

# Effect of Performance Management System on Knowledge Innovation Process\*

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**Abstract** Based on literature review, performance management system (PMS) is divided into four components, respectively performance monitoring mechanism (PMM), performance incentive mechanism (PIM), performance feedback mechanism (PFM) and performance appraisal mechanism (PAM). Knowledge innovation process (KIP) is divided into four phases, respectively knowledge innovation needs finding (KINF) phase, knowledge innovation intention forming (KIIF) phase, knowledge innovation project initiation (KIPI) phase and knowledge innovation results acquisition (KIRA) phase. A concept model named "Effect of PMS on KIP" is proposed, and based on which several propositions about the intrinsic relationship between them are concluded. Firstly, PMM improves KIP by influencing KINF capability in KINF phase. Secondly, PIM improves KIP by influencing the transformation efficiency from KINF phase to KIIF phase. Thirdly, PFM improves KIP by influencing the transformation efficiency from KIIF phase to KIPI phase. Finally, PAM improves KIP by influencing the success possibility of KIRA.

**Key words** performance management system, knowledge innovation process, knowledge management, performance management

## 1 Introduction

In knowledge economy era, consumer demand is changing faster and market competition is getting fiercer, both of which put firms under much greater pressure. Therefore, knowledge is gradually turning to be the only critical firm resource for acquiring competition edge (Lloyd Bruce, 1996), and knowledge management is inevitably becoming a new management function which is of coequal importance with the traditional management functions, namely, human resource management, financial resource management and material resource management. Actually, knowledge management function is forming and even strengthening its core role. According to this trend, there appears a problem of matching between the traditional management functions and the emerging knowledge management. Because human resource management deals with employees which are the main innovators, creators, carriers and users of knowledge, there is an intrinsic relationship between human resource management and knowledge management (Martinsons MG, 1997). The match between the two functions is critical for firms facing the change from traditional industrial economy to knowledge economy. As we all know, human resource management includes performance management system (PMS), pay management system, employee allocation management system, training management system and career management system, etc. (Beaumont PB, 1997), while knowledge management covers knowledge innovation process (KIP), knowledge share process, knowledge retention process and knowledge application process, etc. (Hall Richard, 2002). Because of the limitation of paper length, the paper would only make study on the matching mechanism between some special sub-functions of knowledge management and human resource management. As Ostroff C. (1992) concluded, "..... performance management constructs a knowledge innovation bridge connecting performance appraisers and appraised employees", we choose the PMS of human resource management and the KIP of knowledge management to investigate how they match each other in order to adapt knowledge economy requirements.

## 2 Literature Review and Theoretical Analysis

There are rather limited literatures on relationship between knowledge management and human resource management because they belong to very different fields respectively, and especially there is almost no special research on effect of PMS on KIP except for Ostroff C. (1992) who implicitly

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discussed the very topic and put forth a proposition that there was certain relationship between them. Although the proposition inspires a new idea into the researchers, it is still a black-box how PMS and KIP can interact with each other. Therefore, the authors can only summarize the related literatures mainly focused on the concept and composition of PMS and KIP. The literature review in next part is not a simple introduction but a comprehensive re-understanding of PMS and KIP, based on which the authors reconstruct the two concepts completely.

## 2.1 PMS

PMS is one of the core subsystems of human resource management, which is the foundation of modern firms' persistent running. Based on the comprehensive understanding of related literatures, it can be concluded that there are four main components which are performance appraisal mechanism (PAM), performance feedback mechanism (PFM), performance incentive mechanism (PIM) and performance monitoring mechanism (PMM) respectively (Austin Robert D.,1996; Wright P.M., Boswell W.R.,2002; Jim Highsmith., 2006). The four mechanisms are not independent, and they interact with each other. Specifically saying, each performance management (PM) mechanism has its own institutions, procedures, cultures and indices which all cooperate with others to perform the function of PM. Of the four components, PM institutions are the real entity on which PMS relies, PM procedures are the written rules constraining the running of PMS, PM cultures are the potential rules guiding the running of PMS, and PM indices are the performance standards shaping employees' reasonable behaviour. As is shown in Figure 1.

(1) PAM completes the measurement and evaluation process on performance indices of individuals, teams or departments of a firm, and the process is executed by performance appraisal institutions based on performance appraisal procedures and guided by performance appraisal cultures. The purpose of such a mechanism is to timely appraise employees' working results which would be set as the basis of employees' payments, prize, punishment, promotion and training, etc. In short, PAM is the base of the persistent running of PMS.

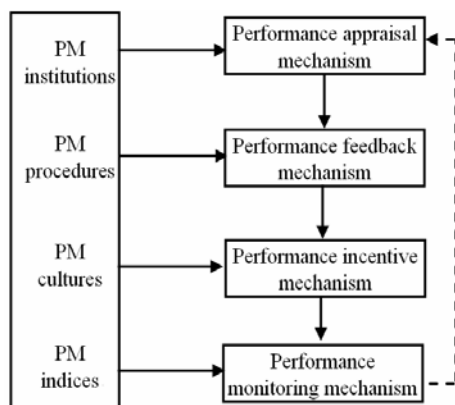


Figure 1 Composition of PMS

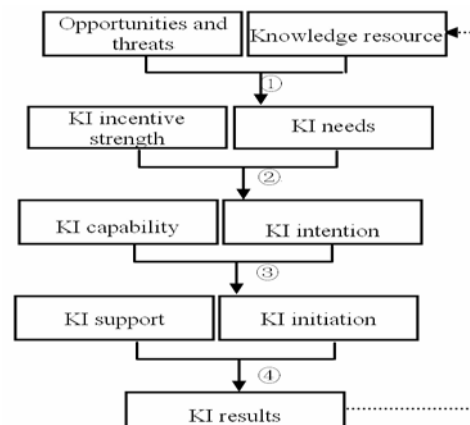


Figure 2 Four-Phased KI Process

(2) PFM is in charge of informing-back process of selected performance information to appraised employees which is carried out by performance feedback institutions based on prescriptive performance feedback procedures and guided by performance feedback cultures. There are two main purposes of such a mechanism, one of which is to make employees know clearly their shortcomings and advantages so as to tell them the right way they should go, and the other is to improve the sense of justice about performance appraisal results by normative performance feedback process so as to make employees accept PMS more easily. All in all, PFM is the coordinator of the persistent running of PMS.

(3) PIM completes the process of implementing incentive policy to all employees according to performance appraisal results, and the process is executed by performance incentive institutions based on rules of payments, prize, punishment, promotion and training, etc., and guided by performance incentive cultures. The main purpose of such a mechanism is to form employees' behaviour guideline which can clearly tell them what the firm encourages and what the firm rejects, and such a guideline can ensure the employees behave as requirements of firm value maximization. In short, PIM is the power of the persistent running of PMS.

(4) PMM is in charge of the process of persistent monitoring and controlling on performance of

whole firm and several critical teams, and the process is carried out by performance monitoring institutions based on documented performance monitoring rules and guided by performance monitoring cultures. The basic purpose of such a mechanism is to find critical dangerous signals influencing the whole firm running and adopt remedies to ensure firm safety. All in all, PMM is the controller of the persistent running of PMS.

## **2.2 KIP**

KIP is one of the core functions of knowledge management, so the related literatures are rather rich. Researchers propose several knowledge innovation (KI) modes mainly including process-based mode (Smith P.G., 1997; Muller, E., 2007), technology-pushed mode and demand-pulled mode (Chau P.Y.K., Tam K.Y., 2000; Constance Van Horne, 2006). The last two KI modes discuss KIP from the point view of KI motivation which of course can help people recognize reasons of KI more clearly, but the two modes do not deal with the special process of KI deeply, and thus can not make helpful suggestions on how to prompt and accelerate KIP. Mainly based on the first KI mode of Smith (1997), the author synthesizes the other researchers' views and finally proposes a modified KI mode named "Four-phased KI mode" which is shown as Figure 2.

As Fig.2 shows, Four-phased KI mode divides the whole KIP into four phases, respectively including knowledge innovation needs finding (KINF) phase, knowledge innovation intention forming (KIIF) phase, knowledge innovation project initiation (KIPI) phase and knowledge innovation results acquisition (KIRA) phase. The four-phased KI mode is a general logic mode. Theoretically saying, each phase is necessary for any KI process. But in practice, some KI process does not pass through a certain phase, or there appear repeats in a certain phase. But such special issues do not affect the typical application value of the mode in general.

(1) KINF phase. The organization actively scans both external and internal environment in order to detect opportunities and threats, or passively accepts signals from environment which can also inform the organization opportunities and threats. In order to deal with threats and make full use of opportunities, the organization will review its knowledge resource in detail in order to know clearly its knowledge gap. Thus KI needs are detected.

(2) KIIF phase. Following the traditional research assumptions, employees in the mode are also risk-aversed. Because KI process is full of failure risks, the organization should set certain prize ensuring enough KI incentive strength in order to make KI needs transferred into KI intention in a greater possibility.

(3) KIPI phase. In order to transfer KI intention into KI action effectively, the potential innovators should know clearly about the quality and quantity of KI capability and knowledge resource which they own or is in their charge. So as rational potential innovators, they must have the ability of judging correctly the matching between KI difficulty and KI capability in order to initiate KI project effectively.

(4) KIRA phase. The special form of KI results mainly include special skills, technology patents, and technology know-how, etc., which can contribute to knowledge accumulation and knowledge application in organization and thus contribute to the long-termed competition advantage (Nonaka Ikujiro, 1996). Whether an KI project can succeed is decided by the strength and effectiveness of organizational support except for accidental factors. Effective organizational support can ensure the transformation from effective KIPI to the success of KIRA.

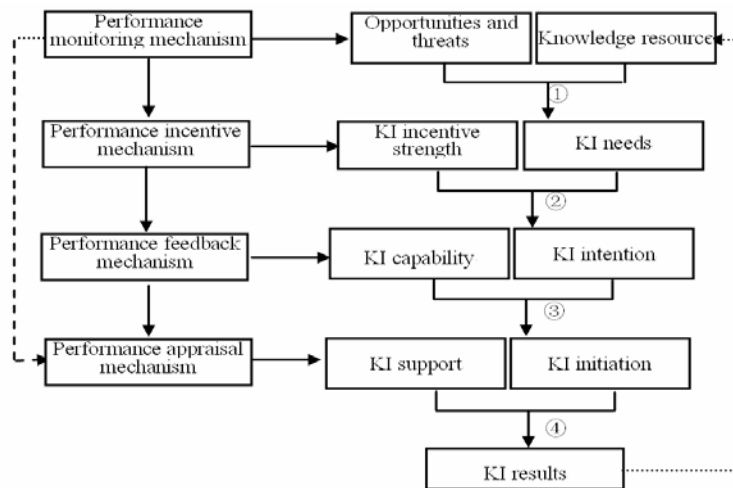
## **3 Effect Model of PMS on KIP**

Based on the concept reconstruction, the paper proposes "Effect model of PMS on KIP". As is shown in Figure 3.

### **3.1 Effect of PMM on KINF**

PMM has formal authority and power in an organization. Because of the consistency and totality of performance monitoring, the knowledge resource scanning of both external and internal environment is actually included in the behaviour of performance monitoring. In other words, PMM changes from passively accepting information into actively searching information which improves the capability of detecting opportunities and threats. Holding other conditions equal, an organization can find more knowledge gap and confirm more KI needs. Therefore, the model proposes as follows.

***Proposition 1** Formal PMM can help employees find KI needs more easily, so PMM has positive effect on KIP.*



**Figure 3 Effect Model of PMS on KIP**

Because of the importance of monitoring function and complexity of information requirements, the targets of performance monitoring are the whole organization and several critical teams. Thus the selection of monitoring institutions and monitoring indices is critical. For monitoring institutions, there are two choices, respectively, monitoring teams coming from human resource management department and teams from top managers. From the aspects of resource allocating, information acquiring and monitoring methods selection, monitoring teams of top managers have greater advantage. Monitoring teams of top managers can scan the environment and resource more thoroughly with more comprehensive views, so it is easier for them to balance the fulfilling of all kinds of organization responsibilities and control the worsening of crises and accidents according to the whole organizational situation. Therefore, it is better for enhancing the effect of performance monitoring on KINF to choose top managers team as monitoring institutions. For performance monitoring indices, there are two problems for choosing, namely, qualitative VS. quantitative, and process-oriented VS. results-oriented. Compared with quantitative indices, an organization is always used to acquiring information about opportunities and threats through qualitative performance indices (Cooper C., 1997). An organization is inclined to focus on critical incidents and revolutionary changes in order to make the best use of resources. Because PMM is continuous, process-oriented indices are more appropriate. After all, results are discontinuous and apt to ignoring critical indices. Therefore, the model makes propositions as follows.

**Proposition 1a** Compared with performance monitoring teams of human resource management department, performance monitoring teams of top managers can more easily find KI needs.

**Proposition 1b** Compared with quantitative performance monitoring indices, qualitative performance monitoring indices are more effective in finding KI needs.

**Proposition 1c** Compared with results-oriented performance monitoring indices, process-oriented performance monitoring indices are more effective in finding KI need.

### 3.2 Effect of PIM on KI intension Forming

PIM realizes the incentive promises according to performance results. In knowledge age, KI is getting more and more important, so the current PIM is naturally encouraging KI behaviour and KI results (Morgan Robert E., 1995). Therefore, the model proposes as follows.

**Proposition 2** PIM can improve KI incentive strength which leads to KI needs change into KI intention more easily, so PIM has positive effect on KIP.

Though PIM inevitably improves KI, the strength is different because of several factors, e.g. performance incentive object, performance incentive method and performance incentive sensitivity. Firstly, incentive object usually refers to team and individual separately. PIM based on team can not only improve team culture and team cooperation, but can keep competition among teams at a higher level which produces a relative balance between competition and cooperation. While PIM based on individual pays too much attention to interpersonal competition and ignores cooperation. As modern KI essentially is a kind of collective activity, individual KI is not the mainstream (Fritsch Michel, Franke Grit, 2004). So PIM based on team is better for KI. Secondly, incentive method mainly includes

promotion, payment, training, and administrative prize et al. Because each team or team member has different sense for the same performance incentive method, it can be concluded that a contingent combination of each performance incentive method can improve incentive strength, and finally improves KI. Thirdly, incentive sensitivity does influence KI. Performance incentive sensitivity means the dependence degree of incentive quantity on performance appraisal results. If performance appraisal results reflect KI, the higher performance incentive sensitivity, the stronger KI incentive strength will be. All in all, the model proposes as follows.

**Proposition 2a** *Compared with PIM based on individual, there is a stronger positive relation between PIM based on team and KIP.*

**Proposition 2b** *Compared with PIM with single incentive method, there is a stronger positive relation between PIM with contingent incentive method combinations and KIP.*

**Proposition 2c** *Compared with PIM with lower incentive sensitivity, there is a stronger positive relation between PIM with higher incentive sensitivity and KIP.*

### **3.3 C. Effect of PFM on KIPI**

PFM can both improve the employees' acceptance to results of PMS and improve employees' recognition and development of KI capability. Feedback can not only make employees recognize their capability and disadvantage, but also show the way they should walk toward. Therefore, feedback mechanism helps employees' recognition and development of KI capability. For general feedback mechanism, some critical performance information will be published all across the organization which actually provides a yellow page of knowledge within the organization and is helpful to the construction of KI network (Martiny Marilyn, 1989). Thus potential knowledge innovators can evaluate accurately the KI capability and resource that they own or can manipulate. Finally, knowledge intention will be changed into KI behaviour more effectively. In short, the model proposes as follows.

**Proposition 3** *PFM is helpful to recognition and development of potential innovators' KI capability, so PFM has positive effect on KIP.*

There are two main factors influencing the positive effect of PFM on KI capability, e.g. feed back institutions and feedback method. Firstly, feedback institutions mainly refer to human resource department and direct leaders. Compared with human resource department, direct leaders know more about employees' performance information and personal features. Thus direct leaders can use different methods to carry out performance feedback which can make employees more easily accept feedback results. Direct leader is more helpful to KI capability recognition and therefore helpful to KI. Secondly, performance innovation method mainly refers to interview feedback, feedback in written documents, telephone feedback and feedback in meetings, etc. For different employees with different features, it is more helpful for employees to recognize their own capability and even the knowledge distribution inside the organization if the PFM adopts different feedback methods or comprehensively uses several methods at the same time. Therefore, the model proposes as follows.

**Proposition 3a** *Compared with human resource department, direct leaders as performance feedback institutions have stronger positive effect on KIP.*

**Proposition 3b** *Compared with single performance feedback method, contingent performance feedback method has stronger positive effect on KIP.*

### **3.4 Effect of PAM on KIRA**

As the base of persistent running of PMS, PAM provides objective guide for KI support decision. KIRA requires all kinds of support from the organization, e.g. time, money, material and intelligence. Facing the request for KI support, the organization has to use PAM to decide whether or not to support and what kind of support should be. During the period of KIRA, PAM follows the whole process of KI and decides whether or not to continue the support or cancel the support. Therefore, the model proposes as follows.

**Proposition 4** *PAM provides decision standard for KI support and improves the possibility of KI success, so PAM has positive effect on KIP.*

There are two main factors influencing the effect of PAM on KI support decision, namely, performance appraisers and performance appraisal indices. Firstly, performance appraisers mainly refer to direct leaders, human resource department or the combination of the two. Direct leaders can guarantee intra-department justice, and human resource department can balance inter-department justice, while the combination of the two can more accurately reflect the KI performance (Flint Douglas, 1999). Secondly, performance appraisal indices refer to task performance indices and contextual performance indices. Task performance indices help the organization to judge innovators' innovation capability, while contextual performance indices represent the team cooperation intention. As the modern KI is mainly

coming from the cooperation instead of individual effort, PAM adopting contextual performance indices can provide more objective standards of KI support decisions. Therefore, the model extends proposition 4 as follows.

**Proposition 4a** *Compared with performance appraisers from human resource department or direct leaders, the combination of the two as performance appraisers have stronger positive effect on KIP.*

**Proposition 4b** *Compared with task performance appraisal indices, contextual performance appraisal indices have stronger positive effect on KIP.*

## 4 Conclusions

The paper investigates the influence of PMS, a subsystem of human resource management, on KIP, a subsystem of knowledge management. At the beginning, PMS is reconstructed and a modified procedural KI mode is proposed. Based on the work above, a concept model named “Effect of PMS on KIP” is constructed. The model concludes, PMM improves KIP by influencing KINF capability in KINF phase, PIM improves KIP by influencing the transformation efficiency from KINF phase to KIIF phase, PFM improves KIP by influencing the transformation efficiency from KIIF phase to KIPI phase, PAM improves KIP by influencing the success possibility of KIRA. The last but not the least, each effect strength on KI will be different according to the choice of several variables of PMS.

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