

## Intelligent information processing in human resource management: an implementation case in China

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**Abstract:** Information systems have been applied to human resource management (HRM) for decades. However, the way of using information systems and the way of processing information for HRM have evolved and dramatically improved over the last decade. More and more HRM systems today are being changed to e-HRM systems. This is mainly due to the advent of Internet technology and the emerging concept of business intelligence. Our study shows the evolution of information systems and information processing in the HRM domain and provides an implementation case in a large Chinese state-run factory. The experiences and lessons learned from this case reveal several common problems in developing information systems in the HRM domain.

**Keywords:** human resource management, information systems, intelligent information processing, e-HRM

### 1. Introduction

The advent of information technology (IT) and information systems, together with Internet technology, has inspired many changes in today's business world (Xu, 2000; Xu *et al.*, 2006). From basic business procedures, routine tasks and business functions, to management styles and business models, the changes can be seen almost everywhere. The impact of IT on today's business is obvious in at least two categories: (1) the improvement of business in efficiency, effectiveness and productivity; (2) the transition of business in the way people create, organize, manage and operate an enterprise. This study shows how information systems and IT are being used in human resource management (HRM) domains through an implementation

case in a Chinese enterprise. The experiences and lessons learned from this case reveal several common problems in developing information systems in the HRM domain.

HRM practices have a long history. Before the mid-1980s, most practices had focused on the low level, routine tasks such as recruiting, record-keeping, rewards and wages (Storey, 1992). It is believed that Fombrun *et al.* (1984) pioneered the development of the concept of strategic HRM and started linking HRM functions with the organizational overall strategy. Strategic HRM mainly focuses on activities involving HR planning and HR policies such as internal career opportunities, training systems, performance appraisals, profit-sharing plans, employment security, voice mechanisms, participation in decision-making, and the degree to

which jobs are defined (Osterman, 1987; Sonnenfeld & Peiperl, 1988; Storey, 1992). Strategic HRM perceives people as critical organizational investments, strategic resources and competitive advantages which determine the success and failure of an organization (Barney, 1991; Ulrich, 1997; Pfeffer, 1998; Becker *et al.*, 2001). Therefore, HRM has gone through the transition from task-oriented HRM to people-oriented strategic HRM. As one of the driving factors that help today's business transit, IT inevitably should play an important role in the HRM domain (Straus *et al.*, 1998).

Information systems have been applied to HRM for decades. However, the way of using information systems and the way of processing information for HRM have evolved, and dramatically improved, over the last decade. This is mainly due to the advent of Internet technology and the emerging concept of business intelligence. In the mid-1990s, the Internet cracked into business operations and the concept of e-business was born. Using Internet technology or IT in general to run business functions, including HRM, is widely accepted as electronic business (e-business). Correspondingly, using IT in HRM is called e-HRM. Dave Ulrich (2000) is one of many early e-HRM advocates. Straus *et al.* (1998) researched several impacts of Internet technologies on managing human resources and concluded that the 'advances in communication technologies and organizational form suggest the re-evaluation of traditional personnel practices'. Although the literature has explored the opportunities provided by IT to dramatically transform organizations and to help organizations in gaining competitive advantages (Culnan & Markus, 1987; Huber, 1990), Powell and Dent-Micallef (1997) argued that IT alone has not produced competitive advantages, but using IT to leverage intangible, complementary human and business resources has helped organizations gain competitive advantages. The proper application of IT in HRM has been proved to be a successful way of running today's business.

In Section 2, we discuss the current status of e-HRM in China and some existing problems in

developing HRM systems. Section 3 provides a detailed analysis of e-HRM development processes and an implementation model by using a Chinese enterprise case. We further analyze the future trends of e-HRM development in China and recommend some solutions in Section 4. Section 5 concludes the study by addressing some problems in e-HRM development for further consideration.

## **2. The current status of e-HRM and existing problems in China**

### *2.1. The current status*

Using the customer database of [www.chinahrm.com](http://www.chinahrm.com), [www.ehr4u.com](http://www.ehr4u.com) has done research on the current situation of Chinese enterprise's e-HRM over the past six months. This research collected 2005 questionnaires from various enterprises in China, 1775 of which were valid. Among all the enterprises surveyed, Chinese domestic enterprises accounted for 78.37% and foreign invested companies took up the remaining 21.63%.

The research showed that even though most enterprises in China take a positive attitude towards e-HRM using computers, networking, business intelligence and Internet technology, they are just taking the first step in revolutionizing HRM with IT. Over 70% of them have not introduced any HRM systems. Most HR managers do not possess sufficient knowledge in IT and information systems to help them in using e-HRM systems. The study showed that over half of the HR managers surveyed have a mediocre ability in applying IT, among whom those from enterprises without use of HRM systems perform worse in applying IT (58% answered levels of 'poor' and 'very poor', which means that they are just able to use office software and to get information from the Internet). 55% of the managers from enterprises that have used HRM systems, however, have above-average ability in applying IT.

Another result from this study showed the levels of communication and cooperation

between the IT department and the HR department. Enterprises preparing to use HRM systems are facing more problems of cooperation between IT and HR departments than those that have adopted HRM systems. Our case study shows that it is quite common that two departments play buck-passing to relieve themselves of responsibilities. In general, most enterprises face a certain level of problems in communications and cooperation between the IT department and the HR department.

The results also showed that 71% of enterprises have not used HRM systems. Most of them are enterprises with a size of less than 500 employees and enterprises of this type are in more urgent need of using HRM systems. The research showed that 55% of the enterprises have used HRM systems for less than two years while those who have used it for over two years only account for 29%. Thus Chinese enterprises' efforts in revolutionizing HRM with IT did not start until two years ago.

In addition, 18% of enterprises that have used HRM systems need to change their systems. Reasons for doing so include (1) the original function is too simple and they hope to use an integrated HRM solution for coordination; (2) improvements and changes are needed in HR procedures; (3) the system is unstable and slow. Among enterprises that need to change the system, over half of them choose to develop new systems on their own.

It is estimated that HR functions used most frequently by enterprises are in the order of HR information management (71%), wages and salaries (68.2%), reports (62.2%), attendance records (59.5%), recruitment (56%) and welfare (53.8%). Therefore, we can conclude that the functions most needed by Chinese enterprises are probably those at operational level rather than at managerial level. Over the next two years, functions used by enterprises in an in-depth fashion will be the employee/manager self-support service, performance management, HR planning, as well as training and development.

In today's HRM systems market of mainland China, no prominent HRM systems suppliers or brands have emerged. In terms of market share,

no one has more than 10%. Enterprises that develop their own systems take up a share as big as 38.2%, and other unnamed brands account for another 24.3%. HRM systems products manufactured by Chinese enterprise resource planning (ERP) enterprises have not fully grown. HRM systems manufactured by foreign ERP enterprises are restrained in market share due to factors such as price and localization. Professional HRM systems suppliers in China are still in their infancy and most of them are still able to establish complete HRM systems solutions and remain generic software developers.

## *2.2. Existing problems*

Several major problems exist in today's Chinese enterprises that may hamper the process of adopting e-HRM. We summarize them in the following four categories.

1. There is a misperception of e-HRM from top management. Many VIPs regard HRM as a kind of unavoidable cost instead of realizing the importance of HRM for the development of enterprises; nor do they have sufficient understanding of in-depth questions such as how to carry out e-HRM, what problems they may encounter in this process and what value it may bring to the enterprise. In addition, they have various misunderstandings about e-HRM. For example, some hope to immediately improve the enterprise's HRM by e-HRM; some assert that e-HRM has few visible effects without evaluating its performance; others do not consider the cost-benefit ratio and return on investment, blindly run after fashion or pursue return without making an investment. Low-level employees usually do not welcome e-HRM. This is mainly because they do not know what this new system is about, or they do not have the knowledge of using computer information systems, or they fear losing their jobs due to the introduction of e-HRM.
2. There is an unbalanced development in enterprises' digitization which predetermines whether e-HRM can be carried out

successfully. Many enterprises either spend too much on e-HRM development or repeat what they already have and waste money. When undertaking e-HRM, enterprises should carefully evaluate what they have already developed, e.g. the computer systems, network systems, and other business applications such as accounting and finance, sales and marketing, manufacturing, and HRM. When choosing e-HRM systems, enterprises should choose those which fit their current organization and satisfy their organizational demands.

3. HRM systems or e-HRM in Chinese enterprises are still in their infancy stage. There are three important parts in e-HRM development: (1) electronic data management, which refers to saving various kinds of HR information as electronic data to facilitate enquiry at any time, also called 'disuse of paper' or 'digitalization'; (2) procedural management, which refers to determining those procedures that have been tested and verified, making them standard operational procedures, and using software modules to implement them on computer systems; (3) strategic management, which refers to a process in which electronic data are processed in a scientific way using mathematical models, information management models and computer simulation models to optimize, control and strategically analyze the enterprise's HRM whereby it plays a supportive role in management and decision-making. At present, the strategic functions of e-HRM software such as HR planning, personnel professional development planning and core capability management are still not being emphasized in many Chinese enterprises.
4. There is a lack of competent staff. In the e-HRM development process, HRM knowledge must be organically integrated with IT. However, most enterprises do not have sufficient staff that possess both HRM and IT knowledge. Those who are experts in HRM have little knowledge about IT techniques and those who know IT do not know

HRM well, have little managerial experience and do not have adequate knowledge about the needs of HR businesses. These factors prevent them from applying IT to the HRM domain in a proper and effective manner.

Meanwhile, many managers are not ready to enter the information age. They are short of decent skills in computer operation, Internet applications and information systems usage. Therefore, e-HRM has become a burden for them.

### **3. A case study of an enterprise e-HRM system in China**

#### *3.1. Brief introduction to Plant A*

With a history of nearly 70 years, Plant A is a large state-owned enterprise in China. It is one of the top 500 industrial enterprises in China, and is the major researching and manufacturing center of electronic track towing equipment in China. Plant A primarily researches, manufactures and sells high-speed electronic locomotives, metro trains, light-rail trains and electric rail trains, with an annual output of 300 main-line electric locomotives. Plant A owns the biggest workshop for final assembly of electric locomotives and modernized manufacturing centers of locomotive veering shelves, high-power electric towing machinery, towing and electric transformers, and resin grit foundry production lines. It owns large quantities of advanced equipment such as high-precision numerically controlled processing centers, robot welders, and numerically controlled cutting, punching, folding and pressing machine tools. Plant A currently has over 10,000 employees, and nearly 3000 of these are engaged in research and development. In 2001, Plant A reached annual revenues of 1.56 billion RMB Yuan. Its assets total 1.78 billion RMB Yuan.

#### *3.2. The overall demand of Plant A for an e-HRM system*

The strategic transformation and rapid development in Plant A caused a managerial revolution

in many aspects. Changes are mainly seen in two areas: talented people and institutions. Starting from innovation and revolution in HRM, and further infiltrating into marketing, financing, manufacturing and researching, Plant A has found the best way to gain an upper hand in competition via managerial innovation. Facing the situation of Plant A, an HRM consulting team has decided that its consulting objective is 'regrouping HR to improve performance'. In early January of 2002, after a systematic investigation and a lengthy communication with Plant A, the consulting team figured out that an e-HRM system for Plant A has the following specific demands.

1. The system must normalize the HRM system and make HRM more intelligent, networked and knowledge-driven, using e-HRM to make the enterprise's HRM dynamically controllable, which includes overall control, dynamic control and proper personnel-position matching.
2. The e-HRM system must cover all aspects of HRM. It should achieve the automation of HRM operations, the normalization of HRM procedures and the systematization of the management, making the e-HRM system become a platform for an informational and professional enterprise's HRM. The HRM department should become an organic entity to make communication smooth and feedback prompt. The overall efficiency may also be increased for the e-HRM system to lead to a decrease in operational complexity.
3. The system must update old concepts via the execution of the e-HRM program and build up a proper enterprise culture. The enterprise culture includes giving employees who contribute the most the economic benefits they deserve, and then fulfilling the principle of getting paid according to contribution.
4. It must perfect the management system and form a specific set of rules and regulations, contracts of labor and other related regulations (security and privacy policies, attendance records etc.) via execution of the e-HRM program.
5. The e-HRM system should be as advanced, complete, practical, efficient, flexible, open and automatic as possible. It should also be easy to operate, maintain and expand, be fault-tolerant, be safe and reliable and be able to handle and coordinate different events at the same time. It should have a strict multiple-user authorization management and functions such as database visiting, data copying, operation and visiting log records and system restoration. It must also ensure the safety of Web communication.
6. The e-HRM system should be developed by using mainstream instruments. It should be ensured that it is open, flexible and stable. The system should be based on the browser/server structure, using a uniform platform with a simple and friendly interface. The database should be structured properly, be easy to maintain and be safe (using databases such as MS SQL DB2 or Oracle). It should be able to provide the function of pigeonholing both past and current data, and powerful enough to achieve rapid remote data access and data maintenance. At the same time, the system should have a qualified data interface and be compatible with various kinds of databases. The interface should allow the HRM system to seamlessly connect to the ERP system, financial system, office automation system and attendance records system, and to conveniently transmit historical data, such as Excel documents, into the database. It should guarantee the smooth data flow in the system (changes to the data in the attendance records system, for instance, may automatically influence the calculation of wages and salaries). Any data or any changes made to the data in one location should be shared among all other locations.
7. The e-HRM system should also have a function of user-defined enquiry that is powerful and flexible enough to generate analytical reports automatically. The reports with real and precise HR figures

should then be used by top-level managers in decision-making processes.

8. The e-HRM system should take full advantage of the Web environment available at Plant A. It should support coordination among multiple regional facilities and multiple sub-companies distributed in different regions. The database model is a centralized database with distributed segmented databases in different locations. The headquarters have the authority to assign access rights and update authority to regional users and the regional users have the right to use and maintain their own data.

### 3.3. Problems to be solved

In early January 2002, the consulting team from company S came to Plant A to start the preliminary diagnosis. 140 questionnaires were sent out and collected, 75 interviews were done and more than 200 files were researched. Based on the information collected, the consulting team finished a detailed report that called for attention to the following problems.

1. There is failure to consider HRM at a strategic level and failure to provide a clear-cut goal in HRM. The report showed that HRM in Plant A has not been uplifted to the level of strategic management. This means that Plant A does not have any strategic plan in HRM that guides long-term HRM objectives and operations. As we know, one of the main goals of HRM is to help the enterprise to achieve its overall management goal from various levels in the enterprise. HRM intends to provide services for three entities: (1) enterprise service, to meet the demands of the enterprise; (2) personal service, to meet the demands of the staff; (3) social service, to meet the demands from the external environment (government, communities etc.).
2. The HRM model is outdated. Plant A does not have an HRM department *per se*. The HRM function is embedded in the department of administrative and personnel affairs and has been done at a very low level.
3. The stimulation system is not satisfactory and leads to a high employee turnover rate. In recent years, Plant A has had an unusually high employee turnover rate. It was estimated that in the year 2000 alone Plant A has held over 20 recruiting job fairs because of the large number of competent employees quitting their jobs. The direct cost of recruiting was estimated at over 500,000 RMB Yuan. The increase in labor cost, high turnover rate, and disputes between employers and employees have cost Plant A significantly. Defects in the stimulation system are to blame for all these.
4. There is a lack of in-depth job analysis and no standard for job design and job responsibility. For over 16 years, Plant A has not undertaken a complete job analysis and has not set up standardized specifications for all positions. Among the employees surveyed, about 30% were not clear about their specified responsibilities and not satisfied with their work; 51.35% complained that they did not have documented specifications that helped them with their jobs.
5. There is a lack of well-defined standards in recruiting and well-planned professional training. Since a complete job analysis has not been done for over 16 years, job specifications are not clear, which in turn leads to a poor standard in recruiting. Employees at different levels tend to be under-qualified. The new recruits bring difficulty in future training. Poorly prepared staff further cause unsatisfactory job fulfillment and complaints against promotion and wages. On the other hand, lack of well-planned professional training also causes problems. Many employees are not clear about their professional development. 74.05% of the staff surveyed complained about insufficient

in-service training to do their jobs, although Plant A has made great investments in training and continuous education.

6. Most employees do not accept the wage standards and the performance assessment. 69.19% believed that they were underpaid. Only 49.19% believed that their wage level is compatible with others in the same industry. Plant A's current wage distribution and wage standards have flaws. For example, the same positions have different wages and different positions might have the same wage. When people are removed from their managerial position, they still get the same wage. This has resulted in the spread of a malcontented mentality among the staff. Plant A has adopted a system of assessing performance for over a year. 59.46% of the employees surveyed believed the current system has defects in fairness while 57.84% observed that Plant A has not taken any corresponding action after the assessment.
7. There is a lack of communication inside the enterprise and the staff identify only weakly with the enterprise. Communications are difficult between levels and within each level in the organization that cause misunderstanding among employees. The stress placed on the shoulders of employees is hard to remove in a timely manner. 67.56% of the employees complained that stress from work has had a negative impact on their personal lives, but no effective measures have been taken to manage it. There is no relaxing environment for subordinates to convey comments to their superiors. There is no mechanism for exchanging ideas. The survey showed that 67.57% of the staff believed that communication channels provided by the plant are insufficient. The survey showed that 60.54% of the staff complained that the plant did not acknowledge their good performance, while 59.46% complained that the plant did not pay enough attention to their work. A lack of communication undermines the morale of the staff and its team spirit and is bad for cultivating a sense of identification among them.

8. Problems with the HRM system make it unable to meet the demands. The HRM system used by Plant A is slow and unstable. Much useful information cannot be input into the system. It is also defective in its enquiry functions and has no analytical function.

### 3.4. Solutions

After a complete investigation and analysis, the consulting team and Plant A were ready to find some solutions for the plant's HRM. Table 1 summarizes the problems to be solved and the corresponding solutions.

### 3.5. The implementation

In March 2002, in line with the solution to Plant A's HRM, the consulting team began to implement the e-HRM system.

#### 3.5.1. The general criteria

1. Put forward the managerial principle to enable the managers to grasp the essence of HRM.
2. Carry out goal management to scout and control the whole process and enable each department/each position to reach its set goal.
3. Optimize managerial procedures to ensure the shortest procedure, the strongest functions, the lowest cost and simplicity of operation. This also makes each job go smoothly according to the procedures.
4. Regulations should be clear, reasonable, scientific and applicable and ensure normalized HRM.
5. Develop software modules out of normalized managerial procedures.

3.5.2. *What needs to be done?* Table 2 lists the tasks to be done, their goals and the corresponding software modules.

#### 3.5.3. Implementation model

#### Step 1 HRM

- HR diagnosis

**Table 1:** *Summary of HRM problems and their solutions*

| Number | Current problems with Plant A's HRM                                                            | Solutions and integration strategies                                                                                  |
|--------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1      | Failure to strategically attach enough importance to HRM                                       | Start HRM planning                                                                                                    |
| 2      | The organizational structure does not illuminate the importance of human resources             | Adjust the organizational structure and draw a clear line between responsibilities of different departments           |
| 3      | The mechanism is defective and the personnel is itinerant                                      | Assure fairness – make wage and welfare policy, promotion policy, long-term stimulation plan and personnel handbook   |
| 4      | Lack of job analysis and clear line of responsibility                                          | Start job analysis and normalization                                                                                  |
| 5      | Imbalance between hiring and cultivating talent                                                | Start professional planning of the staff, human resource investment; establish recruitment system and training system |
| 6      | Performance assessment has no real effect                                                      | Establish performance management system and assessment of talent                                                      |
| 7      | Inadequate communication of ideas and a lack of the staff's identification with the enterprise | Increase communications between employees and the management; build and refine the enterprise's own culture           |
| 8      | No established e-HRM system                                                                    | Establish e-HRM system                                                                                                |

- Design medium and long-term strategic system for HRM
- Assess and design wage and stimulation system
- Stipulate functions for top officials of the enterprise
- Design talent recruitment and selection process
- Design performance assessment system
- Direct job duty arrangements and job analysis
- Provide an HRM policy system

**Step 2** Organizational transformation and structural regrouping

- Diagnose organizational behavior
- Solve disputes between organizational structures and the enterprise's developing strategies
- Set up an authority distribution system
- Optimize organizational structures and managerial procedures
- Organize cultural construction and forge organizational concepts
- Establish academic organizations

**Step 3** Enterprise training and course designs

- Analyze on training needs and design training courses
- Share cases interactively
- Design an in-enterprise training system and procedures
- Establish a sophisticated training assessment system

**Step 4** Provide user instructions and collect feedback for future maintenance

Plant A completed the construction of the e-HRM system by the end of 2002. The system has been running well.

*3.5.4. Value analysis*

**Value 1** The e-HRM system makes it easier for Plant A to strengthen its internal cooperation. Along with the principle of new hired loyalty, a noteworthy phenomenon is that the relationship between the staff and managers as well as that between managers and the teams are gradually becoming the crucial factor in determining whether they are willing to stay in the team. Where there is harmonious management between the staff and the team, they prefer staying in the team to accepting offers from elsewhere.

**Table 2:** *The tasks, goals and the software modules*

| <i>Number</i> | <i>Tasks</i>                   | <i>What to be done</i>                                                                                                                                                                                                                                                                                                                                    | <i>Goals</i>                                                                                                                                                                                                                                                                       | <i>e-HRM modules</i>                       |
|---------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| 1             | HR planning                    | The enterprise's overall strategy of competition is the basis of its HRM planning, which refers to the process of decomposing and redefining the needs of HRM and the possibility of meeting them                                                                                                                                                         | HR utilization rate must be raised by at least 5% to ensure the enterprise's smooth development and HRM planning and to achieve its various goals                                                                                                                                  | HR planning system                         |
| 2             | Position design and analyses   | Job analysis is a method of systematically collecting and analyzing various kinds of job-related information, which includes the specific duty of each job, its requirements, and working conditions and environments                                                                                                                                     | Job analysis aims at defining the mission, duty and responsibility of a given job and paving the way for the training, wage determination, checking and career planning of the personnel                                                                                           | Intelligent job analysis management system |
| 3             | Selection of recruits          | Recruitment of personnel aims at selecting potential employees for the enterprise, searching for qualified applicants for job vacancies. This is the most crucial step of HR development. Done in a less refined way, it may cost the enterprise a lot of time in firing employees                                                                        | A scientific system of recruitment will help the enterprise find suitable talent and thus decrease the huge cost of the itinerancy of talent and increase the rate of success in recruitment                                                                                       | Recruitment system                         |
| 4             | Evaluation of talent           | Tests for the quality of talent measure and assess the basic qualities of morality, hard work, ability, achievements and health for all kinds of recruits in a series of quantified and qualified ways. They use various types of measuring tools, collecting interactive data between candidates and jobs as much as possible to inspire their potential | Tests for the quality of talent aim at helping the enterprise to develop and utilize HR in an effective way, to stimulate the staff and to optimize HRM                                                                                                                            | Talent quality system                      |
| 5             | Training and development of HR | Training is a process in which knowledge is acquired, skills are developed and attitude is improved by proper guidance. It helps the staff to define their missions, duties and goals, and to gain qualities and abilities that enable them to achieve the enterprise's goals                                                                             | Training aims at improving the personnel's working efficiency, helping them master the operational procedures and communication skills needed. It has an apparent economic and cultural benefit. A good training and development in HR may increase the HR utilization ratio by 7% | Training and development management system |
| 6             | Staff performance management   | Performance management is a process to achieve a particular goal and to fulfill the customers' expectations by planning, organizing and using the enterprise's resources. It is also a process in which managers                                                                                                                                          | Performance management aims at inspiring the personnel's potential, improving their performance and even the enterprise's performance by binding their personal goals with the enterprise's strategy. Good                                                                         | Performance management system              |

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|----|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 7  | Wage and welfare management              | continuously communicate with the staff on their duties and improving performances<br>Wage and welfare management refers to the policies and measures dedicated to setting up a scientific and reasonable system of wages and a sophisticated system of pay according to the enterprise's pay strategy during its developing stage, taking into account both the interests of the enterprise and the personnel. It also integrates principles of stimulation, competition, economy and lawfulness<br>Stock option rewarding plan is a long-term stimulating measure used to make up the deficiencies of fixed wage and annual bonus. Stock option rewarding plan takes various forms. It mainly includes stock rewarding plan, stock preferential plan, stock moratorium plan and stock option plan. Enterprises with different backgrounds of ownership structure carry out this plan in different ways. Stock option rewarding plan must accord with the business types and operational features of the enterprises. There are generally four types: publicly listed enterprises, publicly unlisted enterprises, high-tech enterprises and traditional enterprises<br>HR policy impacts all aspects of the enterprise's management of its staff. It mainly includes the employment and management policy, daily working policy, promotion policy, safety policy, penalty and contract termination policy, and personnel rights and conflict resolution policy | performance management may increase the HR utilization rate by 3%<br>Wage and welfare management aims at striking a balance on distributing the enterprise's profit between its own accumulation and the distribution among the personnel, at repaying personnel who contribute to the enterprise in an objective, equal and reasonable way and thus ensuring the personnel of economic and psychological satisfaction in a favorable way for the enterprise's development<br>Stock option rewarding plan aims at establishing a long-term stimulating and restraining system, binding the interests of the staff, particularly those of the top-level managers, with the enterprise's interests, and thus effectively reducing the opportunistic behavior of the managers and making them contribute to the interests of the enterprise and the shareholders as much as possible, resolving the disputes between commission and surrogate, reducing the cost of surrogate and improving the enterprise's performance.<br>Research results in China and abroad show that where stock option rewards are carried out, enterprises perform better<br>HR policy aims at promulgating the enterprise's business ideas and management methods, providing the staff with a clear guide of behavior, safeguarding the interests of the enterprise and the personnel, maintaining good management and reducing avoidable HR disputes | Wage management system<br>Welfare management system<br>Security management system<br>Stock option management system |
| 8  | Long-term senior talent stimulation plan |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                     |
| 9  | HR policy development                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Policy management system                                                                                            |
| 10 | e-HR system                              | e-HR system is a kind of integrated system providing information necessary for HR decision-making. It includes files of personnel affairs and HR informatization (such as HR analysis and HRM reports)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | e-HR system aims at increasing the efficiency in compiling HR files, providing the managers with information required for decision-making in a quick and easy way, drawing strategic plans for enterprises and offering HR forecasting services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Staff information management system                                                                                 |

From a daily perspective, the personnel mainly deal with the teams they belong to rather than the enterprise. Strengthening communications between the personnel and their supervisors adds to the sense of their belonging to the enterprise.

The e-HRM system provides a platform for prompt communication, and makes a seamless cooperation relationship among the personnel come true through management, electronic magazines and e-mails. It also makes it easier for the decision-makers to learn the expectations of the grass-roots personnel. The system's personnel self-help terminals and managers' self-help terminals provide horizontal and vertical communication tools.

**Value 2** The e-HRM system paves the way for the enrichment of an enterprise culture and a healthy development of Plant A. The enterprise culture of Plant A comes with the enterprise itself. It is based on the dominating fundamental values, consisting of its exterior expressions such as personnel behavior, management style and management policy. Figure 1 depicts the formation and enrichment of the enterprise culture.

Three stages are used to build Plant A's enterprise culture. (1) In the growing stage, the management culture turns into a staff culture. A common willingness leads to a power of solidarity. The staff is united together. Clear-cut goals give the personnel new dynamics to make contributions. (2) In the prospering stage, diverse culture prospers at the grass-roots level that not only accords with the characteristics of different sectors and regions but also maintains its own flexibility and creativity. Introduction of an external culture also helps to enrich the enterprise's own culture. (3) The declining stage starts with a partial weakness and grows into an overall looseness. It is shown by a decline in market share and decline in profit. The enterprise has to set out to establish a new culture.

By applying the e-HRM system and introducing the HRM consultation service, Plant A further carries out its enterprise culture and works on a unitary value. The e-HRM system has helped Plant A establish a new working approach of creative thinking, circumventing traditions and

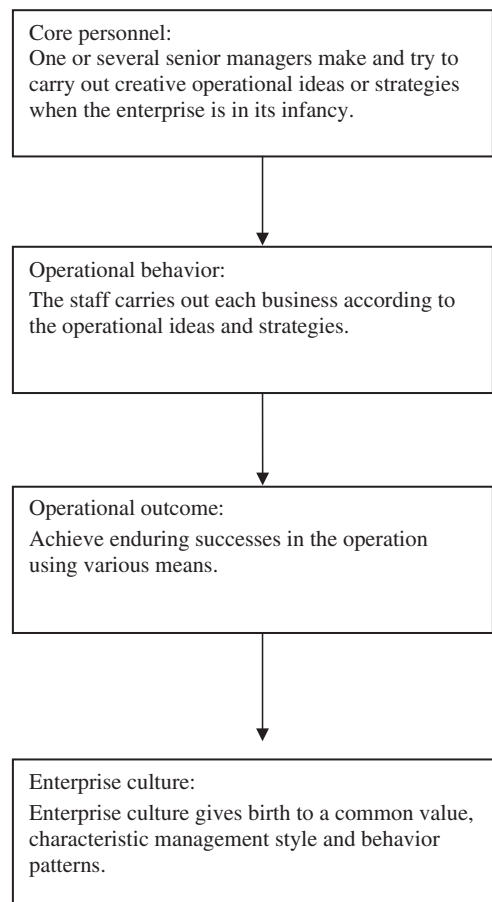


**Figure 1:** *The formation and enrichment of the enterprise culture.*

seeking innovation and a new system of rewards and stimulation.

**Value 3** The e-HRM system brings down Plant A's management costs and raises its productivity. The great functions of an e-HRM system in procedure control and quantified management can be used to ensure that HRM follows a pattern of 'people first' in real terms. Networking computers is an effective means to achieve procedure control. For example, software is used to complete the whole process of a recruitment plan, from drawing the plan, choosing the recruiting channel, and setting it into motion by selecting applicants, giving interviews and undertaking assessments, to making decisions and calculating

costs. From an information management perspective, the e-HRM system collects, processes, analyzes and disseminates information for the whole enterprise. Compared to manual work, it makes the procedure more normative, more effective and more accurate. Plant A's increase in efficiency after the application of the e-HRM system is mainly reflected in the following aspects.

1. It takes less time to make replies. Decision-makers, front-line managers, HRM managers and the personnel from other departments are able to consult with each other and make prompt replies.
2. Traveling cost is reduced. Recruitment, training and assessments are all done online which eliminates a huge amount of traveling cost.
3. It takes less time for decisions to be put into action. HRM resolutions can be made and passed on the spot and put into practice immediately.
4. Since there are personnel self-help service platforms, most of the trivial personnel affairs can be processed online.
5. A well-defined job description provides help in fulfilling various jobs.
6. The establishment of an assessment system and rewards system relieves the employees of their worries, which is conducive to adding to their enthusiasm in work.
7. Using software to process huge amounts of daily management routines saves a lot of overlapping labor.

#### **4. The future trends of e-HRM in China**

There are four areas that appear to be popular in China for future e-HRM development.

##### *4.1. Digitization*

We are in a digital society or information age today. Computers, networks, the Internet, IT, information management, business intelligence and many more of this type of terminology have become common knowledge to the public. And over the last decade, people have experienced a

lot of e-terms such as e-commerce, e-business, e-government, e-manufacturing, e-procurement, e-learning and e-HRM. It is true that more and more organizations or enterprises have started using IT to run their businesses. China is one of the fastest growing countries in the world, and digitization has been a major topic in most Chinese enterprises (Wang & Xu, 2005; Guo *et al.*, 2006; Zhang *et al.*, 2006).

The first step of an e-HRM strategy is office digitalization. It uses computer technology to handle office work which mainly includes the making, transporting and stocking of documents and materials. Office automation is spreading more and more widely, paving the way for e-HRM development. A computer-network-connected environment is highly needed by e-HRM.

##### *4.2. More information systems to be developed and used*

Various types of information systems provide a means of collecting, processing, storing, analyzing and applying information to meet various demands from enterprises. By using information systems, we can optimize the current managerial and organizational structures and adjust managerial mechanisms. The coordination between different departments can be strengthened through information systems. Efficiency and effectiveness will be improved for decision-making processes since the required information can be provided to decision-makers in a more timely manner and more accurately.

Information systems in e-HRM can help us achieve an integrated management covering various aspects such as personnel affairs, wages, statistics, report forms, documents, securities, contracts and authority approval. They provide a seamless connection between different business departments, avoid duplicate data collection and ensure consistency and accuracy of data. They provide valuable information in a comprehensive, accurate and prompt way, fully and effectively satisfying the needs of HRM activities.

#### 4.3. e-HRM becomes a solution for HRM

IT infrastructure is upgraded year after year. Hardware platforms have experienced different forms over the past several decades, from independent computers and networked computers to the client/server architecture and the Internet. Most enterprises today have started using the Internet in their business operations, ranging from the most fundamental Internet service such as getting business information and news and providing enterprise information, to more advanced applications such as online transactions and online services. The concept of e-HRM was born in such a business environment.

e-HRM promotes the comprehensive development of HRM and emphasizes an organic binding of informatization with HR development. Its functions include HR development; talent forecasting; decision-making support by providing precise HR data and analytical reports to decision-makers; performance assessment; and online recruitment and professional training.

#### 4.4. More qualified e-HRM users are needed

The HRM personnel are the main body of HRM informatization and a qualified and professional HRM team is a guarantee of its success. The high quality of HRM personnel means that the HRM personnel must possess the most current and advanced knowledge. They must build and strengthen information awareness, learn the information management concept, and gain the skills in using information systems, Internet technology and applications. They also need to know the new content and the new requirement of HRM in today's information age. Instead of only doing daily routines, e-HRM needs to provide information and analysis of HR data at a strategic level of the enterprise and help top management make decisions for the whole enterprise. Such an intelligent system requires intelligent users. It is the key of successful e-HRM.

### 5. Conclusion

The advent of the knowledge economy and widespread application of computer technology

and the Internet require today's enterprise management to be digitized. This digitization in turn requires HRM to be changed. e-HRM is born in such an environment. Through the analysis of the current status of HRM in Chinese enterprises and through a case study, we show why e-HRM is needed and how e-HRM is developed. We hope the experiences and the lessons we learned in this case will help people in developing their own e-HRM systems.

e-HRM in China is still in its infancy. Many enterprises, particularly small and medium-sized ones, have not accepted the concept of informatization and have not undertaken any sort of construction of it. On the other hand, some large enterprises set out blindly to develop their e-HRM systems without really knowing what e-HRM is and how to develop it. They just follow the fashion which only backfires on them. This study has shown how to prepare the enterprises themselves to start an e-HRM project and do it successfully.

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