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High-performance human resource management and firm performance: The mediating role of innovation in China

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The mediating role of innovation in China

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Abstract

Purpose – Human resources have become a key issue in relation to the strong competition between service firms. Therefore, the purpose of this paper is to explore the relationship between high-performance human resource management (HRM) within this field to firm performance, making a useful attempt to explore the "black box" of enterprise human resources management effect on firm performance.

Design/methodology/approach – In order to validate the relationship between high-performance HRM and firm performance, Chinese service industry samples were collected. Structural equation modeling and regression are adopted to estimate the direct effect of high-performance HRM on firm performance and the mediating role of innovation.

Findings – The results show that the impacts of high-performance HRM on firm performance are significant. Moreover, innovation plays a partial mediating role between them. Training, work analysis and employee participation has a significantly positive impact on firm performance, while effects of profit sharing, employee development and performance evaluation on enterprise performance is not significant. The results strongly support the hypothesis that innovation holds intermediary variables between high-performance HRM and firm performance.

Practical implications – Studying the relationship between high-performance HRM and firm performance can help Chinese enterprises more reasonable and effective learning foreign advanced management ideas and methods. And then can help Chinese enterprises to establish a high-performance HRM system that is suitable for Chinese enterprises; the research can help enterprises to identify meaningful practice of human resources management, outstanding keys, and perfect the HRM system of enterprises; research on innovation and innovative thinking is conducive to develop employees' innovation motive, promote employee' innovative behavior, and improve firm performance.

Originality/value – This paper takes innovation as a mediating variable into the model and studies the intermediary role of innovation.

Keywords China, Innovation, Human resource management

Paper type Research paper

1. Introduction

A high-performance human resource management (HRM) has been proposed to resolve issues such as quality management, lean manufacturing, technological innovations and business process change (Baines and Kay, 2002; Zheng, 2013). Since the

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high-performance HRM system has come into use, it has become favored by international scholars, leaders and managers. After repeated research and practice, this system has become more complete and the positive effects on firm performance have been regularly verified. For example, Arthur (1994) investigates the productivity of unit time and the situation of human resources of smaller steel producers in the USA during the late 1980s to late 1990s. He studied the relationship between them, and used the human resources management system as an independent variable and business performance as the dependent variable. Huselid (1995) and Batt and Moynihan (2002) also verifies the above conclusion, instead listing corporations and the telecommunications industry as research objects. Similarly, many scholars who studie different samples such as China and Southeast Asia also confirm the conclusion (Guthrie, 2001; Bae and Lawler, 2000; Bae *et al.*, 2003). A Chinese study by Zhang and Li (2008) also proves the positive effects of high-performance HRM on firm performance. The conclusions of the research on the relationship between the high-performance HRM and firm performance are not always positive. Harley (2002) investigated relevant data in Australia and conducted empirical research on them, using high-performance HRM as the independent variable, and employee turnover and satisfaction as the dependent variable, and comes to a different conclusion. This shows inconsistencies in the empirical conclusions of scholars and the relationship between them is not necessarily uniform.

In addition, based on the study of the relationship between the two, many scholars focus on the research of the mechanism of the action of the two. For example, some studies use organizational commitment (Moynihan, 1998), the working atmosphere or organization atmosphere (Fulmer *et al.*, 2003), human capital characteristics (Park *et al.*, 2003) as the intermediary variable of the two. Other studies demonstrate that the ability of knowledge management (Liu *et al.*, 2009), the ability for independent innovation (Xing, 2012), organizational learning capability (Yao, 2013), between HRM practices and firm performance has played an intermediary role. The studies are almost always concerned with the relationship between the two and how the mechanism of action concentrates in the industrial enterprises, but research for the service sector is less. In addition, the innovation ability as the intermediary role between high-performance human resources management and enterprise performance has not been directly validated, and neither has innovation ability measuring.

The paper is trying to study the hypothesis based on innovation ability as the intermediary variable between high-performance human resources management and corporate performance, which carrying out a useful attempt to explore the "black box" of the impact of HRM on enterprise performance. The first part of this study puts forward the research questions and the main content through a simple review; the second part reviews the related research on high-performance human resources management systems, research reviews between high-performance HRM and corporate performance and its mechanism. According to the related research, proposing the hypothesis and research model based on SEM intermediary role model, the third part is based on micro investigation: First, to test the scale of reliability and validity, then based on the SEM model to test the relationship through each dimension of practice and business performance of high-performance HRM, using the regression model and SEM model checking the direct effect between HRM and performance of enterprises, and the intermediary role of innovation between the two. The fourth part is the discussion and conclusion of research results.

2. The literature review and hypotheses

2.1 The relationship between high-performance HRM and firm performance

So far, there is no one consistent term or definition for the high-performance HRM. For example, Huselid (1994) calls it the high-performance work system; it is called high-involvement work systems by Bae and Lawler (2000), Pfeffer (1996) refers to it as the best HRM activities or flexible working system, thinking of it as an additional system which could improve organizational effectiveness. Huselid *et al.* (1997) also agree with this viewpoint of improving firm performance. However, Edwards and Wright consider the importance of the effect of this system on employees. They believe that this system implies that the organizations treat their own staff members preferentially, and they are therefore more loyal to the organization. That is, two factors can be improved because of interaction. Godard uses the term "high-performance paradigm," that is, it is a system that can enhance staff capacity, improve employee motivation, ensure their organizational satisfaction and then encourage high performance.

As for practical activities included in high-performance HRM, Pfeffer (1994) presents 16 practices: employment security, recruitment selection, high wages, attractive salary (incentive), employee ownership, information sharing, employee participation authorization, team and work design, training and skills development, cross-training, symbolic egalitarianism, wage compression, internal promotion, long-term point of view, the practice of measuring and penetrating ideas. Subsequently, he summarizes these 16 practices to job security, a rigorous selection process of employees, self-management team, and performance-based variable pay, extensive training, reducing the level of gaps, and information sharing. The system includes seven elements: internal occupation opportunity, staff training, result-oriented performance appraisal, job security, profit sharing, employee participation and job definition (Delery and Doty, 1996).

Chinese scholars also carry out related research. Fan and Bjorkman (2003) divide it into nine aspects: formal practice, strict recruitment, inspirational work design, extensive staff selection, recruitment, training and strict formal diversity, training time, performance-based promotion, performance-based rewards, employee attitude surveys and information sharing. Jiang and Zhao (2004) summarize that the internal labor market system training of performance-based pay after formal recruitment procedures of human resource planning. Combs *et al.* (2006) summarizes 13 actions to carry out in regular practice: incentive compensation, training, salary level, employee participation, selection, internal promotion, daily planning, performance appraisal, teamwork, flexibility, information sharing, complaint procedures and occupation safety. Su (2010b) argues for broad training, competitive staff flow and discipline management information along with strict recruitment market appraisal of salary management based on the internal labor results. Wang (2011) advocates assessment of results, extensive training, communication and sharing, employee benefits, teamwork, employment security, contingency compensation and strict selection. Zhang *et al.* (2012) consider the core substance of a high-performance HRM system is the contribution of human resources management practices in their effect on firm performance. Zhang (2013) considers that strictly regulating the recruitment system training results in a dual oriented performance staff incentive flow of human resources employee planning communication team in management.

In summary, high-performance HRM is a system containing a series of organic combination of human resources practice. They are effective and reasonably integrated. The system can affect employee behavior and attitudes thereby affecting

the employees' job performance and enthusiasm for work, eventually affecting corporate performance. Referencing Delery and Doty's (1996) opinion, it is thought that the system includes training, employee participation, job analysis, performance appraisal, employee development and profit sharing; these six practices work together to comprehensively and effectively improve performance.

A number of studies have been conducted to validate the evidence that high-performance HRM can help to improve firm performance. Empirical research has been conducted to investigate the effect of high-performance HRM on firm performance. Arthur (1994) surveys unit time productivity and human resources management within the USA smaller steel producers from the late 1980s to the late 1990s to research their relationship. The human resources management system is divided into a control system of human resources management and a committed HRM system using the method of cluster analysis and based on the characteristics of HRM. The results show that the committed HRM system is obviously superior to the control system of human resources management on firm performance. Meanwhile a co-commitment HRM system is consistent with high-performance HRM. Lado and Wilson (1994) point out that the high-performance work system can provide higher social complexity and causal ambiguity. Difficult to be copied, it established a barrier of management, formed the core competitiveness of enterprise management, and ensured the enterprise's unique management. Delaney and Huselid (1996) also use the USA 590 enterprises as samples to research this area. It has proved that the human resource activities including recruitment, training and other components have positive effects on firm performance. Surveying 62 car assembly plants in Europe and the USA, MacDuffie (1995) proves that the effect of flexible production enterprises is significantly higher than the effect of scale production enterprises. The flexible production enterprise refers to those with a teamwork system, highly commitmed human resource activities and low inventory management methods. Batt and Moynihan (2002) also put forward the same conclusion, taking the telecommunication industry as a sample. Way (2002) verifies the positive relationship of HRM practices and firm performance by the USA small enterprises.

Most previous studies involve a variety of objectives. Datta *et al.* (2005) and other scholars reveal the relationship between high-performance HRM and firm performance through the study of the relationship with employee productivity. This also provides a theoretical basis and opportunity for later scholars to study the mechanisms between them. At the same time, they also carry out research regarding the enterprise growth stages and characteristics of the industry, and this has proved the different relationship between high-performance HRM and firm performance in different industries and different growth models. On the basis of this, Kintana *et al.* (2006) study the relationship between high-performance HRM and firm performance in technical enterprises by surveying 965 Spanish subjects. They also prove that the relationship in this industry is more obvious than other industries. In addition, Combs *et al.* (2006) summarizes the research and proves the positive correlation between them using a meta-analytic approach. The correlation coefficient is 0.20, which is more apparent in the manufacturing industry. Through this summary, the relationship between high-performance HRM and firm performance is becoming more obvious.

Ericksen (2007) argues that the high performance of human resources practices the ability of external labor to affect the market relationship of business performance adaption ability and internal labor market adjustment to the relevant factors. Armstrong *et al.* (2008) finds that high-performance human resource practices if

combined with differential management will influence the effect on higher labor productivity. Takeuchi *et al.* (2009) point out that the impact of high-performance human resources management on organizational performance is affected by employee job performance and motivation to achieve. Guthrie *et al.* (2009) considers high-performance human resource practices absenteeism rate as intermediary variables into a relationship between high-performance human resource practices and labor productivity in a discussion to explore the positive pressure that can lead to better performance. Gittell *et al.* (2010) study the relationship between the analysis of quality performance and innovation performance and discuss high-performance human resources practices and the quality of enterprise structure and efficiency of the organization recognized by the results that the staff create in performance capabilities and work to obtain performance for coordinating the relationship between the level of intermediary variables.

Similarly, many scholars come to the corresponding conclusion through various samples in China and Southeast Asia. For example, Barnard and Rodgers (2000) investigate staff stability, staffing and employee development in 105 Singapore companies and find that staff development and a high-performance work system is significantly related. Therefore, employee development will undoubtedly improve organization performance. In addition, Bae *et al.* (2003) investigates local and foreign capital enterprises in four Southeast Asian economic regions: South Korea, Thailand, Taiwan and Singapore through a micro study. Data of 680 enterprises show the significant positive relationship between high-performance HRM and firm performance.

The study also provides powerful evidence in China. Cheng and Zhao (2006) demonstrate that high-performance human resource practices on employee organizational commitment and organizational sales growth has a positive effect, but the human resource specificity can be regarded as the intermediary variable. Wood and Wall (2007) also confirm employees use practice is the practice of HRM the most significant impact on corporate performance in HRM system. Zhang and Li (2008) demonstrate the positive role of high-performance human resource practices of the enterprise subjective performance, and that the strategic implementation capacity is the important intermediary variable. Zhang *et al.* (2012) through element analysis find that high-performance human resources management system has a significant positive effect on enterprise performance.

Based on the research above, we put forward the hypothesis:

H1. High-performance HRM has a positive effect on firm performance.

2.2 The relationship between high-performance HRM and innovation

Innovation is also called creation. Creation is the spiritual or material results of cognitive or behavioral activity through which individuals make use of all resources and conditions to create new, meaningful, valuable products, services and technology according to a certain purpose or task. We can see from the definition that novelty is the main and the most important feature of innovation. Novelty maintains that there is no parallel in history for either individuals or organizations. Schumpeter (1934) defines these activities as a kind of innovation. That is to say, innovative forms of organization, new management ideas and methods all belong to innovation.

Innovation refers to the process in which an enterprise supports new ideas, provides human resources and material resources with new ideas and, ultimately, transforms the new ideas into new products, new services or new management means (Lumpkin and

Dess, 1996). Innovation is also defined as people generating new ideas or methods, new products or new services in specific areas. At first, studies regarding the innovation of enterprises and staff mainly focussed on the various characteristics of employees. They tended to explore the relationship between these characteristics and innovation. Later, with research gradually becoming more thorough, researchers begin to study the effect of organization characteristics on employees. In further studies, researchers discuss the influence of organizational environments such as the management method or style of leadership on employee and organization innovation. However, most of the research is concerned with leadership behavior on employee and organization innovation. Few study the effect of HRM on staff and organization innovation in terms of the subtle management methods, especially HRM.

In recent years, research has developed innovation from simply thinking of a concept to the successful implementation, from a static concept into a dynamic process. The process of cognition and idea generation are the beginning stage of innovation (Kanter, 1986). The key step to complete innovation is how to obtain the approver's support, promote the concept and put it into practice. This makes the innovation and innovative concept congruent.

To sum up, this research considers innovation as a process that generates ideas from employees and then puts the ideas into practice using existing resources, including the generation of innovation ideas, the promotion and practice of these ideas using existing resources. It is a multi-stage process.

Many scholars have studied the relationship between HRM practice and innovation in different periods. Service and Boockholdt (1998) establish a theory and empirical model of innovation for organization (Figure 1). In their model they give numerous antecedent variables of innovation. For example, management, results, organization culture and atmosphere, the external environment, the market and the necessity of change are antecedent variables of innovation. From this model, we can clearly see that

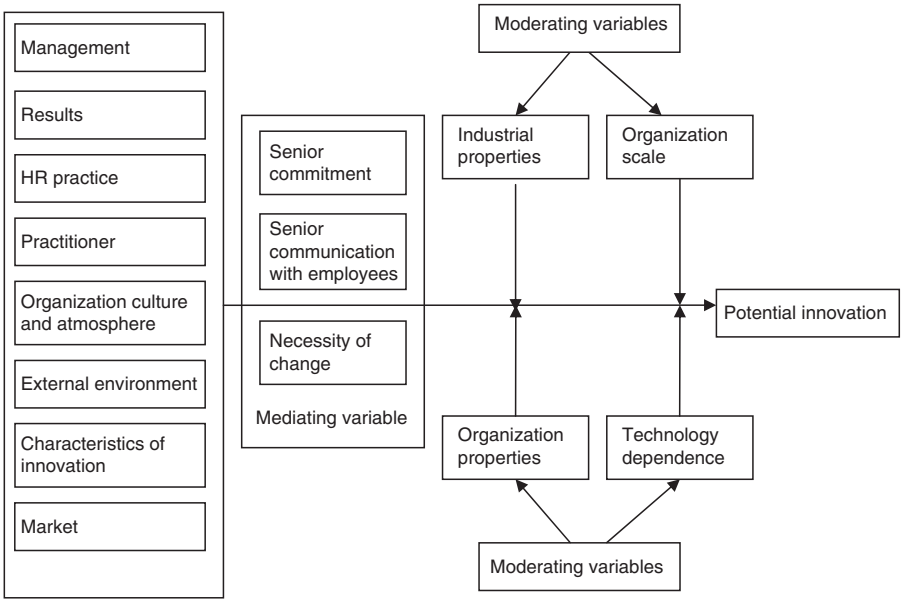


Figure 1.
Theory model and empirical model of innovation

human resources management practice, together with management, organization culture, etc., are important factors that will influence organization innovation.

Employees can find some clues of the behavior in organization through organizational climate. That is to say, organizational climate is the induction/conduction device between employees and organizations, which will help employees to receive the hidden requirements of the internal organization; then the staff should make corresponding behavioral responses for these requirements in theory (James *et al.*, 1997). Therefore, when an enterprise has some kind of incentive innovation atmosphere, it will convey an encouraging signal to the employees. Consequently, when employees receive this signal, they are more likely to exhibit the tendency of innovation, therefore driving forward the entire organization innovation. Organizational environments have important effects on the employee and organization innovation atmosphere (Amabile, 1996). Combined with the theory model of organization innovation, we can see that human resource practice is an important antecedent variable of organization innovation climate. Human resource practices may generate potential innovation results with the mediating role of leadership style and employee communication. Some scholars believe that high-performance HRM systems have a positive impact on organization innovation. For example, Arias-Aranda *et al.* (2001) conclude that the two variables are positively related using data from 173 Spanish enterprises. Laursen and Foss (2003) find that this system is effective in promoting new product development performance.

Gloet and Terziovski (2004) found that through empirical research, the practice of HRM activities can directly affect product and process innovation, therefore, they put forward that for the enterprise to obtain innovation performance in thought it must pay more attention to human resources management. Shipton *et al.* (2005) selected 35 UK manufacturing enterprises for empirical research on the relationship between human resources management activities and innovation performance of enterprises from the perspective of organizational learning, and found that high-performance work systems of enterprise product innovation and technology innovation has a positive impact; they thought that the practice of HRM that is the most effective includes rigorous recruitment and selection, promotion, performance appraisal and extensive training, etc. Li *et al.* (2006) selects 194 high technology enterprises from eight provinces China for empirical research and validated that the human resources management practices have a positive contribution to the performance of technological innovation. Liu *et al.* (2007) did empirical research in the high-tech industry and found that creativity can improve the organizational innovation performance. At the same time, it has positive effects on the innovation capability of high-performance work systems organization. Sjoerd (2008) chose 988 companies in Holland as the sample, and through the analysis of the data found that there is positive relationship between human resources management and product innovation, where HRM practices included work design, staff training, performance and compensation, etc. Chen and Huang (2009) thought that the intermediary variables between high-performance human resources practices and innovation performance for knowledge management capability. Song *et al.* (2011) through empirical cross-level study demonstrated high-performance human resources practices will directly have an impact on employee innovative behavior, but also through the construction of innovative atmosphere within the organization to influence innovative behavior of employees. Million Hee (2011) selected Shenzhen, China small and medium-sized high-tech enterprises as empirical research samples, to collect and using a structural equation model to the data analysis found a positive effect of

strategic HRM innovation of enterprises, with the results confirming that the enterprise culture and the enterprise innovation is the intermediate variable between the two. Qin (2012) reveals that the HPWS's 3 practice job rotation of staff training and cross department communication prepositional have an effect on radical product innovation and knowledge diffusion on business performance by the transmission mechanism.

Based on the researches above, we put forward the hypothesis:

H2. High-performance HRM has a positive effect on innovation

2.3 The relationship between firm performance and innovation

Research has shown that innovation has a close link with organizational performance, and innovation is a factor which can affect organizational performance (Damanpour, 1991; Han *et al.*, 1998; Hurley and Hult, 1998; Yeung *et al.*, 2007). The main results of employee innovation are undoubtedly the changes in organizational technology, the development of marketing strategy, product updates and the innovation of management process means and methods; while these changes offer conditions, resources and possibilities for high profits and high performance of enterprises. Product innovation can make enterprises increase the opportunities for growth and expansion; innovative behaviors and activities will bring the vitality of competitions to the organization. Although theoretically most scholars believe that innovation should have a role on the improvement of firm performance, there is rarely empirical support in the actual research. The relationship between innovation and firm performance needs to be studied further. No matter what kind of innovation, its generation and implementation will affect the performance of employees and organizations. Innovation has a lot of influencing factors, such as organization, environment, personal characteristics and the progress of science and technology (Tornatzky *et al.*, 1990). These factors will have a great impact on innovation, and thus affect the organizational performance.

Chinese scholars have studied the relationship between innovation and performance. Lv (2005) uses a correlation analysis and variance analysis method to study the relationship between empirical organizational innovation and business performance. The results show that management innovation and technological innovation organizations are able to improve the performance of enterprises, and management innovation to enhance the business performance more than technological innovation. Qin *et al.* (2007) conduct a questionnaire survey force on the Pearl River Delta and Yangtze River Delta manufacturing enterprises, by regression analysis research and conclude that corporate innovation strategy activities have a positive impact on financial performance and operational performance of the enterprise. Wang and Shen (2008) study by establishing structural equation modeling, and suggest that the level of technological innovation of enterprise business performance has a direct positive effect. Guo *et al.*'s (2009) empirical analysis on manufacturing companies in western Europe by constructing a structural equation shows that companies' products can effectively promote innovative activities to enhance their market performance and financial performance. Li *et al.* (2010) conclude by studying listed companies in China family enterprise data that kinship family business and innovation activities have a positive impact on the business of positive financial performance, while holding the family business as a way of mediating variables will affect the relationship between innovation and corporate performance. Tian's (2011) studies using structural equation modeling methodology based on a questionnaire survey of 158 knowledge intensive firms, concludes that innovation-oriented

enterprises for business performance has a direct positive influence, but also have an impact through innovation networks . Amores-Salvadó *et al.* (2014) empirically analyze the moderating role of the green corporate image in the relationship between environmental product innovations and firm performance in 157 Spanish metal firms. The results show the importance of efficiently managing the green image of the firm.

Based on the above researches, the following assumption has been made:

H3. Innovation has a positive effect on firm performance

2.4 The mediating role of innovation

The relationship between firm performance and high-performance HRM has been repeatedly validated by many scholars. Many scholars also focus on the role mechanism between them. In 1995, Huselid (1995) uses productivity and turnover rate as the mediating variable of the relationship between firm performance and high-performance work system to make an emprise study. The firm performance is measured by financial indicators, and find the productivity and turnover rate are both the mediating variables between them. At the same time, a large number of scholars use some variables of organizational class as the mediating variables between firm performance and high-performance HRM. For example, in 1998, Moynihan (1998) uses customer satisfaction as the measurement variable of firm performance to study the organizational commitment's mediating effect between firm performance and high-performance HRM. Some scholars also use the work environment or organizational climate as a mediating variable to conduct an empirical study (Fulmer *et al.*, 2003). As research continues to grow, some scholars use some of the characteristics of people as mediating variables, such as intellectual capital (Youndth, 1998), employee skills and attitudes (Park *et al.*, 2003), to come to some conclusions. For example, employees' skills play a mediating role in the relationship between firm performance and high-performance HRM. In addition, in 2008, Chinese scholars Zhang and Li (2008) using the strategic implementation capacity as the mediating variable between them, selected 650 enterprises in the pharmaceutical industry to conduct research, and came to the conclusion that the mediating role of the strategic implementation capacity existed. He and Peng (2008) from the perspective of management and organizational learning knowledge, point out that human resources management practices shared by action-oriented impact on organizational learning and knowledge, have an impact on organizational learning capability through capacity-oriented means, which can then affect innovation performance. Liu *et al.* (2009) a perspective of knowledge management capabilities as a basis for a theoretical study on the mechanism of the effect of human resources management practice and enterprise innovation ability, through the collation and analysis of the previous literature they draw the conclusion that: enterprise human resources management practice has a positive effect on innovation performance, knowledge management ability plays an important mediating effect between HRM practice and enterprise innovation. Su (2010a) through a empirical study proves that, for Chinese enterprises, employees' role behavior is the intermediary variable between HRM and enterprise performance. Xing (2012) through a single case study on the ability of independent innovation in the intermediary role of high-performance human resources office relationship management system and enterprise performance plays a validated role concludes: a high-performance HRM system forms independent innovation ability and enterprise, and external environment dynamic matching can improve the performance of enterprises. Yao (2013) through empirical research to verify the mediating effect of

organizational learning ability between high-performance work systems and firm performance shows that: organizational learning capability and its two sub-dimensions between high-performance work systems and firm performance relationship played a part of the intermediary role. Wu (2014) found that strategic implementation capacity can achieve efficient intermediary function in high-performance human resources management influencing the firm's performance.

Innovation is a factor that has been valued by enterprises, and some scholars have subsequently studied it. For example, Zheng (1991) find that HRM under an innovative culture results in better performance. De Kok and Den Hartog (2006) take innovation as the mediating variable in the relationship between a high-performance work system and employee productivity. That is to say, there is a direct relationship between a high performance work system and employee productivity, and a high performance work system also through innovation affects employee productivity indirectly. At the same time, employee productivity is a factor that affects the firm's performance. However, research that takes innovation as mediating variables in the relationship between firm performance and high-performance HRM is still inadequate. We hope to study the mediating role of innovation and test the mechanism of action between firm performance and high-performance HRM through research.

Based on the above research, the following assumption can be made:

H4. Innovation plays a mediating role between firm performance and high-performance HRM.

2.5 Model

In 1984, James and Brett (1984) proposed that if independent variable X through the influence of the variable M to influence the dependent variable Y, then denote the variable M as an intermediary variable. In the year of 1986, Baron and Kenny (1986) through research indicate that the intermediary variable M must meet four conditions: First, the independent variable X and dependent variable Y must have a significant correlation; Second, the independent variable X and intermediary variable M must have a significant correlation; Third, the intermediary variable M and dependent variable Y must have a significant correlation; Forth, after adding the mediating variables, if the effect of the independent variable X on the dependent variable Y is significantly reduced, the intermediary variable M has partial mediation effect; if the impact of the independent variable X on the dependent Y variable disappears, the intermediary variable M has complete mediation effect. Based on the theory, we put forward the hypothesis that innovation is the intermediary variable between high-performance HRM and enterprise performance, which is the theoretical model of this paper.

2.5.1 The direct model of the relationship between high-performance HRM and firm performance. At first, I built the direct interaction model of the relationship between high-performance human resources and firm performance, in order to easily study the direct relationship between them, leading to the study of the relationship between firm performance and each dimension of high-performance HRM.

Based on the above research, the direct effect model on the relationship between firm performance and high-performance HRM can be provided, as shown in Figure 2.

2.5.2 The innovation mediating role model. The theoretical models that are built in this paper are based on former theoretical research hypotheses. First, three variables (high-performance HRM, firm performance and innovation) are related to each other. Second, there are also a few studies on the innovation's mediating role. Based on the above theories, we build this paper's basic theoretical model (Figure 3).

3. Research method

3.1 Sample

The scales of our questionnaire are nearly all matured scales and the reliability and validity of these scales have been well validated in previous studies. This paper respectively uses scale according to the revised scale based on Delery and Doty (1996) study of high performance HRM used by Zhang Yichi *et al.* in 2008, subjective measurement of business performance and Scott and Bruce's (1994) scale for individual innovative behavior to build a pre-study of the scale (38 issues), then selected some service employees in were pre-investigation of Changchun China and analyzed the results of 150 pre-survey, then found that the reliability and validity of the investigation results are better (the paper did not delete any entries). The final research mainly used a convenient sampling method, by mail or directly sent questionnaires, to conduct a nationwide survey on some service enterprise employees. Questionnaires are mainly from Beijing, Shenzhen, Shanghai, Changchun, Harbin and other cities.

The research subjects are the employees of Chinese manufacturing industry enterprises; 224 questionnaires were collected providing 205 valid questionnaires (Table I). In the sample, gender differences are not obvious; 101 of them are women, accounting for 49.3 percent of the total number of samples; 104 men, accounting for 50.7 percent of the total number of samples. Most of the subjects are under the age of 35. This is a common age range for current employees, because older workers are generally on the "the second production line" in the enterprises. Regarding academic qualifications, 13 have a Master's degree and above, 162 have a Bachelor degree, 30 have a college diploma or below, respectively, accounting for 6.3, 79 and 14.6 percent of

Figure 2.
The direct interaction model

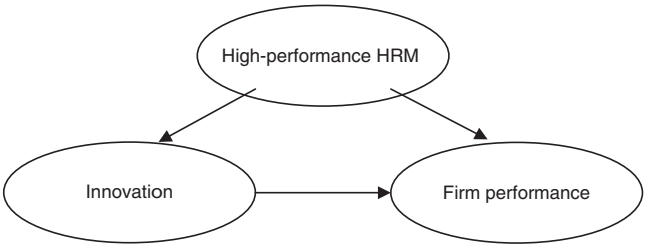


Figure 3.
The mediating role model

Variables	Cronbach's α coefficient	Overall Cronbach's α coefficient
Training	0.866	0.936
Employee participation	0.798	
Job analysis	0.832	
Performance evaluation	0.876	
Employee development	0.852	
Profit sharing	–	

Table I.
High-performance HRM scale cronbach's α coefficient

the total number of samples. From the nature of sample enterprises, the state-owned enterprises, private enterprises, foreign-funded enterprises and other private enterprises respectively have 53, 75, 34, 43, the percentage of total number of samples were 25.9, 36.6, 16.6, 21 percent. "Work experience" within this paper refers to the work experience of respondents in the current worked units. There were 114 people that have work experience of fewer than two years, 80 people have two to five years' experience, and 11 people have experience of more than five years. And, respectively, they accounted for 55.6, 39 and 5.4 percent of the total number of samples. According to job rank, three people are senior managers, 19 were middle managers, 52 line managers, 131 people were general staff, and the proportion of the total number of each sample was 1.5, 9.3, 25.4, 63.9 percent.

3.2 Variable measurement

The scales we use in this paper are basically maturity scales; the reliability and validity of these scales have been well verified in previous studies. In the questionnaire, we evaluate all entries through a Richter 5 rating score. The following introduces specific circumstances relating to the scale.

3.2.1 The selection of scales. We use employee perception to measure the level of high-performance HRM, that is, the level of staff understanding and feedback of high-performance HRM. Finally we adopt a high-performance HRM policy scale which was used by Delery and others. The scale consists of six dimensions to measure high-performance HRM; they are training (four items), employee participation (four items), job analysis (four items), performance evaluation (two items), employee development (four items) and profit sharing (one item). The internal consistency levels, respectively, are 0.81, 0.73, 0.82, 0.81 and 0.71 (Zhang, 2008). They are all higher than the theoretically recommended level of 0.70, which means the scale has good reliability. In addition, combined with the previous statement of employee participation in the original questionnaire, in this paper, according to the definition and content review of a high-performance HRM system, we define employee participation as employee development.

For firm performance, most scholars use objective data to measure by. However, for the confidentiality of data, the difficulty of obtaining micro data, and the objective measurement data changes over time, there is no way to ensure the reliability of data from the impact of the corporate long-term investment's fluctuations and the rate of return on investment. Therefore, using a subjective measurement method to measure firm performance has a certain degree of reliability and practical operability. For example, when Dawes (1999) studied the relationship of market orientation and subjective and objective performance, he pointed out that subjective measurement of the results is consistent with the results of objective measurement, and did not affect the validity of the final results. In addition, objective performance measurement results of state-owned enterprises and non-state-owned enterprises may be significantly different due to some inconsistent standards and objective performance of multiple business enterprise years are also not easily merged. So this paper adopts subjective performance to measure corporate performance to avoid these problems.

In most of the studies that use subjective performance indicators to measure data, the results of its use are good (Tan and Litschert, 1994). We use the following five aspects of subjective performance indicators; total sales, sales growth, market share, competitive position and overall performance to measure the performance of operation

of the enterprise. We additionally use the following five aspects of subjective performance indicators; rate of return on assets, rate of sales profit, level of profit, rate of asset growth and staff morale to measure the company's market performance. Each indicator is divided into five levels to measure, values are measured from 1 to 5 points. Lower scores reflect that the indicator of the enterprise is in a relatively lower position in the industry, higher scores of this indicator reflect that the position of the enterprise in the industry is higher. Respondents evaluate the issues which reflect the enterprise performance according to the enterprise's business operations in the last three years.

Innovative scale was assessed by nine items based on Scott and Bruce's (1994) scale for individual innovative behavior in the workplace. Three items refer to idea generation ("creating new ideas for improvements," "searching out new working methods, techniques, or instruments," and "generating original solutions to problems"); three items refer to idea promotion ("mobilizing support for innovative ideas," "acquiring approval for innovative ideas," and "making important organizational members enthusiastic for innovative ideas"); and three items refer to idea realization ("transforming innovative ideas into useful applications," "introducing innovative ideas into the work environment in a systemic way," and "evaluating the utility of innovate ideas"). Immediate supervisors rated how often respondents performed the nine innovative work behaviors in the workplace.

The reasons for choosing this scale is that although it can be good to measure innovative behavior in theory, it also suitable for the definition for innovation and the innovative concept. It is a scale to measure the dynamic process of new ideas' production, promotion and practice. The dimensions are production of innovation cogitation (three items), promotion of innovation cogitation (three items), and implementation of innovative behavior (three items). Internal consistency coefficients are all above 0.90.

3.2.2 The test of reliability and validity. This paper uses the method of principal component analysis, to conduct exploratory factor analysis on the variables. We conduct factor analysis on various dimensions of each variable to extract common factors. There are two principles of factor analysis to extract common factors, one is in relation to the cumulative variance contribution rate, and another is based on a characteristic root. In this paper, we select the characteristic roots $\geqslant 1$ as the principle of factor extraction and refer to a screen plot to determine the number of extracted factors. In addition, in order to make the factor more indicative to the obvious and simplify explanation,, this paper uses varimax orthogonal rotation method to rotate each factor.

3.2.2.1 The test of high-performance HRM scale. The high-performance HRM scale's overall reliability coefficient (Table I) is 0.936, and, testing it repeatedly, does not require deletion of any entries, and deletion of entries does not make the scale reliability better. The training dimension's reliability coefficient is 0.866, employee participation dimension's reliability coefficient is 0.798, job analysis dimension's reliability coefficient is 0.832, performance evaluation dimension's reliability coefficient is 0.876, and employee development dimension's reliability coefficient is 0.852. Profit sharing uses only one entry, so therefore the reliability of it was not analyzed. The above analysis shows that the reliability coefficient of the scale reached the recommended level of 0.70; it has a good level of reliability, therefore, the research results have a certain degree of reliability through the use of this scale.

In the dimensions of high-performance HRM, the KMO value of training, employee participation, job analysis, performance evaluation and employee development are

0.806, 0.774, 0.800, 0.500, 0.795, respectively, basically larger than the critical value 0.5. By using Bartlett Test Sphericity to test each dimension, the results indicate that it should reject the null hypothesis (Sig. $= 0.000$), it shows that factor analysis can be done to every dimension of high-performance HRM.

We could extract common factors from training, employee participation, job analysis, performance evaluation and employee development, which all belong to high-performance HRM, and the variance contribution rates are 71.722, 63.092, 66.382, 88.931, and 69.284 percent, respectively. From the factor-loading matrix (Table II), based on factor analysis, we could draw the conclusion that the factors load separately onto the dimensionalities; the factor loadings are all significantly > 0.7, and variance contribution rates of every common factor are significantly > 40 percent. All of these indicate that the high-performance HRM scale has good structural validity. After doing exploratory factor analysis to reduce dimension, the former 18 items have been changed into four common factors, which provides the basis for the further research.

The factors of high-performance HRM	Factor loading	KMO	Bartlett χ^2	p
The company's employees are trained every period	0.816	0.806	402.079	0.000
The company provides our employees with a formal training program to them for promotion	0.830			
The company provides comprehensive training for employees	0.907			
The company has formal training programs to teach new employees work skills	0.832			
Managers and employees constantly make open and honest communication	0.803	0.774	271.740	0.000
Company employees have the opportunity to put forward the recommendation on improving the working methods	0.860			
The managers of the company often make decision referring to the views of staff	0.884			
The employees can decide their way of working in many cases	0.652			
There is a clear definition on employees work responsibilities	0.795	0.800	296.050	0.000
The responsibilities manual of employees includes all the responsibilities of employees	0.816			
The employees can be in strict compliance with the specification of responsibilities manual in practical work	0.848			
The company will promptly revise the responsibilities manual when necessary	0.799			
The performance is usually measured as the objective and quantifiable results in the company	0.943	0.500	188.744	0.000
The employees' performance appraisal is based on the objective and quantifiable results	0.943			
The employees have a clear career path within the company	0.862	0.795	356.177	0.000
Direct superiors learn occupation development intention of the employees	0.848			
Employees have more than one suitable position to achieve promotion	0.746			
There is career development for employees working in this company	0.848			

Table II.
The results of exploratory factor analysis of the high-performance HRM

Because profit sharing has just one value, which is not suitable for confirmatory factor analysis, we did not put it into the model. Therefore, we used the confirmatory factor analysis of the five-factor model of high-performance HRM (Figure 4).

We found that among the fitting index of the five-factor model of high-performance HRM (Table III), χ^2/df is obviously < 3, RMSEA is < 0.08, other indexes are all greater

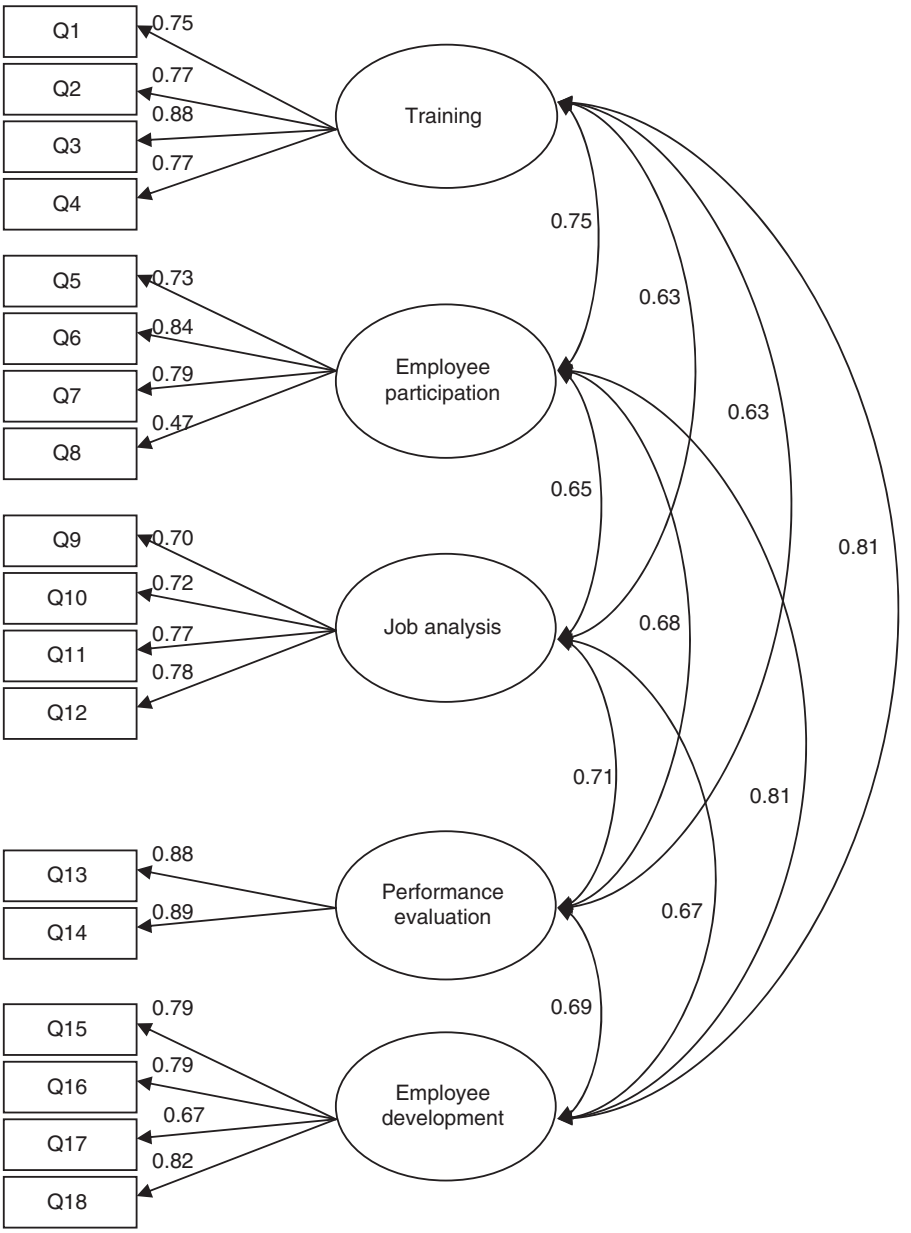


Figure 4.
The five-factor model of high-performance HRM

than the given soundness of a fit index. The fitting is generally accurate, meaning the model could be trusted. As we can see, the confirmatory factor analysis in Figure 4, profit sharing has just one item, which is not suitable for the analysis; however, based on the study of Zhang and Li (2008), it was not deleted.

3.2.2.2 The test of firm performance scale. The general reliability of firm performance scale is 0.925; operating performance has five items, whose reliability is 0.907; market performance has five items, whose reliability is 0.889. They all reach the recommended level of 0.70, which indicates firm performance scale reliability is relatively high and the measuring results are stable and reliable (Table IV).

The KMO value of operating performance is 0.877, and the market performance is 0.860; they are both greater than the critical value, 0.5. Having done the Bartlett Spherical Inspection on various dimensions, the results showed that the null hypothesis (sig. = 0.000) should be rejected, which indicates the various dimensions of innovation can be done by factor analysis.

Variance contribution rates of common factors, which are based on operating performance and market performance of firm performance, are both > 65 percent, from factor loading (Table V) of factor analysis; we could draw the conclusion that the factors separately load onto the dimensionalities, the factor loadings are all

Table III.
Confirmatory factor analysis goodness of fit index of five-factor model of high-performance HRM

Structure equation model	χ^2	df	χ^2/df	RMSEA	CFI	NFI	IFI	TLI	PNFI	PGFI
The role of five-factors model	208.298	125	1.666	0.057	0.960	0.907	0.961	0.951	0.741	0.660

Table IV.
Firm performance scale cronbach's α coefficient table

Research variables	Cronbach's α coefficient	Total Cronbach's α coefficient
Operating performance	0.907	0.925
Market performance	0.889	

Table V.
Firm performance exploratory factor analysis results

Firm performance	Factor loading	KMO	Bartlett χ^2	p
Over the past three years, company's return on assets is higher	0.796	0.877	651.964	0.000
The company's sales margins maintain a high level in the same industry	0.851			
The company's profit is higher	0.881			
The company's employee morale is good	0.898			
The company's asset growth in the industry has an advantage	0.840			
The company's sales margins maintain a high level in the same industry	0.815	0.860	555.893	0.000
The company's overall performance is very good	0.855			
The company's market share maintains a high level in the same industry	0.864			
The company's competitive position is very favorable	0.817			
The company's sales growth rate maintains a high level in the same industry	0.818			

significantly > 0.7. All of these indicate that the high-performance HRM scale has good structural validity. After doing exploratory factor analysis; these have been changed into two common factors.

Confirmatory factor analysis on firm performance, in its goodness of fit index table (Table VI), χ^2/df is < 3, CFI, NFI, IFI and TLI are all > 0.9; PNFI and PGFI are both > 0.5; RMSEA is also in the acceptable range, therefore generally speaking the model fitting is acceptable. In the confirmatory factor analysis (Figure 5), the two factors' items are all more than 0.7, which shows the validity of the scale, that it is consistent with exploratory factor analysis, and that the scale can be used.

3.2.2.3 The test of innovation scale. The general reliability of innovation scale is 0.928, and the test result shows that deleting the items would not improve the reliability of the questionnaire. Production of innovation cogitation has three items, and its reliability is 0.737; promotion of innovation cogitation has three items, and the reliability is 0.861; implementation of innovative behavior also has three items, and the reliability is 0.890. All of these are more than 0.7, which shows the reliability of the scale is good; the results based on the scale can be trusted. The specific internal consistency coefficients are shown in Table VII.

Exploratory factor analysis and confirmatory factor analysis on innovative scale just like high-performance HRM, the KOM values of production of innovation

Table VI. Confirmatory factor analysis goodness of fit index of two-factor model of firm performance

Structure equation model	χ^2	df	χ^2/df	RMSEA	CFI	NFI	IFI	TLI	PNFI	PGFI
The role of two-factors model	61.417	24	2.559	0.087	0.970	0.952	0.970	0.955	0.735	0.500

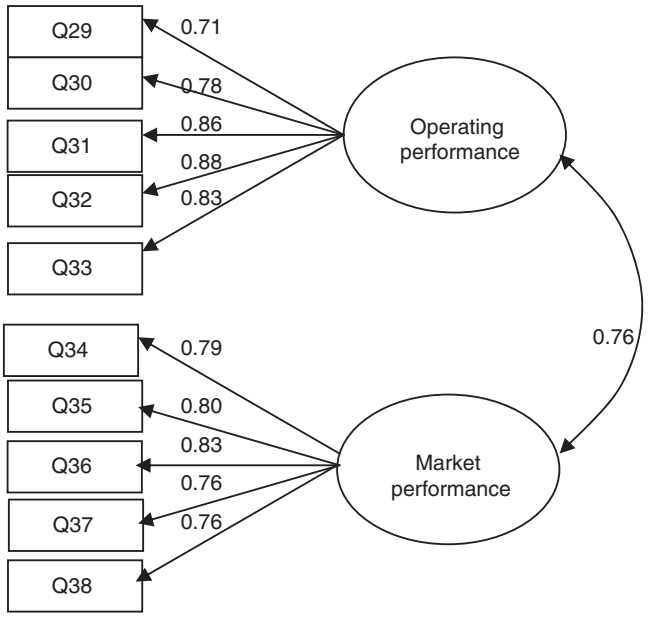


Figure 5. The two-factor model of firm performance

cogitation, promotion of innovation cogitation and implementation of innovative behavior are separately 0.712, 0.721, 0.727; all of them are >0.7 on the Bartlett Spherical Inspection on various dimensions; the results showed that the null hypothesis (sig. = 0.000) should be rejected which indicates the various dimensions of innovation can be done by factor analysis.

We extract a common factor from the three items in the first dimension of innovation, which is named production of innovation cogitation, its variance contribution rate is 71.776 percent, in close value to the second dimension of innovation, named promotion of innovation cogitation, the variance contribution rate is 78.231 percent, also in the same range as the third dimension of innovation, named implementation of innovative behavior, the variance contribution rate is 82.045 percent; the factor loading values of every dimension are shown in Table VIII. From exploratory factor analysis we could draw the conclusion that the factors separately load onto the dimensionalities, the factor loadings are all significantly >0.7, and variance contribution rates of every common factor are significantly >70 percent. All of these indicate that the high-performance HRM scale has good structural validity. After doing exploratory factor analysis to reduce the dimension, the former nine items have been changed into three common factors (Table VIII).

Do confirmatory factor analysis on innovation, in its goodness of fit index table (Table IX), χ^2/df is significantly <3, other index items are all greater than the given level, the fitting is generally good, so the model can be trusted. In addition, the items of confirmatory factor analysis are all more than 0.75, which shows the validity of the scale is good (Figure 6).

Table VII.
Innovation scale cronbach's α coefficient

Research variables	Cronbach's α coefficient	Total Cronbach's α coefficient
Production of innovation cogitation	0.737	0.928
Promotion of innovation cogitation	0.861	
Implementation of innovative behavior	0.890	

Table VIII.
The innovation exploratory factor analysis results

Innovation factors	Factor loading	KMO	Bartlett χ^2	p
The employees can create new ideas for improving the work	0.840	0.712	192.743	0.000
The employees are constantly searching out new working methods, techniques, or instruments	0.848			
The employees can generate original solutions to problems	0.853			
The company mobilizes support for innovative ideas	0.909	0.721	289.072	0.000
Innovative thinking can acquire approval for innovative ideas	0.887			
The company makes important organizational members enthusiastic for innovative ideas	0.857			
Innovative thinking can be turned into useful methods	0.924	0.727	368.598	0.000
Innovative thinking can be introduced into work with the systematic method	0.923			
The company will evaluate the effectiveness of innovative thinking	0.869			

4. Data analysis

4.1 Correlation analysis

4.1.1 The correlation analysis between high-performance HRM and firm performance. From the result of correlation analysis between high-performance human resource and firm performance (Table X), we can draw a conclusion that the various dimensions of the three variables all were significantly positive at a 0.01 level, and are above 0.400. The preliminary results of the correlation analysis supported the *H1*.

Table IX. Confirmatory factor analysis goodness of fit index of three-factor model of innovation

Structure equation model	χ^2	df	χ^2/df	RMSEA	CFI	NFI	IFI	TLI	PNFI	PGFI
The role of three-factors model	61.417	24	2.559	0.087	0.970	0.952	0.970	0.955	0.735	0.500

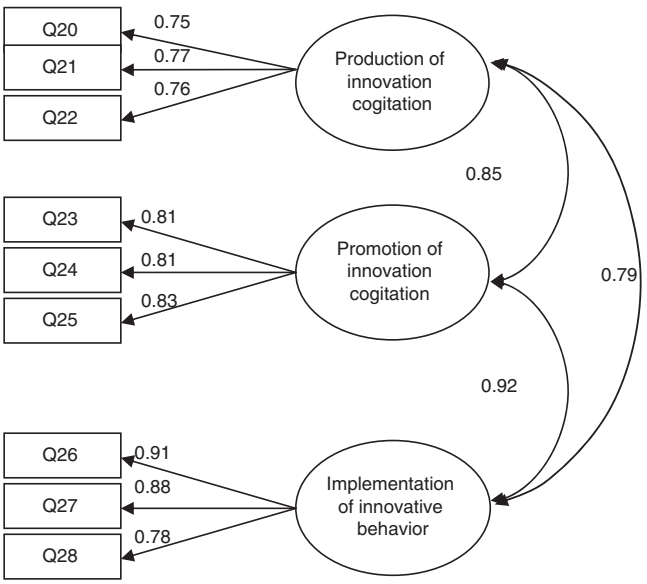


Figure 6. The three-factor model of innovation

Pearson correlation		Firm performance: Operating performance	Firm performance: Market performance
High-performance human resource	Training	0.508***	0.620***
	Employee participation	0.520***	0.580***
	Job analysis	0.541***	0.599***
	Performance evaluation	0.426***	0.543***
	Employee development	0.482***	0.514***
	Profit sharing	0.452***	0.420***

Note: ***Correlation is significant at the 0.01 level (two-tailed)

Table X. The results of correlation analysis between high-performance HRM and innovation

4.1.2 The correlation analysis between high-performance HRM and innovation. From the result of correlation analysis between high-performance HRM and innovation (Table XI), they are above 0.450. The results of the correlation analysis support the *H2*.

4.1.3 The correlation analysis between innovation and firm performance. From the correlation analysis between innovation and firm performance (Table XII), we can draw a conclusion that the various dimensions of the two variables all were significant positive at 0.01 level, and are above 0.500, the results of the correlation analysis supported the *H3*.

4.2 Model analysis

4.2.1 Direct role model analysis. The result of direct role model shows the path coefficient of high-performance HRM to firm performance is 0.89, CR value is 11.038, p is significant, so we can consider that *H1* is right, that is high-performance HRM has a positive impact on firm performance, and this effect is significant. The analyses model of various dimensions shows effect of high-performance HRM on firm performance (Figure 7).

This article further analyzes the role of high-performance human resource on firm performance (Table XIII),we can conclude that the χ^2/df of structural equation model is < 5, even < 2, CF, NFI, IFI, TL are all higher than 5. Every index has a satisfactory

Table XI.
The results of correlation analysis between high-performance HRM and innovation

		High-performance HRM					
Pearson Correlation		Training	Employee participation	Job analysis	Performance evaluation	Employee development	Profit sharing
Innovation	Production of innovation cogitation	0.555***	0.612***	0.476***	0.467***	0.577***	0.483***
	Promotion of innovation cogitation	0.630***	0.616***	0.553***	0.511***	0.625***	0.463***
	Implementation of innovative behavior	0.621***	0.633***	0.522***	0.465***	0.671***	0.472***

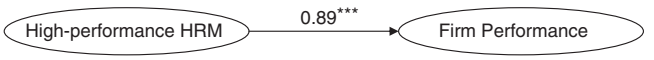
Note: ***Correlation is significant at the 0.01 level (two-tailed)

Table XII.
The results of the correlation analysis between innovation and firm performance

		Firm performance	
Pearson correlation		Operating performance	Market performance
Innovation	Production of innovation cogitation	0.540***	0.589***
	Promotion of innovation cogitation	0.561***	0.615***
	Implementation of innovative behavior	0.529***	0.552***

Note: ***Correlation is significant at the 0.01 level (two-tailed)

Figure 7.
Direct role model



goodness of fit, structural equation model (Figure 8) shows that the path coefficient of firm performance is 0.37 CR is 4.080, p is significant, the standardized path coefficient of job analysis on firm performance is 0.24.CR is 4.805, p is significant, the standardized path coefficient of employee participation on firm performance is 0.34, CR is 3.080, p is 0.002. The effect of the three remaining practices on firm performance is not significant; it proves that the effect of training, job analysis and employee participation in high-performance HRM on firm performance is significant. The role of employee development, profit sharing and performance evaluation on firm performance is not so significant.

4.2.2 Analysis of mediating role of innovation. 4.2.2.1 Test mediating role by regression equation. To test the mediating role of innovation the three following steps are required. First, we take training, employee participation, employee development and the other three practices as an independent variable of high-performance HRM, innovation as an induced variable to test the relationship. Next we take high-performance HRM as an independent variable, firm performance as an induced variable to test this relationship. Finally, we regard high-performance HRM and innovation as independent variables and firm performance as an induced variable to test the mediating role of innovation.

According to the Table XIV, R^2 of each model and the adjustments are good. The F is over 0.01 so it passes the test. DW also shows significance and is suitable for the model. The regression results of high-performance HRM and innovation show a positive correlation. *H1* and *H2* were verified. When innovation was added, the influence significantly weakened from high-performance HRM to firm performance. Coefficient reduces to 0.451 from 0.706. The same time innovation had a positive impact on firm performance and the coefficient is 0.334 and significant at 0.01 levels. After variable added influence between independent variables and induced variables the results did not disappear but were weaker which is acceptable for condition of mediating utility. The *H4* is verified.

Table XIII.
Goodness of fit index of high-performance HRM structural equation model

Goodness of fit index	χ^2	df	χ^2/df	RMSEA	CFI	NFI	IFI	TLI
Structural equation model	7.393	4	1.848	0.064	0.996	0.992	0.996	0.973

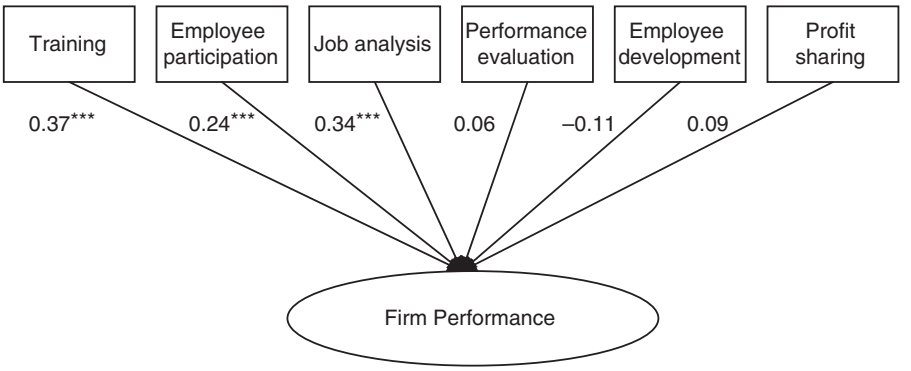


Figure 8.
The relationship model of high-performance HRM's practice and firm performance

Table XIV.
Results of mediating role of innovation by regression equation

Induced variable	Innovation						Firm performance					
Independent variable	Standardized Coefficients B	R^2	Adjusted R^2	F change	Sig. F change	Durbin-Watson	Standardized Coefficients B	R^2	Adjusted R^2	F change	Sig. F change	Durbin-Watson
High-performance HRM	0.765***	0.585	0.583	286.247	0.000	1.892						
High-performance HRM							0.706***	0.499	0.496	202.142	0.000	1.980
High-performance HRM							0.451***	0.545	0.541	121.075	0.000	1.959
Innovation							0.334***					

Note: ***Correlation is significant at the 0.01 level

4.2.2.2 Test mediating role by structural equation modeling. The algorithm of each variable in the regression equation is a method of arithmetic averaging to show any error that may be present. We built a structural equation model to further validate the mediating role of innovation. The three models are direct interaction model, partial mediating role model and fully mediating role model, which were contrasted.

Direct interaction model is without innovation but the model for the results of high-performance HRM and firm performance. The partial mediating role model is affected between high-performance HRM and firm performance both directly and indirectly by innovation. The fully mediating role model has no direct role between high-performance HRM and firm performance but skips innovation. The fully mediating role model fits better than a direct interaction model fitting but the partial mediating role model fit is better than the fully mediating role model fit (Table XV).

Analysis shows that the partial mediating role model is more rational than the fully mediating role model. In the partial mediating role model the coefficient of high-performance HRM and firm performance is 0.57 and CR is 4.083, p is 3 stars. The coefficient of high-performance HRM and innovation is 0.86 and CR is 12.061, p is 3 stars. The coefficient of firm performance and innovation is 0.29 CR is 2.135, p is 0.033. Therefore, the *H1*, *H2* and *H3* were verified.

Compared with the fully mediating role model the coefficient of the partial mediating role model drop from 0.89 to 0.57 is a distinct drop. Variables have a paired relationship and weaken after the mediating variables are added so the conditions converge. The mediating role was to play by innovation between firm performance and high-performance HRM. Until now, the hypothesis four was verified.

Shown in the path coefficient diagram (Figure 9), high-performance HRM not only directly affects the firm performance, but also indirectly effects firm performance by innovation. The direct effect is 0.57, and the indirect effect is $0.249(0.86 \times 0.29)$. So the total effect is 0.819. That is, high-performance HRM is proportional to firm performance.

In summary, the four hypotheses have been tested, indicating that high-performance HRM has positive effects on firm performance; training, employee participation and job analysis are significantly positive impacts, while the other three practices did not draw positive or negative significantly impact; innovation plays a partial mediating role between them.

Structural equation model	χ^2	df	χ^2/df	RMSEA	CFI	NFI	IFI	TLI	PNFI	PGFI
Partial mediating role model	78.582	41	1.917	0.067	0.974	0.948	0.975	0.966	0.745	0.581
Fully mediating role model	94.389	42	2.247	0.078	0.924	0.938	0.965	0.953	0.716	0.588
Direct interaction model	49.507	51	2.606	0.089	0.946	0.946	0.966	0.949	0.642	0.499

Table XV.
Goodness of fit for structural equation model

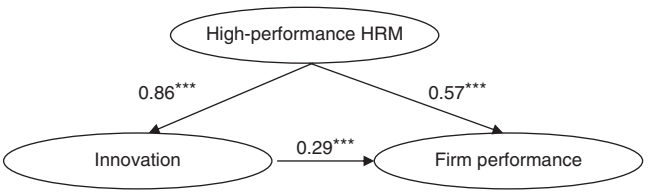


Figure 9.
Mediating role model

5. Conclusion and discussion

This article draws the following conclusions through quantitative analysis.

First, there is a correlation among high-performance HRM systems, innovation and firm performance. A high-performance HRM system has a significant positive impact on innovation; innovation has a significant positive impact on firm performance; high-performance HRM system provides a significant positive impact on firm performance. Second, innovation has played a part of a mediating role between the high-performance HRM system and enterprise performance. A high-performance HRM system has a direct impact on firm performance, improving the high-performance HRM system can achieve the improvement of firm performance; high-performance HRM system has indirect utility on firm performance through innovation. Third, the various practices of the high-performance HRM system for the role of firm performance are different, and training, job analysis and employee participation are significant positives to firm performance. Employee development, profit sharing and performance evaluation as three kinds of practices for firm performance are not significant.

This paper verifies the relationship between different high-performance HRM practices and firm performance. The conclusions indicate that training, job analysis and employee participation have significant positive effects on firm performance, and several other roles are not as obvious. Development of Chinese enterprises has further improved the mechanism of the training. More comprehensive training can promote the comprehensive development of the staff, and further improve firm performance; encouraging employees to participate in the management of the business and expressing their views can improve their organizational loyalty, thus improving firm performance; the use of these several practices should be improved. This conclusion also shows that with the continuous development of the Chinese economy and the economic level seems to have been able to support this management system and play its role of high performance.

In addition, we added innovation to the model and verified the partial mediating role of innovation between high-performance HRM system and firm performance. This further develops the Chinese scholar Zheng's (1991) argument that the performance of human resources management production is better in an innovative culture; De Kok and Den Hartog (2006) conclusion that innovation played a mediating between high-performance HRM system and employee productivity utility is also supported to some extent. It can be seen, as Chinese enterprises perform under the conditions of globalization in the twenty-first century, that if you want to improve the ability to innovate, create and control the core competence, then enhancing the improvement of human resources management system has practical significance. Human resources management practices, such as improving training, job analysis, employee engagement and performance evaluation, all create a better innovation management environment for the organization and improve the innovative initiative of the staff, but also moral and material support for the employee innovation behavior should be provided to turn thinking innovation into actual productivity.

This study has some limitations; first of all, the service industry covers a wide range of industry sectors. The specific industry characteristics of the research in this paper is not clear enough and the amount of data has some limitations; second, there is a lack of consideration for the actual conditions such as firm size, the work experience of the research object, the nature of the organization, and it did not join with the structural equation model, which may make the data structure too idealistic. In future research, we need to improve the measurement of innovation, and, expanding the scope of research

and comprehensive consideration of the various enterprise scenarios, further examine the relations and mechanisms of high-performance HRM system and corporate performance.

The focus of this study is the analysis of the internal structure of high performance HRM system, the relationship and mechanism of action between the system and firm performance, without involving any human resources strategy integration problems. At present, there are still many problems for the research of high performance human resources management system, which will become the main research direction in the future:

First, high performance HRM system involves the work flow design, organization structure, HRM measures, as well as others in many aspects, and in the present research there remains disagreement for the definition of high performance work systems. Second, the current research on "best practices" is inconclusive. For optimal HRM practice, in previous studies, different scholars put forward many different measures. The definition, combinations style and the selected performance index of these measures in each study are not the same. In addition, the evaluation of each measure's effect on organizational performance by different scholars are not the same. Third, by what mechanisms high performance work systems affect organizational performance are not clear: enterprise strategy, human capital is regarded as the intermediary variable to carry on related research, but needs further verification.

References

Amabile, T.M. (1996), *Creativity in Context: Update to "the Social Psychology of Creativity"*, *Westview press*.

Amores-Salvadó, J., Martín-de Castro, G. and Navas-López, J.E. (2014), "Green corporate image: moderating the connection between environmental product innovation and firm performance", *Journal of Cleaner Production*, Vol. 83 No. 11, pp. 356-365.

Arias-Aranda, D., Minguela-Rata, B. and RodrõÂguez-Duarte, A. (2001), "Innovation and firm size: an empirical study for Spanish engineering consulting companies", *European Journal of Innovation Management*, Vol. 4 No. 3, pp. 133-141.

Armstrong, C., Flood, P.C., Guthrie, J.P., Maccurtain, S. and Mkamwa, T. (2008), "Should high performance work systems include diversity management practices?", Academy of Management Proceedings, Vol. 1, pp. 1-6.

Arthur, J.B. (1994), "Effects of human resource systems on manufacturing performance and turnover", *Academy of Management Journal*, Vol. 37 No. 3, pp. 670-687.

Bae, J. and Lawler, J.J. (2000), "Organizational and HRM strategies in Korea: impact on firm performance in an emerging economy", *Academy of Management Journal*, Vol. 43 No. 3, pp. 502-517.

Bae, J., Chen, S.-J., David Wan, T.W., Lawler, J.J. and Walumbwa, F.O. (2003), "Human resource strategy and firm performance in pacific rim countries", *The International Journal of Human Resource Management*, Vol. 14 No. 8, pp. 1308-1332.

Baines, T.S. and Kay, J.M. (2002), "Human performance modelling as an aid in the process of manufacturing system design: a pilot study", *International Journal of Production Research*, Vol. 40 No. 10, pp. 2321-2334.

Barnard, M.E. and Rodgers, R.A. (2000), "How are internally oriented HRM policies related to high-performance work practices? Evidence from Singapore", *International Journal of Human Resource Management*, Vol. 11 No. 6, pp. 1017-1046.

Baron, R.M. and Kenny, D.A. (1986), "The moderator – mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations", *Journal of Personality and Social Psychology*, Vol. 51 No. 6, p. 1173.

Batt, R. and Moynihan, L. (2002), "The viability of alternative call centre production models", *Human Resource Management Journal*, Vol. 12 No. 4, pp. 14-34.

Chen, C.J. and Huang, J.W. (2009), "Strategic human resource practices and innovation performance – the mediating role of knowledge management capacity", *Journal of Business Research*, Vol. 62 No. 1, pp. 104-114.

Cheng, D.J. and Zhao, S.M. (2006), "Between the heavy-involvement work system and company performance: the effect of specific utilization of human capital upon the dynamic of environment", *Management World*, Vol. 246 No. 3, pp. 86-93+171.

Combs, J., Liu, Y., Hall, A. and Ketchen, D. (2006), "How much do high-performance work practices matter? A meta-analysis of their effects on organizational performance", *Personnel Psychology*, Vol. 59 No. 3, pp. 501-28.

Damanpour, F. (1991), "Organizational innovation: a meta-analysis of effect of determinants and moderator", *Academy of Management Journal*, Vol. 34 No. 3, pp. 555-590.

Datta, D.K., Guthrie, J.P. and Wright, P.M. (2005), "Human resource management and labor productivity: does industry matter?", *Academy of Management Journal*, Vol. 48 No. 1, pp. 135-145.

Dawes, J. (1999), "The relationship between subjective and objective company performance measures in market orientation research: further empirical evidence", *Marketing Bulletin*, Vol. 10 No. 3, pp. 65-75.

De Kok, J.M.P. and Den Hartog, D. (2006), "High performance work systems, performance and innovativeness in small firms", SCALES-paper, EIM Business and Policy Research Reports (N200520).

Delaney, J.T. and Huselid, M.A. (1996), "The impact of human resource management practices on perceptions of organizational performance", *Academy of Management Journal*, Vol. 39 No. 4, pp. 949-69.

Delery, J.E. and Doty, D.H. (1996), "Modes of theorizing in strategic humean resource management: tests of universalistic contigency and configurations performance preductions", *Academy of Management Journal*, Vol. 39 No. 4, pp. 802-35.

Ericksen, J. (2007), "High-performance work systems, dynamic workforce alignment, and firm performance", *Academy of Management Proceedings*, Vol. 8 No. 1, pp. 1-6.

Fan, X.C. and Bjorkman, I. (2003), "Human resource management and the performance of foreign invested enterprises in China", *Journal of Management Sciences in China*, Vol. 6 No. 2, pp. 54-60+67.

Fulmer, I.S., Gerhart, B. and Scott, K. (2003), "Are the 100 best better? An empirical investigation of the relationship between being a great place to work and firm performance", *Personnel Psychology*, Vol. 56 No. 4, pp. 965-993.

Gittell, J.H., Seidner, R. and Wimbush, J. (2010), "A relational model of how high-performance work systems work", *Organization Science*, Vol. 21 No. 2, pp. 490-506.

Gloet, M. and Terziovski, M. (2004), "Exploring the relationship between knowledge management practices and innovation performance", *Journal of Manufacturing Technology Management*, Vol. 15 No. 5, pp. 402-409.

Guo, X.D., Sun, J. and Wu, J. (2009), "Chen rong. How does customer orientation and innovation orien-tation influence firm performance?", *Nankai Business Review*, Vol. 12 No. 3, pp. 67-73+93.

Guthrie, J.P. (2001), "High-involvement work practices, turnover, and productivity: evidence from New Zealand", *Academy of Management Journal*, Vol. 44 No. 1, pp. 180-90.

Guthrie, J.P., Flood, P.C., Liu, W. and MacCurtain, S. (2009), "High performance work systems in Ireland: human resource and organizational outcomes", *The International Journal of Human Resource Management*, Vol. 20 No. 1, pp. 112-125.

Han, J.K., Kim, N. and Srivastava, R.K. (1998), "Market orientation and organizational performance: is innovation a missing link?", *Journal of Marketing*, Vol. 62 No. 4, pp. 30-45.

Harley, B. (2002), "Employee responses to high performance work system practices: an analysis of the AWIRS95 data", *The Journal of Industrial Relations*, Vol. 44 No. 3, pp. 418-34.

He, H.T. and Peng, J.S. (2008), "Mechanism of human resource management practices on innovation performance – based on knowledge management and organizational learning perspective integration", *Foreign Economics & Management*, Vol. 30 No. 8, pp. 53-59.

Huelid, M.A., Jackson, S.E. and Schuler, R.S. (1997), "Technical and strategic human resource management effectiveness as determination of firm performance", *Academy of Management Journal*, Vol. 40 No. 1, pp. 171-188.

Hurley, R.F. and Hult, G.T. (1998), "Innovation, market orientation and organizational learning: an integration and empirical examination", *Journal of Marketing*, Vol. 62 No. 7, pp. 42-54.

Huselid, M. (1995), "The impact of human resource management practices on turnover, productivity, and corporate financial performance", *Academy of Management Journal*, Vol. 38 No. 3, pp. 635-72.

Huselid, M.A. (1994), "Documenting HR's effect on company performance", *HR MAGAZINE*, Vol. 39, pp. 79-79.

James, L.R. and Brett, J.M. (1984), "Mediators, moderators, and tests for mediation", *Journal of Applied Psychology*, Vol. 69 No. 2, p. 307.

James, M.S., William, E.B. and Noordewier, T. (1997), "A framework for market-based organizational learning: linking values, knowledge, and behavior", *Journal of the Academy of Marketing Science*, Vol. 25 No. 4, pp. 305-318.

Jiang, C. and Zhao, S. (2004), "Firm characteristics, human resource management and performance: an empirical study of Hong Kong enterprises", *Management Review*, Vol. 16 No. 10, pp. 22-31+63-64.

Kanter, R. (1986), "Supporting innovation and venture development in established companies", *Journal of Business Venturing*, Vol. 1 No. 1, pp. 47-60.

Kintana, M.L., Alonso, A.U. and Olaverri, C.G. (2006), "High-performance work systems and firms' operational performance: the moderating role of technology", *The International Journal of Human Resource Management*, Vol. 17 No. 1, pp. 70-85.

Lado, A.A. and Wilson, M.C. (1994), "Human resource systems and sustained competitive advantage: a competency-based perspective", *Academy of Management Review*, Vol. 19 No. 4, pp. 699-727.

Laursen, K. and Foss, N.J. (2003), "New human resource management practices, complementarities and the impact on innovation performance", *Cambridge Journal of Economics*, Vol. 27 No. 2, pp. 243-63.

Li, J., He, X.G. and Mao, J. (2010), "Kinship, innovative competence and firm performance", *Nankai Business Review*, Vol. 13 No. 3, pp. 117-124.

Li, Y., Zhao, Y. and Liu, Y. (2006), "The relationship between HRM, technology innovation and performance in China", *International Journal of Manpower*, Vol. 27 No. 7, pp. 679-697.

Liu, B.C., Tang, N.Y. and Jiang, H.L. (2009), "Wu bing. Strategic human resource management practices and organizational innovation: knowledge management perspectives", *Science & Technology Progress and Policy*, Vol. 26 No. 3, pp. 146-149.

Liu, S.S., Liu, T.T. and Liu, X.Y. (2007), "Study on the relationship between human resource management system and organizational performance of high-tech company", *Studies in Science of Science*, Vol. 25 No. 4, pp. 764-771.

Lumpkin, G.T. and Dess, G.G. (1996), "Clarifying the entrepreneurial orientation construct and linking it to performance", *Academy of Management Review*, Vol. 21 No. 1, pp. 135-172.

Lv, Y.F. (2005), *The Study on the Correlation Between Leadership Behavior, Organizational Learning, Innovation and Performance*, Fudan University, Shanghai.

MacDuffie, J.P. (1995), "Human resource bundles and manufacturing performance: organizational logic and flexible production systems in the world auto industry", *Industrial and labor Relations Review*, Vol. 48 No. 2, pp. 197-221.

Moynihan, C. (1998), "Theories in health care and research: theories of masculinity", *BMJ: British Medical Journal*, Vol. 317 No. 7165, p. 1072.

Park, H.J., Mitsuhashi, H., Fey, C.F. and Björkman, I. (2003), "The effect of human resource management practices on Japanese MNC subsidiary performance: a partial mediating model", *The International Journal of Human Resource Management*, Vol. 14 No. 8, pp. 1391-1406.

Pfeffer, J. (1994), *Competitive Advantage Through People*, Boston/Mass.

Pfeffer, J. (1996), "When it comes to 'best practices' – why do smart organizations occasionally do dumb things?", *Organizational Dynamics*, Vol. 25 No. 1, pp. 33-44.

Qin, J. (2012), "System of high performance work practice, knowledge dissemination and radical innovation", *Science Research Management*, Vol. 33 No. 1, pp. 71-78.

Qin, X.L., Yang, D.T. and Wei, J.R. (2007), "An empirical research of the relation of innovation strategy and training with firm performance in manufacturing industry", *Chinese Journal of Management*, Vol. 4 No. 3, pp. 354-357.

Schumpeter, J. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge, MA.

Scott, S.G. and Bruce, R.A. (1994), "Determinants of innovative behavior: a path model of individual innovation in the workplace", *Academy of management Journal*, Vol. 37 No. 3, pp. 580-607.

Service, R.W. and Boockholdt, J.L. (1998), "Factors leading to innovation: a study of managers' perspectives", *Creativity Research Journal*, Vol. 11 No. 4, pp. 295-307.

Shipton, H., Fay, D., West, M., Patterson, M. and Birdi, K. (2005), "Managing people to promote innovation", *Creativity and Innovation Management*, Vol. 14 No. 2, pp. 118-128.

Song, D., Yuan, Y.Z. and Zhang, W.W. (2011), "A cross-level rsearch on the impact of strategic human resource management and innovative climate on employee innovative behavior", *Science of Science and Management of S & T*, Vol. 32 No. 1, pp. 172-179.

Su, Z.X. (2010a), "High-performance human resource management system in transitional china: a contextualizing research", *Nankai Business Review*, Vol. 13 No. 4, pp. 99-108.

Su, Z.X. (2010b), "Human resource management and firm performance in transitional China: the mediating role of employee in-role behaviovr", *Nankai Business Review*, Vol. 22 No. 8, pp. 76-83.

Takeuchi, R., Chen, G. and Lepak, D.P. (2009), "Through the looking glass of a social system: cross-level effects of high performance work systems on employees' attitudes", *Personnel Psychology*, Vol. 62 No. 1, pp. 1-29.

Tan, J.J. and Litschert, R.J. (1994), "Environment-strategy relationship and its performance implications: an empirical study of the chinese electronic industry", *Strategic Management Journal*, Vol. 15 No. 1, pp. 1-20.

Tian, M.L. (2011), "Study on relationship between innovation orientation and firm performance in knowledge intensive firms", *Science and Technology Management Research*, Vol. 31 No. 24, pp. 5-8.

Tornatzky, L.G., Fleischer, M. and Chakrabarti, A.K. (1990), *The Processes of Technological Innovation*, Lexington Books, Lexington, p. 298.

Wang, H. (2011), "Empirical study on the structural dimensions of the high performance work system and its impact on firm performance", *Soft Science*, Vol. 25 No. 1, pp. 140-144.

Wang Y. and Shen Y.C. (2008), "The collaborative impact of knowledge management capability and technology innovation capability on enterprises performance", *Economic Forum*, Vol. 427 No. 3, pp. 78-79+84.

Way, S.A. (2002), "High performance work systems and intermediate indicators of firm performance within the US small business sector", *Journal of Management*, Vol. 28 No. 6, pp. 765-785.

Wood, S.J. and Wall, T.D. (2007), "Work enrichment and employee voice in human resource management-performance studies", *The international Journal of Human Resource Management*, Vol. 18 No. 7, pp. 1335-1372.

Wu, J.J. (2014), "High performance human resource management and enterprise performance: the mediating role of strategy implementation capability", *Manager's Journal*, Vol. 1059 No. 15, p. 131.

Xing, Z.L. (2012), "A research of high-performance human resources management system and organization's performance: case study of China's chinext companies", *Management Review*, Vol. 24 No. 7, pp. 91-98.

Yao, Q. (2013), Empirical Study on the Relationship Among High Performance Work System, Organizational Learning Capability and Firm Performance, University of Electronic Science and Technology of China, Chengdu.

Yeung, A.C.L., Lai, K.H. and Yee, R.W.Y. (2007), "Organizational learning, innovativeness, and organizational performance: a qualitative investigation", *International Journal of Production Resesarch*, Vol. 45 No. 11, pp. 2459-2477.

Youndth, M.A. (1998), "Human resource management systems, intellectual capital and organizational performance", Unpublished PhD thesis, Pennsylvania State University, Pennsylvania.

Zhang, C.Q. (2013), "Influence of knowledge-intensive-business service enterprises' high-performance work system on employee service performance: mediating role of service climate", *Human Resources Development of China*, Vol. 291 No. 21, pp. 46-51.

Zhang, H.Y., Li, D.F. and Yao, Q. (2012), "A meta-analysis on the relationship between high performance work system and firm performance in the context of China", *Nankai Business Review*, Vol. 15 No. 3, pp. 139-149.

Zhang, Y. and Li, S. (2008), "High-performance HRM and firm performance: the mediating role of strategic implementation capacity", *Management World*, Vol. 4, pp. 107-113.

Zhang, Y.C. (2008), "Li shuling. High performance human resource management and enterprise performance: the mediating role of strategy implementation capability", *Management World*, Vol. 139 No. 4, pp. 107-114+139.

Zheng, C. (2014), "The inner circle of technology innovation: a case study of two Chinese firms", *Technological Forecasting and Social Change*, Vol. 82 No. 2, pp. 140-148.

Zheng, Q. (1991), "Type of corporate culture, corporate strategy and financial performance of the relationship – an empirical study of Taiwan manufacturing", Institute of business management master's thesis of Zhongshan University, Kaohsiung.

Further reading

Amabile, T.M., Conti, R., Coon, H., Lazenby, J. and Herron, M. (1996), "Assessing the work environment for creativity", *Academy of Management Journal*, Vol. 39 No. 5, pp. 1154-1184.

Batt, R. (2000), "Strategic segmentation in front-line services: matching customers, employees and human resource systems", *International Journal of Human Resource Management*, Vol. 11 No. 3, pp. 540-561.

Beugelsdijk, S. (2008), "Strategic human resource practices and product innovation", *Organization Studies*, Vol. 29 No. 6, pp. 821-847.

Gerhart, B., Wright, P.M., Mahan, G.C. and Snell, S.A. (2000), "Measurement error in research on human resources and firm performance: how much error is there and how does it influence effect size estimates?", *Personnel Psychology*, Vol. 53 No. 4, pp. 803-834.

Gittell, J.H., Seidner, R.O.B. and Wimbush, J. (2008), "A relational model of high performance work systems", *Academy of Management Proceedings,* Vol. 8 No. 1, pp. 1-6.

Janssen, O. (2001), "Fairness perceptions as moderator in the survilinear relationships between job demands and job performance and job satisfaction", *Academy of Management Journal*, Vol. 44 No. 5, pp. 1039-50.

Lee, S.-G., Trimi, S. and Kim, C. (2013), "Innovation and imitation effects' dynamics in technology adoption", *Industrial Management & Data Systems*, Vol. 113 No. 6, pp. 772-799.

Lin, R.-J., Che, R.-H. and Ting, C.-Y. (2012), "Turning knowledge management into innovation in the high-tech industry", *Industrial Management & Data Systems*, Vol. 112 No. 1, pp. 142-163.

Pérez-López, S. and Alegre, J. (2012), "Information technology competency, knowledge processes and firm performance", *Industrial Management & Data Systems*, Vol. 112 No. 4, pp. 644-662.

Pfeffer, J. (1995), "Producing sustainable competitive advantage through the effective management of people", *The Academy of Management Executive*, Vol. 9 No. 1, pp. 55-69.

Pfeffer, J. (1998), *The Human Equation: Building Profits By Putting People First*, Harvard Business Press, Boston.

Sharon, K.P. (2003), "Longitudinal effects of lean production on employee outcomes and the mediating role of work characteristics", *Journal of Applied Psychology*, Vol. 88 No. 4, pp. 620-634.

Širca, N.T., Babnik, K. and Breznik, K. (2013), "Towards organisational performance: understanding human resource management climate", *Industrial Management & Data Systems*, Vol. 113 No. 3, pp. 367-384.

Wan, X. (2010), "Study on the relationship between high tech SMEs strategic human resource management and enterprise performance", *Yunnan Finance & Economics University Journal of Economics & Management*, Vol. 25 No. 4, pp. 100-102.

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