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Design of Functions and Framework of Enterprise Human Resource Management Information System

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Abstract: To acquire competitive advantages, a large number of enterprises construct Management Information System (MIS) by application of advanced information technology. Human resource management is the foundation for the enterprise to obtain talents and improve the competitive force and, is more the core of MIS. This research was conducted to determine design of functions and framework of Human Resource Management Information System (HRMIS). Generally speaking, HRMIS contains the function modules of system management and maintenance, personnel management, employee recruitment, employee training, performance evaluation, salary management and human resource decision making. In design of framework of HRMIS, Browser/Server (B/S) framework mode has multiple advantages than Client/Server(C/S) framework mode. B/S mode applies continuously mature and popularized browser technique to fulfill the powerful functions which can only be fulfilled by complex special software in the past. In addition, it economizes the development cost. As a kind of brand-new software system construction technique, B/S mode is mainly a 3tier system structure that is constituted by the representation tier, the function service tier and the data service tier.

Key words: Human resource management, information system, functions, framework

INTRODUCTION

Today when economic globalization and informatization spread all over the world, profound transformation is occurring to the traditional management mode. Meanwhile, quite a large number of enterprises come to realize application of advanced information technology in constructing an enterprise management information system is a necessary means to acquire competitive advantages. As the first resource, management and application of human resource is the foundation for the enterprise to obtain talents and improve the competitive force and, is more the core of the management informatization of the enterprise. Through organic combination of information technology and management technology, Human Resource Management Information System (HRMIS) applies modern information technology to set up a standardized and networked working platform for human resource management. This not only strengthens systematization and structuralization of human resource management and improves working efficiency, but also facilitates improvement of the entire management level of the enterprise (Li, 2004). Thus, modern enterprises are supposed to strengthen the efforts to apply information technology in human resource management and carry out HRMIS.

CONNOTATION AND ADVANTAGES OF HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM

HRMIS is a system that is constituted by a variety of modules internally correlated and that is used to collect, handle, store and promulgate human resource management information (Li, 2006). This system is able to furnish support in decision making, coordination, control and analysis in activities of an organization's human resource management. HRMIS is not simply a matching combination of some software and hardware, but, instead, an enormous, complicated and step-by-step systematic project. Therefore, it needs to be continuously modified and enlarged in accordance with the actual situation of the enterprise's development and, meanwhile, needs to be integrated with the financial department, logistics and client relationship management department of the enterprise to realize convenience, systematization and office automation of human resource management. Compared with the traditional human resource management, HRMIS has significant advantages.

Reducing management cost: During the traditional human resource management period, the human resource department has to rely on manual operation whether in job

designing, organization training, employee recruitment or in the trivial and specific work of payment interval and archives administration, so the efficiency is low and they are also likely to make mistakes. HRMIS can reduce the operation cost in human resource management, lower the employee turnover rate and cut down on communication expenses, so as to reduce the management cost of the enterprise.

Standardizing the business process: The former human resource managers have to face up with cumbersome and complex administrative affairs, so they have neither time nor energy to standardize the business process of human resource operation system. HRMIS makes it possible to closely concentrate and analyze all disperse information of human resource, which greatly optimizes the business process of human resource management and improves the working efficiency.

Optimizing information channel: The traditional human resource management is slow in transferring information and, moreover, the information is likely to be changed, as a result of which the original intention of the managers might be misinterpreted. In contrast, HRMIS is able to directly convey the information to each grass-root employee, which is good for management and implementation of a policy.

Changing the management philosophy: The traditional human resource management is progressive management from top to bottom, which not only wastes time and energy, but has great difficulty in implementation. By contrast, the HRMIS makes it possible to let all staff in the enterprise to participate, which changes the previous situation of passively accepting an order and enables all staff to actively participate, a new situation of interactive management formed.

THE CURRENT DEVELOPMENT CONDITION OF HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM

The developmental history of HRMIS can be traced back to the end of the 60 sec in the twentieth century, when large-sized enterprises often manually calculated and paid employees' salary, which was not only toilsome, but was also likely to make mistakes. Under the background when computer technology entered a practical stage, in order to resolve the above contradiction, the first generation of HRMIS was born at the right moment. Nevertheless, it was nothing more than an automatic instrument for calculating salary and it

had neither the function of report generation nor the function of salary data analysis (Li, 2010).

The second generation of HRMIS came into being at the end of the 70 sec in the twentieth century. Due to the rapid development of computer technology, the second generation of HRMIS basically resolved major defects of the first generation of HRMIS. Furthermore, its functions of report generation and salary data analysis were greatly improved. However, since this generation of HRMIS was mainly researched and developed by computer professionals, it failed to systematically take into consideration of the demand and philosophy of human resource.

The revolutionary transformation of HRMIS occurred at the end of the 90 sec in the twentieth century. Especially, development of the technology of Internet/Intranet made emergence of the third generation of HRMIS inevitable. The third generation of HRMIS is characterized by the fact that it, from the perspective of human resource management, uses a concentrated database to manage in a unified way almost all data related with human resource (such as, compensation and welfare, recruitment, personal career design, performance management, job description, personal information and historical data) and forms an integrated information source. The friendly user interface and powerful report generation instrument, analysis instrument and information sharing make it possible for the human resource management personnel to free themselves from burdensome daily work and concentrate all their energy to devote to human resource planning and policy making from a strategic height.

DESIGN OF FUNCTIONS OF ENTERPRISE HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM

In order for the HRMIS to comprehensively realize the functions of human resource management and provide powerful data support for management decision-making, HRMIS usually should contain the following several function modules, as is shown in Fig. 1.

System management and maintenance system: This system contains the functions of privilege management, interface management and database management, etc., In privilege management, a system administrator has the privilege to add new users, modify and set user privilege and improve the security of the system. Interface management is extension and expansion of the system, an interface that provides DR-MIs system, enterprise production system and enterprise financial system. In the

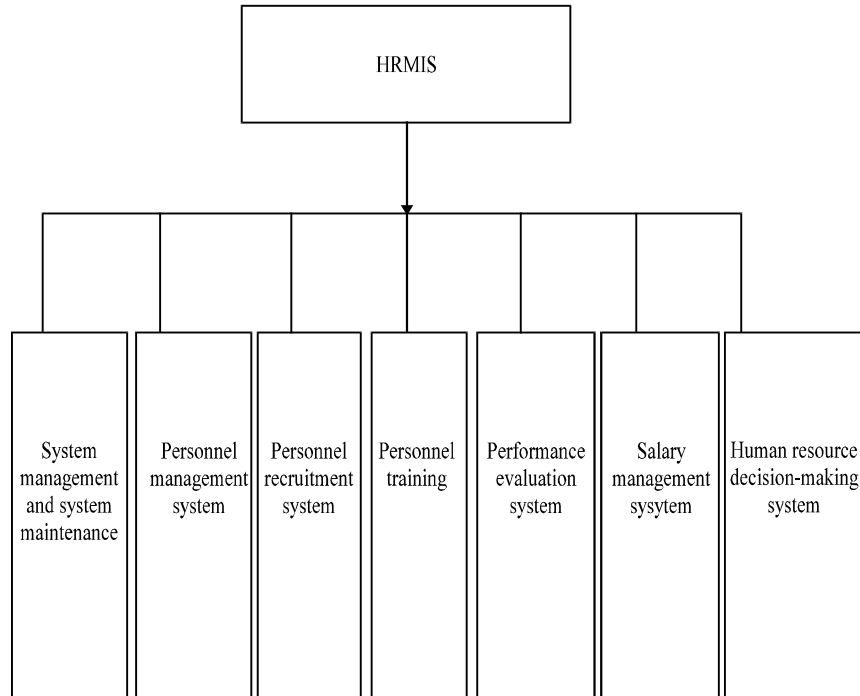


Fig. 1: The function modules of HRMIS

application program, it provides connections of the Office software, such as, Word and Excel, helps users to analyze, check and calculate human resource management data and assists in generation of all kinds of reports in human resource management. Finally, it secures daily operation of the entire system (Zhu, 2004).

Personnel management system: Personnel management system is the most fundamental daily work in human resource management, which manages the basic information and alteration information of all levels of staff (including in-service staff, the emeritus and retired and other staff) and provides standard, flexible and thorough staff information. The detailed functions are as follows: (1) recording the basic information of staff, including staff number, name, gender, date of birth, job position, work experience, educational background, honors and awards, picture, contact information and family information, etc.; (2) signing labor contract and training contract, recording contract signing and termination condition; reminder of contract expiration; calculation of compensation and liquidated damages; (3) automatic recording of the attendance condition of staff and calculating by connection with the salary management system; registering daily work performance of staff by connecting with the performance management system; recording the job transfer information of staff and transfer reasons; (4) recording the turnover information of staff,

the turnover reasons and making a statistical analysis; making a detailed resource utilization list of outgoing staff, a financial transaction list, a work handover list, a training list and a turnover notice letter; terminating attendance record and salary interval of these staff; transferring their information from the database of in-service staff to the database of outgoing staff.

Personnel recruitment system: The major functions of this system contains: (1) making a plan of recruitment, including applicants' registration, log in, resume input and modification, submitting of resume, examination of completeness of resume and auto reply Email of the system; (2) displaying, at any time, information of job vacancy, job description, specific requirement for the job and necessary conditions for application of the job; (3) building, in different classifications, archives of applicants for later check and retrieval; (4) printing a notice letter and notifying the applicants of the recruitment result; (5) signing a contract with those applicants recruited and automatically transferring relative data into the information database of staff; (6) transferring the data of those applicants who are not recruited into the back-up talent pool.

Personnel training system: Its major function is to provide online training for staff. The network-based virtual learning center makes learning become a real-time

and interactive process, in which the enterprise training cost is greatly reduced since the learning expense is burdened by staff themselves. A more important job of human resource management department is to emphasize staff self-learning, self-management and self-stimulation and design a scientific and reasonable evaluation system to guarantee the effect of the training. Online training enables staff to independently choose the content they have interest in and provide pertinent training, which helps to improve the personal business skills of staff and adapt to the requirements for fierce internal job position competition.

Performance evaluation system: Performance evaluation is one of the core functions of human resource management and provides evidence for staff appointment, deployment, promotion, training and remuneration. Its major functions are as below: (1) connected with job position information, performance evaluation, together with the line department, finishes performance evaluation on staff; (2) selecting reasonably evaluation indexes and making an evaluation form; (3) updating, at any time, the performance evaluation information according to performance content, evaluation method and evaluation subject and generating a report and evaluation opinions according to different requirements; (4) the staff may, at any time, check their performance condition; providing elementary materials for other sub-systems.

Salary management system: The purpose of salary management is to resort to scientific salary design to absorb and retain excellent employees required by the organization, stimulate and gather employees, reduce employee turnover rate, control the operation cost and improve enterprise economic benefit. The major functions that this system contains mainly have the following three aspects: (1) setting salary standard, changing daily salary, adjusting calculation and payment of salary and all kinds of welfare in a unified way, automatic calculation of personal income tax and automatic calculation of such items to be withheld and remitted as social insurance; (2) calculating deduction on salary and welfare caused by such paid vacations as annual leave, personal leave, sick leave, marriage leave and funeral leave and by other reasons, such as, being late, leaving the job position early and absenteeism and directly generating a general ledger voucher by connecting salary and general ledger of the enterprise; (3) storing complete historical information for query and report generation.

Human resource decision-making system: This function is to filter the information that enterprise leaders have no eye on from plenty of information on the basis of information management, summarize, refine and process

some information that is beneficial to leaders' decision making and make the information known in the form of word, table and intuitive diagram. This function is mainly aimed at leaders of enterprises and leaders of human resource department. The function mainly contains institutional resource analysis, employee performance evaluation analysis, horizontal and longitudinal salary and welfare analysis, bonus assessment analysis and employee demand analysis. The entire analysis system forms an overall and direct information analysis system to provide the most effective decision-making support for leaders about human resource allocation.

DESIGN OF THE FRAMEWORK OF HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM

Selection of the framework modes of HRMIS: Strictly speaking, the framework design technology of HRMIS has no specific stipulation and there are two mainstream design modes for analyzing development of the construction technology of information system, namely, C/S mode and B/S mode. C/S mode, abbreviation of Client/Server needs to install client-end system on the computer of users. B/S mode, abbreviation of Browser/Server, doesn't need to install client-end system on the user end and only needs a web browser.

B/S mode is an altered or improved mode of C/S mode with the emergence of Internet technology. Under this mode, the user interface is totally realized with www browser, but the main transaction logic is realized on the server end, which forms the so-called 3 tier frame work. B/S mode applies continuously mature and popularized browser technique to fulfill the powerful functions which can only be fulfilled by complex special software in the past, economizes the development cost and is a kind of brand-new software system construction technique. By contrast, the traditional C/S mode software needs to develop different versions of software in different operation systems. And as the product is upgraded very fast, such high cost and low efficiency can no longer adapt to the fast upgrading. After the cross-platform language of Java came into being, B/S mode became popularized faster and this kind of mode has become the first choice of framework in contemporary HRMIS.

Generally speaking, compared with the traditional C/S framework mode, the B/S framework mode has the following advantages (Chu, 2003):

- Browser/Server is a kind of client mode and it is enough for the client-side software to install a browser. Besides, requirement for client-end hardware configuration is low
- The standard is unified and maintenance is relatively simple. HTML is an organizational mode of Web

information and all sorts of Web servers and browsers follow this international standard. Application of B/S mode concentrates all development personnel into the server end and it is enough to develop and maintain the server-end application program, while the application program on the server can be implemented on the client end through web browser, which gives full play to group advantage of development personnel. Besides, maintenance of the application program is relatively simple

- There is no need to develop client-end software. The browser software can be obtained free of charge from the Internet. It is enough for a client computer that installs Windows operation system to apply the built-in networking protocol and browser
- Cross-platform support. Since this mode adopts a unified communication protocol and both the browser software and the server software can support multi-platform, it is convenient to operate on a heterogeneous platform of the enterprise
- The browser interface is easy to learn and use and users don't have to possess too much technical knowledge

The structure of HRMIS based on B/S mode: The window on the main interface in the B/S mode-based HRMIS is integrated with Web browser and information handling function, which can be connected as required to the Intranet or Internet of the enterprise to check and deal with relative enterprise internal information and information about policies and regulations and realize all-around information resource sharing. This sort of B/S mode is mainly a 3tier system structure that is constituted by the representation tier, the function service tier and the data service tier, as is shown in Fig. 2.

The physical structure of this system mainly has three layers. The first layer is a network user terminal that is distributed in the enterprise group and all over the country and even in the whole world. Those concerned have the privilege to use the browser on the terminal and enter the management system from any direction within the scope of authority. The second layer is the Web

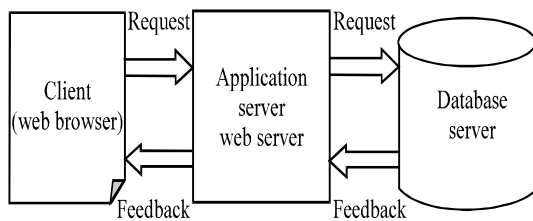


Fig. 2: HRMIS system structure based on B/S mode

server located in the computer room of the information center of an enterprise which is responsible for receiving the visit request from all users and conveys the handling result to the users through the internet. The third layer is the database server that is similarly located in the computer room of the information center which is responsible for storing and handling the data collected through the internet. Therefore, the software structure can also be classified into three layers, namely, browser layer, application server layer and database server layer.

The core of the system is the Web Service which is responsible for long-distance or local HTTP search request, acquire related data from the database server according to the search condition and then translate the result into standard HTML language and all kinds of Script codes, which are conveyed to the user browser that submits the request. Likewise, the browser will apply to send the request of recording the data altered, deleted and added to the Web server which, together with the database server, cooperates in finishing all the above study.

BASIC REQUIREMENTS FOR DEVELOPMENT OF HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM

Usually, development of HRMIS needs to satisfy the following several requirements:

Completeness: In designing the system, it is necessary to pay attention that the system has to comprehensively cover all business functions of human resource management and design of each business function has a complete and standard business flow, which is a platform of informatization management for daily study.

Integrity: In usage of the system, it is only necessary to input once data about employees and then other modules of the system are able to share the information, which is likely to reduce a great deal of repeated input work. In addition, this system can not only be employed as a complete system, but also can be individually used as a split module.

Usability: In designing the system, it is necessary to take into account whether the interface of the system is concise, whether it intuitively embodies the major work content of management and whether the system adopts a navigator interface so as to direct users to conduct each operation according to optimization management flow. There is almost no pop-up dialog box and all relevant information can be displayed on a single interface and all

functions can be operated on the interface. In such way, on one hand, integration of information is improved and, on the other hand, quite a lot of complex operations are reduced on the dialog box.

Self-service: In designing the system, it is necessary to take into account whether the system is able to provide multiple-level and stratified data management functions for different areas in their selection of a system. Daily management with self-service function is able to be operated on any network computer after authentication of identity. Employees can check online the rules and regulations of the enterprises, the organizational structure, information about important persons and the following information related with employees themselves: the occupation information, salary condition, accumulative welfare condition, performance fulfillment condition and registered training demands and can communicate with the management department via the electronic means. A line manager is able to, within the limits of his authority, check the personnel information of his subordinate employees, alter the attendance information of employees and survey application of employees for training and vocation, etc. and conduct online performance management to employees. A general manager can examine online all important information related with human resource, such as the allocation situation of human resources and cost fluctuation of human resource, etc.

Intellectuality: The system should have automatic E-mail function and is able to send information in batches to relevant persons via E-mail, which can greatly diminish the intensity of administrative affairs work of management personnel. The system also should set the reminder function, which can enable users to operate at regular time and make human resource management turn out to be active, effectively enhancing satisfaction of employees with human resource management.

Security: The system is able to encrypt the database, realize strict rights management and set different levels of limits of authority for operation by users on different modules, sub-modules and even data items. Whether the system is secure is also reflected in that the system is able to establish a log file, keep track of and record detailed situation of each operation by users on the system and also set up regular back-up system of data to offer the data disaster recovery function.

Openness: The system should provide strong data interface and realize in a relaxed way the input and output

of all sorts of data and seamless link of the system with external system. This is convenient to introduce all sorts of office documents and store the documents in the database, which not only standardizes management of human resource documents, but also increases security of the documents. In the meanwhile, the system should also support all mainstream relational database management system and all kinds of document processing systems.

Flexibility: The system is able to change conveniently customization functions according to demands of users and alter conveniently display of data items of the interface according to demands of users. The strong query function is able to flexibly set up arbitrary query composition on multiple conditions and support real-time and dynamic switch between Chinese and English (or other languages).

Strong reports/diagram output function: The system is able to furnish strong reports making and management tool for users to directly design all kinds of reports required. With the flexible reports generator, users are able to rapidly finish design of all kinds of reports and change in design at any time when necessary. Reports can be output to a printer, Excel document or TXT text file. The system can provide perfect diagram statistic and analytical function (such as histogram, pie graph and line graph, etc). The statistical diagram that is output can be directly input into MSOffice document and rapidly generate human resource working reports.

CONCLUSIONS

At the era of knowledge economy, human is the unique source of enterprise competitive force, the first competitive force of the enterprises and the first product of the enterprises. Then, it is very important to enhance the human resource management level at the era of knowledge economy. HRMIS has brought new opportunities for introduction, optimization, development, application, cultivation, assessment and performance management of human resources at the era of knowledge economy. Application of HRMIS has not only improved the human resource management mode and attained the purposes of improving the working efficiency, reducing the operation cost of HR work and reducing the employee turnover rate, but has also enabled the role of human resource department to have a fundamental transformation, which makes the human resource department become the decision-making supporters of the management level and provide information and solutions for a decision-making. In the new social and economic

environment, informatization of human resource management has been proved to be the only route for enterprise development and an inevitable condition for enterprise survival.

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