees’ motivation and employees’ ability of Minbaeva et al. (2003) on the four dimensions of absorptive capacity as used by Jansen, van den Bosch and Volberda (2005). The variables competence appraisal, training, internal communication, performance based compensation and merit based performance will be part of the empirical research. By doing so, detailed insights into the influence of the separate HRM tools on each of the separate dimensions of absorptive capacity will be gained. This adds new theory to the research field and will help practitioners to use the right HRM tool to influence a certain dimension of absorptive capacity that needs attention.

This paper aims to answer the following research question:

To what extent do different HRM tools influence potential and realized absorptive capacities?

All data were collected by administering a questionnaire by email as well a regular mail to 1104 medium sized companies in the Netherlands. Only validated scales were used. These scales were translated from English to Dutch. A reliability analysis, a correlation analysis and several linear regressions were carried out. The results indicate that there indeed exists a positive influence between HRM tools and the dimensions of absorptive capacity.
Table 1 shows which HRM-tools have a positive and significant relationship with absorptive capacity.

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Table 1: Overview of results

The results of this study suggest a relationship between competence appraisal and exploitation. The literature about ability and motivation of employees suggest that formal job analyses results in getting the right person for the job (Huselid 1995 and Minbaeva et al. 2003) and direct feedback from manager to employee increases motivation, performance and the notion of self efficacy (Weiner 1986, Parker 1998, Bertrams 1999 and Minbaeva et al. 2003). However, in this study only exploitation of new knowledge was found to have a significant relationship with competence appraisal. An explanation for this could be that acquisition, assimilation and transformation of new knowledge are not always visible to a manager. Hence, it is difficult for a manager to give direct feedback on these activities. Further research should focus on the link between internal communication and competence appraisal. When employees have a structural system to report knowledge based activities, it is easier for the manager to give direct feedback. One more subject to reflect on is the formal job analysis. Often the method that is used to perform the formal job analyses greatly influences the choice for an employee (Visser et al. 1997). Therefore it is suggested that further research should focus on the influence of several job analyzing techniques with respect that they evaluate the extent to which employees are able to acquire, assimilate, transform and exploit new knowledge.

Not all of the hypotheses are supported. For example, training is generally found to have a positive relationship with absorptive capacity, organizational productivity and financial performance (e.g. conform research by Kirkpatrick 1967, Russel, Terborg and Powers 1985, Noe 1986 Cohen and Levinthal 1990 Huselid 1995, Minbaeva et al. 2003) . It was there for hypothesized that training would have a positive influence on all dimensions of absorptive capacity. However, none of the relationships turned out to be significant. What might be an explanation is related to a remark that Kelloway and Barling (2000) made, namely that an employee has to be willing to learn. Without motivation, training is useless. Other points to consider are the usability of the training in practice as well as the quality of the training. It could therefore be researched what the influence of training motivation, usability of the training and the overall quality of training have on the several dimensions of absorptive capacity.

Internal communication turned out to be one of the most valuable HRM-tools, since three out of four dimensions of absorptive capacity have a significant and positive relationship as was expected on
basis of the literature (Minbeava et al. 2003 and Cohen and Levinthal 1990). Only acquisition seems to have no significant relationship. An explanation for this could be an observation of Dyer and Nobeoka (2000) that having a effective internal communication system is not enough to motivate employees to actually share and acquire new knowledge. Other HRM-tools like merit based compensation show better result for acquisition.

Taken together performance based and merit based compensation also have a positive relationship with three out of four dimensions. However the results do not confirm all hypotheses. This confirms the mixed results that have been reported in the existing literature. Kawasaki and McMillan (1987) and Ittner, Larker, and Rajan (1996), find positive relationships, while Garen (1993) and Bushman, Indejikian, and Smith (1996) find little. Notable exception is exploitation, which has a positive but not significant relationship with performance based and merit based compensation. While literature indirect indicates that it should be easier to put a price tag on the visible exploitation of knowledge (Osterloh and Frey 2002). Furthermore, Minbaeva et al. (2003) found a positive relationship between compensation and employee motivation. This could indicate that if the motivation is present there could be something wrong with the ability of an employee to finally exploit the new knowledge. Further research should find out what the best combination of performance base compensation and merit based compensation and other HRM tools is. Finally, more extensive research is needed to study the difference between performance base compensation and merit based compensation.

In further research other HRM tools like, cross functional teams, job rotation, training on the job and personal coaching should be tested on the dimensions of absorptive capacity. In that way a manager will get a fully equipped toolbox of HRM tools to influence the dimensions of absorptive capacity.

The main limitation of this study lies in the adopted measurement approach. The data analysis was restricted to those aspects that can be measured with a questionnaire. Additionally, the questionnaire was administered in a short period of time which resulted in a low response rate. Furthermore, the questionnaire was sent to 1 or 2 respondent per company and targeted managers. Arguably, the employees on the work floor would have been able to generate valuable insights as well. Future research should involve big groups of employees within several firms. In this way the data managers provide can be matched against the data of the employees. This will possibly give a more realistic view of the effects of HRM tools on employees. Furthermore, the model in this research adopted linear regression techniques. Using a three-stage least squares regression like Minbaeva et al. (2003) might have been more appropriate. The previous limitations should be taken into account in future research.
Chapter 1 Introduction

To what extent do HRM tools influence potential and realized absorptive capacities?

It is by now axiomatic that economic growth occurs due to the ability of a nation’s industry to develop and sustain their competitive position, and that this requires growth in the productivity of its capital and labor (Fagerberg 1994). Furthermore, economic growth concerns not just the acquisition and development of knowledge through innovation and learning, but also the diffusion and efficient utilization of this knowledge (Narula 2004). To survive selection pressures, firms need to recognize new external knowledge, assimilate it, and apply it to commercial ends (Jansen, van den Bosch and Volberda 2005). This ability is referred to as absorptive capacity (Cohen and Levinthal 1990). Zahra and George (2002), distinguish four dimensions of absorptive capacity namely acquisition, assimilation, transformation and exploitation. Acquisition and assimilation are forms of potential absorptive capacity and transformation and exploitation of knowledge are forms of realized absorptive capacity (Zahra and George 2002). They argue that firms need to manage these dimensions of absorptive capacity successfully to induce organizational learning and thereby obtain superior economic performance.

It is commonly accepted that organizational learning, and therefore absorptive capacity, is closely linked to how an organization manages its human resources (Lado and Wilson 1994). For instance, limited investments in training and personal development may result in low levels of employee knowledge and skills, thereby inhibiting organizational learning (Minbaeva et al. 2003). In spite of this fact antecedents of knowledge transfer and absorptive capacity have mostly been treated as exogenous to organizational processes and arrangements (Foss and Pedersen 2002). Existing literature predominantly focuses on absorptive capacity on the level of the international joint venture (Lyles and Salk 1996), on the dyad level and on the organizational level (Lane en Lubatkin 1998). As a response to this Minbaeva et al. (2003) introduces the concepts “employees’ motivation” and “employees’ ability” as important components of absorptive capacity and points out that the role of individuals has been neglected. The research of Minbaeva et al. (2003) confirms that there is a positive relation between HRM tools (competence appraisal, training, internal communication and performance and merit based compensation) and employees’ motivation and employees’ ability. In addition they show that the interaction effect between employees’ motivation and employees’ ability is a facilitator of knowledge transfer (Minbaeva et al. 2003). This supports what earlier research of Barling and Kelloway (2000) and Balwin (1959) say about the influence of the combination of motivation and ability on absorptive capacity.

In light of the above this paper will expand the research of Jansen, van den Bosch en Volberda (2005) and Minbaeva et al. (2003) and will examine the influence of the HRM tools on the four dimensions of absorptive capacity. The variables competence/performance appraisal, training, internal communication, performance based compensation and merit based performance will be part of the
empirical research. By doing so, detailed information about the influence of the separate HRM tools on each of the separate dimension of absorptive capacity will be exposed.

This adds new theory to the research field and can help practitioners to use the right HRM tool to influence a certain dimension of absorptive capacity that needs attention.

The main question in this paper is:

*To what extent do HRM tools influence potential and realized absorptive capacities?*

To answer the main question the following sub-questions have to be answered:

- Is competence appraisal positively related to each of the dimensions of absorptive capacity?
- Is training positively related to each of the dimensions of absorptive capacity?
- Is internal communication positively related to each of the dimensions of absorptive capacity?
- Is performance and merit based compensation positively related to each of the dimensions of absorptive capacity?

To empirically test and answer all the questions a survey study was performed. This research comprises five chapters. Chapter 2 deals with the literature review and hypothesis development. In chapter 3 the methods used in this research are explained. Chapter 4 shows the result that are found to empirically support or reject the hypothesis. Finally, chapter 5 presents conclusions, implications, limitations as well as suggestions for further research.
Chapter 2 Literature review and hypothesis development

In the prehistory mankind had to survive its environment by sharing knowledge about drinking spots, food and surviving techniques. The way in which each of these humans acquired, assimilated and brought the new knowledge into practice determined their further path in life. Nowadays environment is not so different. To survive selection pressures, firms need to recognize new external knowledge, assimilate it, and apply it to commercial ends (Jansen, van den Bosch and Volberda 2005). This ability is referred to as absorptive capacity (Cohen and Levinthal 1990). According to Zahra and George (2002) there are four dimensions of absorptive capacity acquisition, assimilation, transformation and exploitation. Acquisition and assimilation form potential absorptive capacity. Transformation and exploitation form realized absorptive capacity.

Cohen and Levinthal (1990) argue that the development of absorptive capacity and innovative performance are history or path dependent. The lack of investment in an area of expertise early on may foreclose the future development of that area. With other words the way in which an organization develops absorptive capacity has a big impact on the innovation and eventually the performance of an organization. Drucker (1998) supports this statement by saying that a firm’s ability to recognize and manage organizational knowledge will be the single most important determinant of a firms survival.

This article focuses on employees because the knowledge of the firm resides within them. According to Davenport (1999) employees are investors of their intellectual capital and certainly not an asset of the organization. Kelloway and Barling (2000) complete this by saying that employees choose when and how much of their knowledge they invest in the organization. Moreover, an employee could decide to stop investing his or her knowledge when the payoff is too low. Hence, organizations should rather focus on managing the people, the true owners of the knowledge than the knowledge itself.

Considering the above, it is crucial for an organization to know in what way it can influence the behavior toward knowledge transfer of employees. One way in which organizations can influence their employees is through Human Resource Management (HRM). Existing literature provides the evidence that several Human Resource practices indirectly lead to higher levels of revenue growth through their effect on knowledge-creation capability (Collins and Smith 2001, Huselid 1995).

Minbaeva et al. (2003) identifies employees ability and employees’ motivation as the key aspects of absorptive capacity. Employees’ ability is the educational background and acquired job skills of the employees. Employees’ motivation is the level of aspiration or energy the employees have to transfer knowledge (Minbaeva et al. 2003 and Kim 2001). An organization will be successful to the extent in which they increase employees’ ability and motivation to engage in knowledge work (Kelloway and Barling 2000). So by influencing employees ability and employees’ motivation with Human Resource tools (HRM tools) firms can influence the four dimensions of absorptive capacity and eventually the
transfer of knowledge and innovation. This article focuses on the specific relationships between distinct HRM tools and the four dimensions of absorptive capacity.

**Prior knowledge**

Before elaborating on the HRM tools it is important to know that to contribute to any of the dimensions of absorptive capacity it is essential for an employee to have some prior knowledge of the field they are working in. This knowledge exists of information, ideas or expertise relevant to perform a task (Bartol and Srivastava 2002). Cohen and Levinthal (1990) argued that prior knowledge is needed to assimilate and use new knowledge. Without prior knowledge any individual would be lost in the enormous amount of data that is coming towards them. Lindsay and Norman (1977) advocate this by saying that knowledge may be nominally acquired but not well utilized because an employee did not already possess the appropriate prior knowledge necessary to use it to the fullest.

Knowledge multiplies by sharing but the sharing of knowledge does not automatically take place. Employees have the tendency to ‘sit’ on their knowledge, because knowledge is power. Therefore to share knowledge firms have to use certain HRM tools to overcome these obstacles (Horn 2004). If there is an employee with some prior knowledge. What could an organization do to make him/her contribute to the dimensions of absorptive capacity? In this research five of these HRM tools will be studied.

**Competence/performance appraisal**

The first HRM-tool is competence/performance appraisal which generally takes two forms namely formal job analysis and direct feedback.

Formal job analysis is a systematic method of collecting and analyzing information about jobs. Based on one of the many available methods, jobs are broken down into pieces or tasks. A formal job analysis consists of two essentials: a job description and a job specification. A job description is a written description of the activities that have to be performed. In general, a job description also contains information about tools and equipment used in the job and about the working conditions. So job descriptions specify the job content and the job context. The job specification indicates which specific skills, competences, knowledge, capabilities and other physical and personal attributes one must have to perform the job successfully (Visser et al. 1997). This will facilitate the selection decision in choosing the right person for the job (Minbeave et al. 2003 and Huselid 1995).

Furthermore, employees become aware of what personal skills, competences and characteristics are required and hence what skills can be further developed by acquiring, assimilating, transforming and using new knowledge. A second form of competence/performance appraisal is direct feed-back on the performance of an employee. When employees get feedback on their performance this can give
them a better insight into their contribution and what is expected from them. This will likely increase their motivation to perform the task in accordance with what is expected (Bertrams 1999).

When a firm has clear expectations about a specific job, employees will have a clear vision of what is important to the firm. This will give employees guidance in their quest for acquiring and assimilating new knowledge to develop oneself in line with the skills, competences and characteristics for the job. In this way a crystal clear job description will help to acquire and assimilate new knowledge.

After using the job description as a starting point it is important to give employees feedback on their performance. It is not enough to only give direction at the start of a job. This will cause employees to wander around and feel uncertain about their performance, while it is so important to keep giving directions. If employees are aware of the value of the knowledge they have acquired and assimilated, they are more likely to transform and exploit it in desired ways. Besides that, due to the present prior knowledge an employee will be more capable to assimilate, transform and use it within the organization (Cohen and Levinthal 1990).

Feedback will also give employees a notion of self-efficacy. Self-efficacy is the sense of confidence individuals have in their ability to perform a task. If a manager evaluates the performance of an employee this employee can make the right attributions to the success or failure of a task (Weiner 1986). As motivation for successfully performing a task is influenced by the attributions an employee makes.

For example if a person fails to perform a task successfully because he or she is missing important information it is very important that a manager points out that reason to the employee. If a manager does not evaluate the task this may give the employee the feeling that he or she is not capable enough. As a result of that the employee will make wrong attribution about failing the tasks. This can influence motivation for performing a future task (Weiner 1986).

In addition direct feedback can enhance employees' confidence to perform a task that is not generally expected of them (Parker 1998). By proactively performing a task an employee will exploit new knowledge. In this way direct feedback can make an employee more able to exploit knowledge.

In this way I come to the following hypothesis:

**Hypothesis 1a:** Competence appraisal will be positively related to acquisition and assimilation of new knowledge.
Hypothesis 1b: Competence appraisal will be positively related to transformation and exploitation of new knowledge.

Training

The importance of the influence of training on financial performance of an organization is demonstrated by Russel, Terborg and Powers (1985). Minbeave et al. (2003) tested in their research that training has a significant positive effect on employees’ ability. Furthermore, they confirmed that employees’ ability in combination with employees’ motivation has a positive effect on all four dimensions of absorptive capacity (Minbaeva et al. 2003).

Kirkpatrick (1967) pointed out four levels of effectiveness of training. On the first level an employee only has a reaction to the training content. An employee on the second level is acquisitioning knowledge and new skills (Kirkpatrick 1967). Huselid (1995) advocated this as well by saying that by participating in training courses, on the job training, attending conferences and following regular education employees will inevitable acquire new knowledge. In combination with proper training this new knowledge can be assimilated with the prior knowledge. Due to training employees will better understand where to place the new knowledge in relationship with the prior knowledge. Research on memory development (Cohen and Levinthal 1990) referred to this as the acquisition of knowledge and the ability to recall and use it. With their updated knowledge and skills employees are more capable to understand the already available knowledge around them. On the third level of Kirkpatrick (1967) model employees undergo a behavioral change and in the fourth and final level the employees are able to make improvements in individual or organizational productivity. Training eventually supports making an employee capable to put the new knowledge in to practice. Training as well as direct feedback will enhance employees’ self-efficacy. Is this way training also will give employees the confidence that they are able to use new knowledge to perform a task or upcoming problem.

Optimistic results of employee learning, behavioral change, and improvements on the job are expected from well-designed training courses Noe (1986). Important to keep in mind is that training will not be effective if an employee does not want to (Noe 1986, Balwin 1991, Kelloway and Barling 2000).

Considering the above the following hypothesis was formulated:

Hypothesis 2a: Training will be positively related to acquisition and assimilation of new knowledge.

Hypothesis 2b: Training will be positively related to transformation and exploitation of new knowledge.
**Internal communication**

Before getting into the following HRM-tool it is important to distinguish the difference between explicit and tacit knowledge. Explicit knowledge can be coded in writing or symbols (Polanyi 1966). This can easily be transferred though the firm. Tacit knowledge on the other hand resides within employees and cannot be transferred as a separate entity. Polanyi (1966) gives a clear example which explains the difference between tacit and explicit knowledge: “You can identify one face out of thousands, but it is nearly impossible to give an adequate description of this face to another person, so that she is able to identify the face”. The way in which the transfer of both kinds of knowledge can be promoted is different as well. Explicit knowledge is visible and the amount of knowledge an employee transferred can be measured. Firms can promote the transfer of explicit knowledge by giving a reward. As a result employees will be extrinsically motivated to transfer explicit knowledge (Osterloh and Frey 2000).

Tacit knowledge is difficult for competitors to copy and that makes it an important competitive advantage (Teece 1998). To promote the transfer of tacit knowledge is a much bigger challenge. Since the amount of tacit knowledge transferred cannot be measured it is not easy to hang a price tag on it (Osterloh and Frey 2000). The eventual result of the transfer of tacit knowledge is visible in for example the quality or the efficiency in which a product is made (Osterloh and Frey 2000). If a firm wants to promote the transfer of tacit knowledge they will have to find a way to motivate them intrinsically (Osterloh and Frey 2000).

Minbaeva et al. (2003) tested in their empirical study that the influence of internal communication on employees’ motivation and absorptive capacity is significant and positive. With this Minbaeva et al. (2003) confirmed what Cohen en Levinthal already stated in 1990 that the firm’s absorptive capacity depends on the individuals who stand at the interface of either the firm and the external environment or at the interface between units within the firm. A strong internal communication system can promote a climate that supports knowledge sharing by communicating and signaling the knowledge-centered activities that contribute towards the achievement of the company goals (Bowen & Ostroff 2004). Furthermore, firms can ask employees and teams to describe critical incidents related to the four dimensions of absorptive capacity. This will signal the importance of these knowledge centered activities (Jackson 2006). Making this information accessible to every employee creates the possibility to exchange and combine new knowledge among employees (Nahapiet and Ghoshal 1998). Moreover, knowledge sharing promotes the use of knowledge. As employees attempt to share knowledge they are forced to explicitly formulate what they know. This makes it possible to evaluate, assimilate, transform and exploit it to solve problems or create new products.

This is simple when the knowledge is explicit. Explicit knowledge can be easily put on paper. Tacit knowledge conversely is more difficult to transfer. Other forms of internal communication like cross-
functional teams (Lam 2000), socialization, observation, apprenticeship (Nonaka 1994) and awareness days will have to promote the transfer of tacit knowledge. Probably internal communication will have a major influence on the acquisition of knowledge. When employees participate in for example cross functional teams or best practice teams they will feel they have the chance to make a contribution to the organization. This will make them intrinsically motivated to exchange and acquire new knowledge. If they will assimilate, transform and use the new knowledge will depend on whether the climate of the organization promote this. Toyota is a example of a company with highly interconnected and strong tie network that has established a variety of institutionalized routines that facilitate multidirectional knowledge flows among suppliers (Dyer & Nobeoka 2000). This means that every employee that works at Toyota is part of a network that facilitates the transfer of knowledge. Earlier research suggested that participating in a knowledge sharing network knows several dilemmas. First there is the dilemma of getting employees motivated to openly share valuable knowledge with others (Wood & Gray 1991). The second quandary is the free rider problem. When useful knowledge becomes a public good it is almost unavoidable that other employees will benefit from this without making a own contribution to sustain it (Dyer & Nobeoka 2000). The final problem is getting maximum efficiency in knowledge transfers amongst a large group of individual employees. A firm has to overcome these problems to set up effective internal communication system for the transfer useful knowledge.

Nevertheless, the following hypothesis was formulated:

**Hypothesis 3a:** Internal communication will be positively related to acquisition and assimilation of new knowledge.

**Hypothesis 3b:** Internal communication will be positively related to transformation and exploitation of new knowledge.

**Performance based compensation and merit based compensation**

Performance based compensation is a way to reward employees with a bonus for their effort. Merit based compensation is also a reward for employees’ effort but then in form of a promotion to a better paid job or a job with more responsibilities.

Generally economists have the idea that rewarding employees according to their contribution to the firm will have a positive influence on productivity (Bénabou and Tirole 2003). Psychologists do not always agree on that and believe that reward can have a negative influence on the productivity of employees because it undermines intrinsic motivation (Bénabou and Tirole 2003). In 1999 Prendergast (1999) gave a large overview of the existing literature regarding incentives and found out that the literature on trade-off on incentive systems have mixed results. Some authors such as Kawasaki and McMillan (1987) and Ittner, Larker, and Rajan (1996), find evidence of such a trade-off, while Garen (1993) find little. Even in cases where the effects are present, the results are sometimes
weak or explain very little of the variation in observed incentives. This leads to think that the influence of a reward on the transfer of explicit knowledge would show mixed result as well. Contradictory to that Osterloh and Frey (2002) advocate that it is commonly accepted that getting a reward (extrinsic motivation) can positively influence the transfer of explicit knowledge. The reason for this is that the transfer of explicit knowledge is visible and can be measured. As it can be measured it is easier to place a price tag or reward on it. Tacit knowledge as earlier explained resides within the employee and is difficult for competitors to copy. This makes it a sustainable competitive advantage (Teece 1998). That is why it is so important that this tacit knowledge in transferred to others within the organization.

Intrinsic motivation is crucial when tacit knowledge has to be transferred (Osterloh en Frey 2002). Motivation is intrinsic if an activity is undertaken for one’s immediate need or satisfaction (Deci 1975). Literature on the question whether rewards positively influence the transfer of tacit knowledge do show mixed results. A major contention in education and psychology theory is that rewards have a negative effect on a persons’ intrinsic motivation (Bénabou and Tirole 2003). Cameron en Pierce (1994) conclude that rewards do not have a detrimental effect on intrinsic motivation. Osterloh en Frey (2002) advocate that when the transfer of tacit knowledge is crucial financial rewards are unsuitable for motivation. Unlike Sprinkle (2002) who argues that employees who get incentive based contracts are likely to perform better than employees that do not have an incentive based contract. Sprinkle (2002) adds that if the task is more cognitive then practical than a certain amount of experience and feedback may be necessary before the incentives will increase the performance.

In line with Sprinkle (2002) it is expected that performance based compensation or rewards will have a positive effect in knowledge transfer in general but only if it is accompanied by other HRM tools like feedback and competence appraisal. In addition Sprinkle (2002) points out that not only the duration of the effort will increase but also the intensity of the effect. Hence, performance based compensation will have an equal effect on all dimensions of absorptive capacity.

In this way the following hypothesis are formulated:

**Hypothesis 4a:** Performance based compensation will be positively related to acquisition and assimilation of new knowledge.

**Hypothesis 4b:** Performance based compensation will be positively related to transformation and exploitation of new knowledge.

**Hypothesis 5a:** Merit based compensation will be positively related to acquisition and assimilation of new knowledge.
**Hypothesis 5b:** Merit based compensation will be positively related to transformation and exploitation of new knowledge.

The following conceptual model was based on the hypothesis above:

**Conceptual model**

![Conceptual Model Diagram](image-url)
Chapter 3 Methodology

Settings and data collection

The focus of this research is the influence of HRM-tools on the different dimensions of absorptive capacity. Advocated by Jansen, van den Bosch and Volberda (2005) firms need to recognize new external knowledge, assimilate it, and apply it to commercial ends. The only possibility to transfer knowledge is through the employees that are owners of this knowledge. For that reason, investigating HRM-tool en their influence on absorptive capacity seems obvious.

This empirical research was conducted under 1104 medium sized companies in the Netherlands. These companies operate in several branches, including manufacturing, logistic, financial and public services. In 2009 a survey was administrated to the procurement, sales, logistic and financial managers. To ensure confidentiality the names of the participating managers were not revealed and there was the opportunity to return the questionnaires directly to the research team. Only existing scales were used, that were translated from English to Dutch.

Using a business address database from ADHOC Data (adhocdata.nl) 1104 questionnaires were administered digitally to the several branches mentioned above. Unfortunately the business address database was not up-to-date and of the 1104 email addresses 196 did not exist anymore. As a result of that only (1104-196) 908 questionnaires reached the firms. This does not directly mean that the email that reached the firm were actually read. The business address database that was used only contained info email addresses. So I cannot be sure if the questionnaires reached the right person. Additionally a reminder email was send. From the 908 questionnaires 63 questionnaires were returned, however only 55 were completed. The response rate of this first questionnaire was very low. Which can be caused by the summer holiday, the incorrect email addresses and the very long questionnaire. It was impossible to draw any conclusions because of the low response rate, so a second questionnaire was send to the same 1104 firms, only on paper. Theoretically the chance that a respondent fills in the questionnaires twice is very low. Of the 1104 posted questionnaires 25 were returned, however only 16 were completely filled in. In addition 234 questionnaires were returned unopened. Because the questionnaires were send to the same firm the total response rate of these two will be calculated as followed ((63+25)*100)/908= 9,69%. Unfortunately the overall response rate was still too low. As a last resource the network of Professor Ploos van Amstel was used to administer another 1000 questionnaires. From the 1000 questionnaires, 48 were returned but only 28 were completed. In total (908+1000=1908) questionnaires were administered and in total (88+48=136) were returned. This gives a total response rate of 7,13%.

The respondents had the possibility to fill out the questionnaires in three different ways. From the 136 returned questionnaires 46% was collected by web link, 19% was collected by paper link, 19% was collected by paper copy and 35% was collected by the network of Professor Ploos van Amstel. In order to determine any
significant difference between the subgroups the correlations and descriptive data were studied. No significant difference was found so all questionnaires were combined to one dataset and imported to SPSS, a statistical computer program.

To filter out all questionnaires where respondent for example only filled in “1” through the whole questionnaires a frequency test was performed. All questionnaires seemed to be filled in correctly so no questionnaire was excluded.

To test if there was any case of multicollinearity a correlation analysis was performed. After this a linear regression analysis was undertaken. All independent variables (competence appraisal, training, internal communication, performance based compensation and merit based compensation) were tested on each of the dimensions of absorptive capacity. Next to that, the control variables firm size and firm age were part of each regression.

**Measures**

All data used in this research is from the administered questionnaires. Next to that the questions used in these questionnaires were already validated by Minbaeva et al. (2003) and Jansen, van den Bosch and Volberda (2005).

**Acquisition**

The extent to which employees acquire knowledge from their surroundings is measured by the construct acquisition. The first item measures the amount of visits an employee pays to other organizations or branches. The second item measures the quantity of corporate knowledge that is acquired through informal contacts. The third item asks the respondents whether they frequently have contact with different players within the firm’s own supply chain. The fourth items deals with the question whether the firm periodically organizes special meetings for customers and others to exchange knowledge. The last item deals with the question whether employees often meet with others like, accountant or consultants. All these items were measured on a Seven-point Likert scale (1=strongly disagree to 7=strongly agree) Jansen, van den Bosch and Volberda (2005). (Cronbach’s Alfa= 0,768)

**Assimilation**

The extent to which employees assimilate knowledge into the organization is measured by the construct assimilation. This construct is measured by three items, all on a Seven-point Likert scale (1=strongly disagree to 7=strongly agree). The first item asks respondents if they (the firm) are slow in recognizing changes is the market. The second item measures if new chances and opportunities for improving customer service are quickly recognized. The last item deals with the question if the firm is
quickly in analyzing and interpreting changes in market demands (Jansen, van den Bosch and Volberda 2005). (Cronbach’s Alfa= 0,830)

**Transformation**

The extent to which employees convert and combine new knowledge in something useful, is measured by the construct transformation. All 6 items are measured on a Seven-point Likert scale (1=strongly disagree to 7=strongly agree). The first item asks if the organization thinks about consequences of changes in the market in relationship with new products and services. The second item identifies if employees document their knowledge for future use. The third item measures if an organization quickly acknowledges the usefulness of new knowledge in combination with existing knowledge. The fourth item deals with the question if employees share practical knowledge with each other. The fifth item measures whether a firm has difficulties to use the possibilities of new knowledge. The final item asks if the consequences of trends in the market are often discussed. (Jansen, van den Bosch and Volberda 2005) (Cronbach’s Alfa= 0,854).

**Exploitation**

The extent to which employees use new knowledge is measured by the construct exploitation. The first item asks if it is clear to every employee how a certain activity should be performed (Jansen, van den Bosch and Volberda 2005). The second item deals with the question if complaints from customers fall on deaf ears (Jaworski and Kohli 1993). The third item measures the degree in which the firm has a clear separation of roles and responsibility. The next item asked if a firm has difficulties introducing new products and services (Jansen, van den Bosch and Volberda 2005). The last questions measures if employees share the same language concerning products and services (Szulanski 1996). All 6 items measure on a Seven-point Likert scale (1=strongly disagree to 7=strongly agree) (Cronbach’s Alfa= 0,822).

**Competence/performance appraisal**

The degree to which competence/performance appraisal is used in a firm is measured by three items. One item measures the percentage of the workforce that regularly receives a formal evaluation of their performance (in percent), one item measures the percentage of jobs whereby a formal job analysis has been conducted (in percent), and the third item measures the percentage of new jobs for which a formal analysis of the desired personal skills/competencies/characteristics is carried out prior to the selection decision. Competence/performance appraisal is calculated as the average score reported by respondents across these three items (Minbaeva et al. 2003). (Cronbach’s Alfa= 0,703)
Training

The degree to which a firm applies the HRM practices of training is measured by two different items. The first item measures how many days of formal training managerial employees receive annually. The second item measures how many days of formal training non-managerial employees receive annually (Minbaeva et al. 2003). (Cronbach’s Alfa = 0.817)

Internal Communication

The degree to which the exchange of information is promoted within the organization is measured by three items (all on seven-point scales). These three items capture to what extent communication flows between employees in different departments, non-managerial employees, managerial employees and the HRM department and the top management team. Internal communication is calculated as the average score reported by respondents across these three items (Minbaeva et al. 2003). (Cronbach’s Alfa = 0.876)

Performance based compensation

This construct is capturing the extent to which compensation within the firm is performance-based. One item measures the percentage of employees having the opportunity to earn individual, group or firm-wide bonuses (per cent), and two items ask the respondents to point out whether the firm uses performance-based compensation (1=not at all and 7=to a large extent) and whether the compensation systems are closely connected to the financial results of the firm (1=not at all and 7=to a large extent). The combination of these three items compose the construct of performance based compensation (Minbaeva et al. 2003). (Cronbach’s Alpha=0.668)

Merit based compensation

The extent to what internal promotion in the firm is used, is measured by three items. The first item measures if employees have the opportunity to be promoted to positions of bigger pay and/or responsibility within the firm (1=no opportunities and 7=many opportunities), the second item measures whether the firm places a great deal of importance on merit when making promotion decisions (1=not at all and 7=to a large extent), and the third item measures to what degree upper-level vacancies are filled from within (1=not at all and 7=to a large extent). This measure of merit-based promotion, is based on the average of the first two items because third item did not pass the reliability analysis. (Cronbach’s Alpha=0.815)

Employees’ ability

The construct of employees’ ability is capturing the potentials and abilities of all the employees together (not individually). Employees’ ability was measured by asking respondents to assess the quality of the firms’ employees relative to the employees of the competitors for three items: overall
ability, job related skills and educational level. (Seven-point Likert scale going from 1=Far below average to 7=Far above average for all three items) (Minbaeva et al. 2003). (Cronbach’s Alpha=0.818)

Employees’ motivation

Employee motivation is measured in the same way as employee ability, not for the individual motivation but for the overall motivation of the employees within the firm. Two items measured in a similar way as the above mentioned construct by asking the respondents to assess the quality of the firms’ employees relative to the employees of the competitors. This was done using a seven-point Likert-type scales (1= far below average to 7= far above average). The three other items were measured using a seven-point Likert scale (1=strongly disagree to 7=strongly agree) and the respondents were asked to indicate whether the employees act in a way that helps company performance, whether employees add up in a positive way to company performance and whether the company, compared to other companies, have a highly motivated group of employees. Employees’ motivation is a construct calculated as the average score across these five items (Minbaeva et al. 2003). (Cronbach’s Alpha=0.855)

Transfer of knowledge

In the questionnaire the respondents have been asked to what degree they utilize knowledge from others. This construct is measured by 6 items on a seven-point Likert scale. Three items measure the transfer of tacit knowledge from suppliers, competitors and customers, and three items measure the same for explicit knowledge. Knowledge transfer is calculated as the average score reported by respondents on those 6 items (Minbaeva et al. 2003). (Cronbach’s Alpha=0.802)

Control variables

All hypothesis are tested after controlling for the firms’ age and size.

Firms’ age. The older the firm the higher its level of independence tends to be. Empirical findings (Foss and Pedersen,2002) point out that a higher degree of innovation in firms is associated with high autonomy, and since more innovative firms might be less dependent on knowledge transferred from others, the firms’ age might be negatively related to the level of knowledge transfer. Then again innovative firms are more attractive to others. So other firms may be very interested to exchange knowledge with an older and highly innovative firm. Therefore the relationship between firm age and knowledge transfer may be positive (Minbaeva et al. 2003)

Firms’ size. Looking from the same perspective as above, it is to be expected that larger firms acquire more knowledge compared to smaller firms simply because of the fact that they are able to generate
more knowledge by themselves. So there might be a negative relationship between size and the acquisition of knowledge. On the other hand, again arguing along the same line as above, there could be a positive relationship because a big firm with lots of knowledge is interesting to other firms. The firm size is measured as the total number of employees of the firm. (Minbaeva et al. 2003).

The following table presents a summary of the result of the reliability test:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Items</th>
<th>α</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential absorptive capacity</td>
<td>9</td>
<td>0.808</td>
<td>4.656</td>
<td>0.176</td>
</tr>
<tr>
<td>Acquisition</td>
<td>6</td>
<td>0.768</td>
<td>4.735</td>
<td>0.254</td>
</tr>
<tr>
<td>Assimilation</td>
<td>3</td>
<td>0.830</td>
<td>4.498</td>
<td>0.012</td>
</tr>
<tr>
<td>Realized absorptive capacity</td>
<td>12</td>
<td>0.901</td>
<td>4.709</td>
<td>0.187</td>
</tr>
<tr>
<td>Transformation</td>
<td>6</td>
<td>0.854</td>
<td>4.598</td>
<td>0.119</td>
</tr>
<tr>
<td>Exploitation</td>
<td>6</td>
<td>0.822</td>
<td>4.820</td>
<td>0.264</td>
</tr>
<tr>
<td>Transfer of tacit knowledge</td>
<td>4</td>
<td>0.835</td>
<td>3.627</td>
<td>0.039</td>
</tr>
<tr>
<td>Transfer of explicit knowledge</td>
<td>3</td>
<td>0.745</td>
<td>3.800</td>
<td>0.329</td>
</tr>
<tr>
<td>Employee ability</td>
<td>3</td>
<td>0.818</td>
<td>4.952</td>
<td>0.010</td>
</tr>
<tr>
<td>Employee motivation</td>
<td>4</td>
<td>0.855</td>
<td>0.543</td>
<td>0.126</td>
</tr>
<tr>
<td>Training</td>
<td>2</td>
<td>0.817</td>
<td>5.534</td>
<td>0.000</td>
</tr>
<tr>
<td>Competence appraisal</td>
<td>3</td>
<td>0.703</td>
<td>4.073</td>
<td>0.022</td>
</tr>
<tr>
<td>Internal communication</td>
<td>3</td>
<td>0.876</td>
<td>5.356</td>
<td>0.016</td>
</tr>
<tr>
<td>Performance based compensation</td>
<td>3</td>
<td>0.668</td>
<td>4.207</td>
<td>0.193</td>
</tr>
<tr>
<td>Merit based compensation</td>
<td>3</td>
<td>0.815</td>
<td>5.475</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Table 2: Reliability test
Chapter 4 Results

Table 3 presents the descriptive data and the correlation matrix (means and standard deviations of all variables).

<table>
<thead>
<tr>
<th>Variable Names</th>
<th>Variables</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACQUISITION</td>
<td>Y1</td>
<td>4.7783</td>
<td>1.09099</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASSIMILATION</td>
<td>Y2</td>
<td>4.5167</td>
<td>1.48042</td>
<td>0.444**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRANSFORMATION</td>
<td>Y3</td>
<td>4.5967</td>
<td>1.17354</td>
<td>0.621**</td>
<td>0.743**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXPLOITATION</td>
<td>Y4</td>
<td>4.8333</td>
<td>1.17015</td>
<td>0.405**</td>
<td>0.766**</td>
<td>0.743**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPETANCE APPRAISAL</td>
<td>X1</td>
<td>4.1</td>
<td>2.12</td>
<td>0.195</td>
<td>0.262**</td>
<td>0.296**</td>
<td>0.378**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAINING</td>
<td>X2</td>
<td>3.98</td>
<td>2.00494</td>
<td>0.118</td>
<td>-0.054</td>
<td>0.155</td>
<td>-0.037</td>
<td>-0.057</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTER COMMUNICATION</td>
<td>X3</td>
<td>5.3633</td>
<td>1.29585</td>
<td>0.281**</td>
<td>0.510**</td>
<td>0.544**</td>
<td>0.534**</td>
<td>0.257**</td>
<td>0.1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PERFORMANCE COMPENSATION</td>
<td>X4</td>
<td>4.2067</td>
<td>1.57618</td>
<td>0.334**</td>
<td>0.446**</td>
<td>0.535**</td>
<td>0.384**</td>
<td>0.263**</td>
<td>0.083</td>
<td>0.391**</td>
<td>1</td>
</tr>
<tr>
<td>MERIT COMPENSATION</td>
<td>X5</td>
<td>5.475</td>
<td>1.17931</td>
<td>0.425</td>
<td>0.515</td>
<td>0.539</td>
<td>0.442</td>
<td>0.393</td>
<td>-0.019</td>
<td>0.594**</td>
<td>0.548**</td>
</tr>
</tbody>
</table>

Table 3 Correlation matrix: * p < .05  ** p < .01  *** p < .001

As expected there is a high correlation between the different dimensions of absorptive capacity. This can mainly be explained by the fact that all dimensions of absorptive capacity blend in together. However this has no negative influence on the explanatory variables. In addition, none of the correlations indicate multicollinearity.

Tables 4 and 5 present the output of the regression analysis for HRM tools and the dimensions of absorptive capacity. Almost half of all hypothesis are supported and explain the relationship between the HRM tools and the dimensions of absorptive capacity. The following results were found to support or reject the hypothesis.
<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Acquisition</th>
<th>Assimilation</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variables</strong></td>
<td>B</td>
<td>P-value</td>
<td>B</td>
</tr>
<tr>
<td><strong>Direct effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competence Appraisal</td>
<td>0.12</td>
<td>0.824</td>
<td>0.038</td>
</tr>
<tr>
<td>Training</td>
<td>0.056</td>
<td>0.315</td>
<td>-0.079</td>
</tr>
<tr>
<td>Internal Communications</td>
<td>0.01</td>
<td>0.916</td>
<td>0.358**</td>
</tr>
<tr>
<td>Performance based Compensation</td>
<td>0.087</td>
<td>0.262</td>
<td>0.205*</td>
</tr>
<tr>
<td>Merit based Compensation</td>
<td>0.335**</td>
<td>0.01</td>
<td>0.22</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>0.009</td>
<td>0.883</td>
<td>0.036</td>
</tr>
<tr>
<td>Years</td>
<td>0.46</td>
<td>0.423</td>
<td>-0.075</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.157</td>
<td></td>
<td>0.331</td>
</tr>
<tr>
<td>F-value</td>
<td>3.635**</td>
<td></td>
<td>7.992***</td>
</tr>
<tr>
<td>N</td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4 Regression output  * p < .05  ** p < .01  *** p < .001

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Transformation</th>
<th>Exploitation</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variables</strong></td>
<td>B</td>
<td>P-value</td>
<td>B</td>
</tr>
<tr>
<td><strong>Direct effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competence Appraisal</td>
<td>0.048</td>
<td>0.305</td>
<td>0.121</td>
</tr>
<tr>
<td>Training</td>
<td>0.063</td>
<td>0.204</td>
<td>-0.059</td>
</tr>
<tr>
<td>Internal Communications</td>
<td>0.268**</td>
<td>0.003</td>
<td>0.378**</td>
</tr>
<tr>
<td>Performance based Compensation</td>
<td>0.220**</td>
<td>0.002</td>
<td>0.121</td>
</tr>
<tr>
<td>Merit based Compensation</td>
<td>0.158</td>
<td>0.164</td>
<td>0.023</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>0.01</td>
<td>0.861</td>
<td>0.043</td>
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<tr>
<td>Years</td>
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<td>0.48</td>
<td>-0.033</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.413</td>
<td></td>
<td>0.334</td>
</tr>
<tr>
<td>F-value</td>
<td>10.968***</td>
<td></td>
<td>8.050***</td>
</tr>
<tr>
<td>N</td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5 Regression output  * p < .05  ** p < .01  *** p < .001
Competence appraisal

**Hypothesis 1a** expected a positive relationship between competence appraisal and the acquisition and assimilation of knowledge. Unfortunately none of relationships are significant. Consequently hypothesis 1a is rejected.

**Hypothesis 1b** predicted that competence appraisal and transformation and exploitation would have a positive relationship. Opposite to the expectation the regression equation for transformation was not significant ($B=0.048 \ p=0.305$). Conversely the regression for exploitation was significant ($B=0.121 \ p=0.017$). Hence, mixed support for hypothesis 1b is found.

Contradictory to the expectation competence/performance appraisal only has a significant relationship with the exploitation of new knowledge. This is in line with the conclusions of Parker (1998), who assumed that direct feedback will give employees a sense of confidence to perform a task. Unfortunately, there is no significant relationship with the other dimensions of absorptive capacity. The line of expectations was that choosing the right person for the job would simultaneously mean that this person would be capable of acquiring, assimilating and transforming new knowledge in the right way. The empirical findings of this study do not support this theoretical approach. An explanation for this could be the fact that it is difficult for a manager to give direct feedback on thing that are hard to measure like the acquisition, assimilation and transformation of new knowledge. This is where direct feedback has a link with internal communication. Managers have to make clear that they want to receive information about the knowledge based activities of their employees. If they neglect this, none of the employees will come to them to for example tell that they gained new knowledge that is not useful at this moment but can be useful in the future. Another explanation can be found in the formal job analysis itself. The way a job is described has a big impact on the selection process. A job analysis can be task, behavior or trait orientated (Visser et al. 1997). If a firm stated that knowledge work is important it is wise to use behavior orientated job analysis. In nowadays fast changing environment it is important to have employees who have the right behavior to handle with complex and fast changing problems, are able to learn and acquire, assimilate, transform and exploit new knowledge. If a firm has a task orientated job description this will only select an employee on performing certain tasks. Because of the fast changing environment the content of the task can change. So firms need to select employees that have the flexible to change along with it (Visser et al. 1997).

Training

**Hypothesis 2a** examined if the relationship between training and acquisition and assimilation is positive. The overall regression of acquisition and assimilation is significant and positive. ($R^2$ adjusted = 0.157 and $p=0.331$). Nonetheless the P-values of training are not significant. Therefore hypothesis 2a is rejected.
**Hypothesis 2b** posited a positive relationship between training and transformation and exploitation of new knowledge. However none of the regressions are significant. Consequently hypothesis 2b is rejected.

In their research Minbaeva et al. (2003) found that training has a significant and positive effect on employees’ ability. None of the regressions between training and absorptive capacity in this research were able to support the suggested relation in literature (Cohen and Levinthal 1990, Russel, Terborg and Powers 1985 and Kelloway and Barling 2000).

An explanation of the above could lie in de remark that Kelloway and Barling made in 2000 that a employee has to be open to receive new knowledge during a training. So if an employee is not motivated to learn the quality of the training can be good but it will be a waste of time. Furthermore an employee has to have the ability to lean. This means he or she will need prior knowledge and needs to understands its own job (Yamnill and Mclean 2001) to use the new knowledge in practical situations.

Quality of training is the next point to consider. In this research only the days of formal training received were measured. This says nothing about the quality of the training or if it is appropriate to use in practice. Therefore it could be wise to research if there are better scales for measuring training and the transfer of useful knowledge in training then only counting the number of days. In addition trainers should make their student aware that high effort will lead to high performance in training and eventually to high job performance (Noe 1986). In this way employee will be more motivated to acquire, assimilate, transform and exploit new knowledge.

This still leave the question open why Minbaeva et al. (2003) had a significant and positive relationship between training and employees’ ability. The answer may lie in the analyze method. In this research a linear regression was used, as Minbaeva et al. (2003) used a three-stage least square model to test their relationships. This method has the ability to builds accurate models when errors in the dependent variable are correlated with the independent variables.

**Internal communications**

**Hypothesis 3a** indicated a positive relationship between internal communication and the acquisition and assimilation of knowledge. The relationship between internal communication and acquisition turned out not to be significant. The relationship with assimilation on the other hand is significant (B = 0,358 p = 0,03). For that reason hypothesis 3a is partly supported.

**Hypothesis 3b** indicated a positive relationship between internal communication and transformation and exploitation. The overall regression of transformation and exploitation is significant (R² adjusted = 0,413 and p<0,001). In addition all the p-values are significant (transformation with B= 0,268 and p = 0,003, exploitation with B = 0,378 p = 0,000). Accordingly hypothesis 3b is supported.
In line with the conclusion of Cohen and Levinthal (1990) and Minbaeva et al. (2003) these research results indicated that most of the relationship between internal communications and dimensions of absorptive capacity are significant and positive.

The exception is acquisition, which is an unfortunate surprise. The other dimensions of absorptive capacity cannot take place without acquisition. This could indicate that other factors are influencing the acquisition of new knowledge. This is in line with the dilemma of motivating employees to share knowledge which Dyer & Nobeoka (2000) point out. Having an (effective) internal communication system or giving employees the chance to participate in cross functional teams is not enough to motivate them to share and acquire new knowledge. Other HRM-tools like for example, merit based compensation may provide better results. Employees have to feel there is a collective purpose for sharing knowledge (Dyer & Nobeoka 2000). If free rider behavior is allowed this may damage mutual trust between employees which is needed to share knowledge. If more employees stop sharing knowledge because they have no trust there will be no knowledge to acquire for others. Firms should have rules and regulations to prevent free rider behavior.

**Performance based compensation and merit based compensation**

**Hypothesis 4a** predicted a positive relationship between performance based compensation and the acquisition and assimilation of new knowledge. The relationship with acquisition is not significant. The relationship between performance based compensation and assimilation on the contrary is significant (B = 0.205 p = 0.031). In view of that, hypothesis 4a is partly supported.

**Hypothesis 4b** examined a positive relationship between performance based compensation and transformation and exploitation of new knowledge. Only one of the dependent variables had a significant relationship with performance based compensation. So the hypothesis is partly supported. Transformation of knowledge is highly significant (B = 0.220 p = 0.002) for performance based compensation.

**Hypothesis 5a** is concerned with whether there exists a positive relationship between merit based compensation and acquisition and assimilation of knowledge. The hypothesis is partly supported because merely the relationship with acquisition is significant (B = 0.339 p<0.01).

**Hypothesis 5b** predicted a positive relationship between merit based compensation and transformation and exploitation of new knowledge. This hypothesis is rejected since none of the relationships are significant.

To the best of my knowledge, the existing literature about compensation does not show any differences between a rewards in the form of compensation or promotion. In contrast, the empirical
results from the underlying study indicate that there is a difference in the effect on the dimensions of absorptive capacity.

Performance based compensation seems to have a significant and positive relationship with assimilation and transformation while merit based compensation is the only HRM-tool that has a significant and positive relationship with the acquisition of new knowledge.

This is peculiar because if a manager want to give a promotion or a financial reward for knowledge based activities acquisition, assimilation and transformation are harder for a manager to detect then the final use and exploitation of new knowledge. For that reason it is extraordinary to see that in this research acquisition, assimilation and transformation of knowledge are positively influenced by giving a reward. Furthermore because, Minbaeva et al. (2003) did find and positive relationship between compensation and employee motivation. This could lead to think that if the motivation is present there could be something wrong with the ability of an employee to finally exploit the new knowledge. Next to that the same reason as why training had no significant relationship could be a explanation. This research used a linear regression where Minbaeva et al. (2003) used a three-stage least square model to test their relationships.

The outcomes for performance based compensation and merit based compensation do not confirm the hypothesis but this could be expected because the existing literature already states mixed results. As mentioned earlier in chapter 2, authors such as Kawasaki and McMillan (1987) and Ittner, Larker, and Rajan (1996), find a positive relationship between incentives and motivation, while Garen (1993) and Bushman, Indejikian, and Smith (1996) find little. Even in cases where the effects are present, the results are sometimes weak or explain very little of the variation in type of incentives.
An overview of the final model is presented below. The extended lines mean the relationship is significant and the dashed lines indicate the relationship is not significant.

Final model

Figure: 3 Final Model
Chapter 5 Conclusion, limitations and implications

This study builds on and contributes to the expanding body of previous research on the dimensions of absorptive capacity, and in particular the work of Jansen van den Bosch en Volberda (2005) and Minbaeva et al. (2003). The overarching goals was to study the influence of certain HRM tools (competence appraisal, training, internal communication, performance based compensation and merit based compensation) on the separated dimensions of absorptive capacity (acquisition, assimilation, transformation and exploitation). The results reports indeed a positive influence of a number of the HRM tools on the dimensions of absorptive capacity.

Peculiar to discover is that the HRM tools aiming at employees’ ability (competence appraisal and training) turned out to have almost no significant relationship with the four dimensions of absorptive capacity. Only competence appraisal had a significant relationship with the exploitation of new knowledge. This could mean that other HRM tools are needed to improve employees’ ability. Nevertheless, Minbaeva et al. (2003) research suggest that a combination of both employees’ ability and employees’ motivation is needed to transfer knowledge. The HRM tools that could advance employees’ motivation (internal communication, performance based compensation and merit based compensation) appear to be significant in more than half of the cases. This indicates that the HRM tools internal communication, performance based and merit based compensation are effective tool for a manager to improve the motivation for the acquisition, assimilation, transformation and exploitation of knowledge. Table 6 gives an overview of the combination between the dimensions of absorptive capacity and the HRM tools and the results of this research.

<table>
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<th>Competence appraisal</th>
<th>Training</th>
<th>Internal Communications</th>
<th>Performance B Comp</th>
<th>Merit B Comp</th>
</tr>
</thead>
<tbody>
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<td>Not</td>
<td>Not</td>
<td>Not</td>
<td>Significant</td>
</tr>
<tr>
<td>Assimilation</td>
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<td>Not</td>
<td>Significant</td>
<td>Significant</td>
<td>Not</td>
</tr>
<tr>
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<td>Significant</td>
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</tr>
<tr>
<td>Exploitation</td>
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<td>Not</td>
<td>Significant</td>
<td>Not</td>
<td>Not</td>
</tr>
</tbody>
</table>

Table 6 Overview of results

Limitations

The main limitation of this study is the measurement approach. The data analysis is restricted to those aspects that can be gained through a questionnaire. Additionally, the questionnaire has been administered only in a short period of time which also explains the low response rate. Next to that the questionnaire was only send to 1 of 2 respondent per company. This research had the intention to focus on the true owners of knowledge within in firm. But the questionnaires was only send to managers of those employees. New research should involve big groups of employees within a just a few firms. In this way the data managers provide can be matched against the data of the employees. This will possibly give a more realistic view of the effects of HRM tools on employees. Next to that the model in this research used a linear regression. This could have influenced the result. Using a
three-stage least squares regression like Minbaeva et al. (2003) did may give other results. The previous limitations should be taken into account for further research.

**Implications**

Despite the limitations, the study contains several results that are consistent with theories on absorptive capacity and HRM. The implications of this study and discussion of results in relation to literature reviews can be found below.

Results show that only exploitation has a significant relationship with competence appraisal. Chapter four gives a number of possible explanations for this. Essential is the link with internal communication because manager cannot give direct feedback on knowledge based activities that he is not aware of. Managers should start creating an environment that make it possible to inform them about all ongoing knowledge based activities. This will make it easier for managers to give direct feedback and maybe when appropriate a reward. Another point of consideration is the method of job analysis. Nowadays environment is fast changing and employees should be flexible and able to adapt their way of working if their surroundings demand that. So firms need to select employees that have the flexible to change along with it (Visser et al. 1997). The method used to select employees has a tremendous influence on the kind of employees that a firm finally hires. As mentioned in chapter 4 a job analysis can be task, behavior or trait orientated (Visser et al. 1997). In this research there was only the question if a job analysis was performed. It is important to ask what method for job analysis was performed. If a firm stated that knowledge work is important it is wise to use behavior or trait orientated job analysis. Further research should focus on the influence of several job analysis methods on the dimensions of absorptive capacity.

Empirical test turn out that training has no significant relationship with none of the dimensions of absorptive capacity. Yet Minbaeva et al. (2003), Huselid (1995), Cohen and Levinthal (1990), Kelloway and Barling (2000) and Russel, Terborg and Powers (1985) all support the suggestion that training has a positive and significant relationship with learning and knowledge transfer in general. In chapter 4 several possible explanations are given for the poor results of training on the dimensions of absorptive capacity. First of all, the questions in the questionnaire about training should be more extensive. Important to know is, if employees are motivated to learn, if they think the training is applicable in practice and if they think the quality of the training is sufficient. In this research only the days of formal training received were measured. Further research should focus on getting more realistic scales for measuring training and the transfer of useful knowledge in training then only counting the number of days. In this research a linear regression was used to analyze the relationship between HRM-tools and the dimensions of absorptive capacity. Using a three-stage least square model to test relationships gives the possibility to builds accurate models when errors in the dependent variable are correlated with the independent variables. Although no indication for such errors were found in this research, three-stage least square method could provide more significant relationships between HRM tools and the dimensions of absorptive capacity. Organization spend
millions on training every year yet the most striking result of this research is that training has no significant relationship with the dimensions of absorptive capacity. This does not mean managers should rigorously cut in their training budget and stop training their employees. However especially during this financial crisis managers have to be very critical in formulating learning objectives and methods they choose to improve performance. Important points to consider are: the motivation of employees to learn, usability of the training in practice and the overall quality of the training. Further research will have to give more insight in what the best configuration of training is for each target group.

Result show that internal communication is a good way to promote knowledge based activities since 3 out of 4 relationships are significant. Managers can improve internal communication with relatively low cost. Just by creating the possibility for employees to come together on awareness days, best practice teams and informal socials, there will be a measurable positive influence on the assimilation, transformation and exploitation of new knowledge. Next to that executive managers can take an example from Toyota's knowledge sharing network (Dyer & Nobeoka 2000). Although this is a network strategy focusing on sharing knowledge through a whole supply chain this can be used to structure an internal communication network. Most important is to create a shared social community were employees feel safe to share knowledge without that chance of abuse or free rider behavior. Further research should focus on which internal communication tools are suitable to influence the dimension of absorptive capacity.

This empirical research pointed out that performance base compensation and merit based compensation have a positive influence on acquisition, assimilation and transformation. Important for managers to keep in mind is that if they use a reward to motivated employees to participate in knowledge based activities, it has to be accompanied by other HRM tools like feedback and competence appraisal Sprinkle (2002). Otherwise reward can even have a negative influence on the motivation to share knowledge. Further research should find out what the best combination performance base compensation and merit based compensation and other HRM tools is. Next to that more extensive research is needed to study the difference between performance base compensation and merit based compensation. Certainly because merit based compensation is the only HRM tool that influences acquisition. Considering that without acquisition the other dimension of absorptive capacity cannot take place, the focus of further research should lie on identifying more HRM tools that positively influence acquisition.

Subsequently, other HRM tool like, cross functional teams, job rotation, training on the job and personal coaching should be tested on the dimensions of absorptive capacity. As a result of that a manager will get a fully loaded toolbox of HRM tools to influence the dimensions of absorptive capacity.
Research turned out effective knowledge management and effective HRM have an important influence on the competitive position and economic performance of a firm (Cohen and Levinthal 1990, Huselid 1995, Drucker 1998, Collins and Smith 2001, Jansen, van den Bosch and Volberda 2005). Most firms have a HRM department but not have a separate knowledge department. Mostly the HRM department deals with knowledge management as a sideline. A dedicated knowledge department could be the spider in the interorganizational network that coordinates all knowledge based activities and will create a shared social community (Dyer & Nobeoka 2000) which gives employees the trust to share, acquire assimilate, transform and exploit knowledge. Further research should study what the influence of a separate knowledge department is on the dimension of absorptive capacity.
Appendix I: Measures

Measure (on a 7-point likert scale)

Potential absorptive capacity (Jansen e.a., 2003)  
\( \alpha = 0.808 \quad \mu = 4.656 \quad \sigma = 0.176 \)

Acquisition  
\( \alpha = 0.768 \quad \mu = 4.735 \quad \sigma = 0.254 \)

- Our firm has frequent interactions with corporate headquarters to acquire new knowledge.
- Employees or our firm regularly visit other branches.
- We collect industry information through informal means (e.g. lunch with industry friends, talks with trade partners).
- Other divisions of our firm are hardly visited. (REVERSE CODED)
- Our firm periodically organizes special meetings with customers or third parties to acquire new knowledge.
- Employees regularly approach thirds parties such as accountants, consultants or tax consultants.

Assimilation  
\( \alpha = 0.830 \quad \mu = 4.498 \quad \sigma = 0.012 \)

- We are slow to recognize shifts in our market (e.g. competition, regulation, demography). REVERSE CODED
- New opportunities to serve our clients are quickly understood.
- We quickly analyze and interpret changing market demands.

Realized absorptive capacity (Jansen e.a., 2003)  
\( \alpha = 0.901 \quad \mu = 4.709 \quad \sigma = 0.187 \)

Transformation  
\( \alpha = 0.854 \quad \mu = 4.598 \quad \sigma = 0.119 \)

- Our firm regularly considers the consequences of changing market demands in terms of new products and services.
- Employees record and store newly acquired knowledge for future reference.
- Our firm quickly recognizes the usefulness of new external knowledge to existing knowledge.
- Employees hardly share practical experiences. REVERSE CODED
- We laboriously grasp the opportunities for our firm from new external knowledge. REVERSE CODED
- Our firm periodically meets to discuss consequences of market trends and new product development.

- Medewerkers van onze organisatie bezoeken regelmatig andere organisaties of branches.
- We verzamelen bedrijfinformatie langs informele weg (bijv lunch met kennissen uit dezelfde bedrijfstak of een gesprek met een handelspartner).
- Onze organisatie heeft frequent contact met spelers binnen de keten voor het inwinnen van nieuwe kennis.
- Andere afdelingen van onze organisatie of andere afdelingen in de keten worden nauwelijks bezocht.
- Onze organisatie organiseert periodiek speciale bijeenkomsten voor de klanten en andere organisaties binnen de keten om nieuwe kennis in te winnen.
- Onze medewerkers benaderen geregeld andere marktpartijen zoals accountants, consultants en/of belastingsadviseurs.

- Wij zijn langzaam in het onderkennen van veranderingen in de markt (concurrentiepositie, wet- en regelgeving, demografie).
- Nieuwe kansen en mogelijkheden om service aan een klant te bieden worden snel onderkend.
- Wij zijn snel in het analyseren en interpreteren van veranderingen in de marktvraag.
- Onze organisatie denkt veelvuldig na over de consequenties van de veranderingen in de markt met het oog op nieuwe producten en diensten.
- Medewerkers documenteren en slaan nieuwe kennis op om later te gebruiken.
- Onze organisatie herkent snel de bruikbaarheid van nieuwe externe kennis in combinatie met bestaande kennis.
- Medewerkers delen nauwelijks praktische ervaringen met elkaar.
- We hebben moeite met het benutten van de mogelijkheden van nieuwe kennis.
- In onze organisatie worden regelmatig de consequenties van de markt trends en nieuwe productontwikkelingen besproken.
Exploitation

- It is clearly known how activities within our firm should be performed.
- Client complaints fall on deaf ears in our firm. REVERSE CODED
- Our unit has a clear division of roles and responsibilities.
- We constantly consider how to better exploit knowledge.
- Our firm has difficulty implementing new products and services. REVERSE CODED
- Employees have a common language regarding our products and services.

\[ \alpha = 0.822 \quad \mu = 4.820 \quad \sigma = 0.264 \]

Transfer of tacit knowledge

- To what extent have you learned new marketing expertise from your most valuable business partner?
- To what extent have you learned knowledge about foreign cultures and tastes from your most valuable business partner?
- To what extent have you learned managerial techniques from your most valuable business partner?

\[ \alpha = 0.835 \quad \mu = 3.627 \quad \sigma = 0.039 \]

Transfer of explicit knowledge

- To what extent is the knowledge that you have gained from your most valuable business partner written knowledge about the technology?
- To what extent is the knowledge that you have gained from your most valuable business partner procedural manuals or technical manuals?
- To what extent is the knowledge that you have gained from your most valuable business partner written knowledge about management techniques?

\[ \alpha = 0.745 \quad \mu = 3.8 \quad \sigma = 0.329 \]

Employee ability (Minbaeva et al. 2003)

- Assess the quality of the subsidiary’s employees relative to that of its competitors in overall ability.
- Assess the quality of the subsidiary’s employees relative to that of its competitors in job related skills.
- Assess the quality of the subsidiary’s employees relative to that of its competitors on educational level.

\[ \alpha = 0.818 \quad \mu = 4.952 \quad \sigma = 0.010 \]

- Het is voor elke medewerker duidelijk hoe activiteiten binnen onze organisatie zouden moeten worden uitgevoerd.
- Klachten van klanten zijn binnen onze organisatie aan dovemans oren gericht.
- De verdeling van taken en verantwoordelijkheden is helder binnen onze organisatie.
- Onze organisatie is constant op zoek naar manieren om kennis beter te benutten.
- Onze organisatie heeft moeite met het implementeren van nieuwe producten en diensten.
- Medewerkers delen dezelfde vaktaal met betrekking tot onze producten en diensten.

- In welke mate heeft uw organisatie kennis opgedaan van uw belangrijkste handelspartner over nieuwe marketing expertise?
- In welke mate heeft uw organisatie kennis opgedaan van uw belangrijkste handelspartner over de cultuur binnen uw bedrijfstak?
- In welke mate heeft u kennis opgedaan van uw belangrijkste handelspartner over managementtechnieken?

- In welke mate is de kennis die uw organisatie ontving/ontvangt van uw belangrijkste handelspartner geschreven kennis over technologie?
- In welke mate bestaat de kennis die uw organisatie ontving/ontvangt van uw belangrijkste handelspartner uit procedurele of technische handleidingen?
- In welke mate bestaat de kennis die uw organisatie ontving/ontvangt van uw belangrijkste handelspartner uit geschreven kennis over managementtechnieken?

- Wat is uw oordeel over de algemene capaciteiten van uw medewerkers ten opzichte van die van de medewerkers van uw concurrenten?
- Wat is uw oordeel over de functie specifieke vaardigheden van uw medewerkers ten opzichte van die van de medewerkers van uw concurrenten?
- Wat is uw oordeel over het opleidingsniveau van uw medewerkers ten opzichte van dat van de medewerkers van uw concurrenten?
Employee motivation (Minbaeva et al. 2003)  
- Asses the quality of the subsidiary’s employees relative to those of its competitors on motivation  
- Asses the quality of the subsidiary’s employees relative to those of its competitors on work.  
- Do employees behave in ways that help company performance  
- Do employees contribute in a positive way to company performance  
\[ \alpha = 0.855 \quad \mu = 5.433 \quad \sigma = 0.126 \]

Training (Minbaeva et al. 2003)  
- How many days of formal training do the managerial employees receive.  
- How many days of formal training do the non-managerial employees receive.  
\[ \alpha = 0.817 \quad \mu = 5.534 \quad \sigma = 0.000 \]

Competence Appraisal (Minbaeva et al. 2003)  
- What proportion of the workforce regularly receives a formal evaluation of their performance (in percent).  
- On which proportion of jobs a formal job analysis has been conducted (in %)?  
- Which proportion of new jobs for which a formal analysis of the desired personal skills/competencies/characteristics is carried out prior to making a selection decision?  
\[ \alpha = 0.703 \quad \mu = 4.073 \quad \sigma = 0.022 \]

Internal Communication (Minbaeva et al. 2003)  
- To what extent is there communication between non-managerial employees and managerial employees?  
- To what extent is there communication between the HR department and the top management team?  
\[ \alpha = 0.876 \quad \mu = 5.356 \quad \sigma = 0.016 \]

Performance based Compensation (Minbaeva et al. 2003)  
- The proportion of employees who have the opportunity to earn individual, group or company-wide bonuses (percent)  
- Does the company uses performance-based compensation?  
- Is the compensation systems closely connected to the financial results of the subsidiary?  
\[ \alpha = 0.668 \quad \mu = 4.207 \quad \sigma = 0.193 \]

Merit based performance (Minbaeva et al. 2003)  
- Does qualified employees have the opportunity to be promoted to positions of greater pay and/or  
\[ \alpha = 0.815 \quad \mu = 5.475 \quad \sigma = 0.014 \]
• Does the subsidiary places a great deal of importance on merit for promotion decisions

• To extent which upperlevel vacancies are filled from within.

• Goed presteren is erg belangrijk bij het besluit tot promotie binnen onze organisatie.

• In welke mate worden vacatures op het hoogste niveau intern opgevuld.
Literature list


