

# Design and Implementation of Human Resources Management System using SSH Fuzzy Framework

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**Abstract** — In order to design a human resource management system, the Secure SHell, SSH, fuzzy framework is used in this paper for efficiency and high reliability. SSH fuzzy mathematics method plays a positive role in building the enterprise human resources management system. By evaluating production quota of an enterprise, we can make a scientific comparison in human resources management level between different corporations. The evaluation model, as the result of applying SSH fuzzy mathematics method, can reflect the fuzzy relations between production quotas clearly through relation matrix, making the evaluation index analysis more comprehensive. The test results show that the performance of human resources management system can be improved by using SSH fuzzy framework.

**Keywords** - design and implementation; human resource management system; SSH fuzzy framework; approximation performance

## I. INTRODUCTION

With the increasing dynamic and complexity change in business environment, the enterprises are confronted with more severe challenges about increasing human resource management's contributions to improve organizational performance. The study of the relevant literatures shows the positive correlation between high performance HR practices and organizational performance. But the conclusions refer in the current study could not explain why many companies don't acquire high performance system obtain excellent performance either. Therefore, focusing on the classification of HR system, and exploring how to achieve high performance by different HR systems has important theoretical and practical meanings.

Enterprises need constant combining the existing information system in the course of information, in order to meet demand of e-commerce, system integration orders the information-based systems of a set of enterprises according to service object business way, procedure, solve such several tasks as the data analysis, information sharing of enterprises, making policy. Proceeding with basic conception of system integration, Li's paper [1] has introduced enterprise's information integration content, difficult of information integration point between office automation (OA) system and electronic human resources (eHR) system and background of these two systems. Integrated platform and common use solution based on Lotus and its basic principle are provided. System integration on this solution can be used in the trade on Internet, customer's relation management (CRM), supply the chain to management (SCM), commercial intelligence, work flows of different enterprise practice integrating application etc. As a instance, system integration of office automated system and human resources in Dongfeng Yulong Motors Sales Co.,LTD is introduced. The article has analyzed the relation between OA system and eHR system, the background of the integration, integration

point, and security management in the instance. It has explained that it's time to use the systematic integrating and development, and has described interface function especially. On the basis of the solutions put forward, the technique of mutual implementation data between two systems have been discussed in detail.

With the development of knowledge economy and the network economy era's coming, as the most important capital, human resource attract more and more attention. Zhang's paper [2] adopts the advanced human resource management idea, by use of SSH software framework, and career technical college personnel work's characteristic, and the whole development process of human resource management system in Colleges and universities is discussed.

Huang's [3] paper analyzes the present situation of human resources in higher vocational Colleges, on this basis, describes the main contents of his paper. Then, after the introduction of human resources management system's development environment, technology and platform, the paper discusses the basic concept of human resource management, describes the position setting, personnel management, contract management, attendance management, salary management, training management and recruitment management, the core function of human resources management is discussed, the development goal of the system and the design of the overall system function structure is given.

Xu's [4] paper discusses the design principle of the system, gives the overall system architecture design, database design process description of conceptual model design, database physical model, gives the structure design system of the main database table, discusses the general framework of SSH interface system design process, presents the realization method system mainly Java class. Finally his paper discusses the implementation of human resources management system in higher vocational colleges, describes the system development environment, the key process and

code framework the SSH framework integration configuration, discussed the main function of the system. The system is running, realize the personnel basic information management functions, provide integrated information services to the department of personnel and staff, replaced many manual operation. Using data integration platform's support, it promotes efficiency of school personnel management and construction of the digital campus [5].

## II. THE BASIC CHARACTERS OF HUMAN RESOURCE MANAGEMENT

The increasingly complex and competitive environment has changed the organizational management mode, and constantly has propelled the transformation of enterprise's human resource management functions. With the evolution of HRM functions, HRM roles development has undergone several stages: firstly transferred from the administrative roles to the service-delivery roles, and then played the strategic partnership roles. Although the mainstream theories emphasize the contribution of the strategic roles of HRM to organizational performance, but HRM still has been regarded as worthless. Therefore, clarifying the differences between theories and reality is the fundament for understanding such questions as "where does HRM come from?," "where does HRM go?," and "how to go to the future?"

Most HRM roles are classified based on the roles task feature in research. For example, Ulrich has classified HRM roles into four groups: strategic partners, change agents, employee champion and administration experts. Although this paradigm matches the structural role theory, it can't reflect the overall structure of HRM roles, and then results in disputes. At present, cross-boundaries HRM practices have emerged in large numbers of enterprise, which is much more important for HR managers to balance the different demands coming from stakeholders inside and outside enterprise. It is valuable to exploring the new HRM functional roles from the perspective of beyond organizational boundaries. Many researchers have explored the HRM roles transformation mechanism with dynamic analysis methods, however, most researches still focus on how to change HR managers' behavioral pattern to meet up with roles expectation. And the same time, there are no adequate systematic theories which explain the question: Why HRM functions usually develop from administrative roles to strategic roles in most western countries? From theories constructing viewpoint, roles' formation, evolution, transformation and position are the relative themes in strategic HRM field. Among them, roles development's reasons and process are the basic topics.

Firstly, roles classifications are the foundation for roles development research. Current studies overemphasize the difference among the roles task and behavioral feature, but not to explain the overall feature of HRM roles structure. This paradigm results in confusion in understanding roles categories. The confusion of roles nomination and categories could be avoided on basis of P-R-T model. It is essential for HRM roles classification from the complete roles structure viewpoint. Secondly, organizations have changed from closed system to open system in nowadays. Inter-

organization HRM business emerges and propels the emergence of HRM new roles--boundary spanner. Based on across organizational boundaries viewpoint, this research constructs five new rolls of HRM function, such as: ambassador, relationship, knowledge-champion, task-coordinator and gatekeeper. But both constitute the entire HRM roles system. Thirdly, HRM roles development is propelled by multiply factors inside and outside organization, which can't separate from environment. This research makes an investigation about the relationship of HRM roles development with organizational strategies, structure, HR departmental social capital, inter-organizational relationship on basis of co-evolution framework, and finds that: open-innovative strategy, the level of organizational mechanism have the positive influences on HRM roles development. While integrated inter-organizational relationship is the moderate variable, HR departmental structural social capital is the mediator variable in the relationship of HRM roles development (dependent variable) with independent variables in the context of China.

Theory innovation in the theory study of corporate social responsibility, corporate social responsibility is from the perspective of resource view, behavior, ability view and environment view angle, which expands inner assumptions and theory of corporate social responsibility. Enterprises to fulfill their social responsibility as a resource, first of all, is the enterprise to fulfill corporate social responsibility can improve enterprise's reputation and social influence, can attract a large number of talents to join the enterprise, but also can get the recognition of the values of the enterprise employees, in order to obtain the employee's knowledge, experience, skills, and social capital support, human resource management activities will be the source of these resources which convert them into improving organizational performance. Second, Corporate social responsibility as a human resources management of the antecedent, improve human resources management efficiency, the functions of the human resource management as an important functional departments to fulfill social responsibility to employees, to corporate social responsibility into the practice of human resource management, human resource management has more legitimacy foundation, thus is advantageous to the human resources management and corporate social responsibility to improve organizational performance. Corporate social responsibility can be either as a dependent pre-variable the effectiveness of human resource management; also can be used as a tool of human resources management reform and innovation, make human resources management more positive impact on organizational performance.

It can be concluded that:

(1) Single HR practice's effect on organizational performance is limited, even playing a negative role on organizational performance, but the combination of multiple HR practices will play a huge positive complementary effect on organizational performance.

(2) The different types of Systems can all promote organizational performance. But the more commitment HR systems such as high involvement, paternalistic and

professional are performing better than the control-based HR system.

(3) The substitutive effects often occur in the same one human resource bundle. Among the human resource practices aim to reduce the employ turnover, the sharing incentive HR practice can substitute with instant rewards HR practices, and the dependence incentive HR practice substitute with developmental incentive.

(4) The combinations of HR practices that can bring high operation performance and low staff turnover rates are quite different. The instant incentive HR practices and sharing incentive HR practices are more frequently occur in combinations of lower staff turnover rate, but the instant incentive HR practices and common cognitive mode-enhancing HR practices are more frequently occur in high operation performance combinations.

### III. SSH FUZZY FRAMEWORK

With the continuous development of Web technology, the emerging technology SSH framework based on J2EE framework gradually replace traditional EJB component technology to become mainstream application development framework. With the continuous development of network information, expanding the network, network equipment base explosive growth trend, for network operation and management requirements are also increasing, and network management current state of development, the management system, while providing a large number of management capabilities, but also produced along with the complicated network management operations, and how effectively the complicated network operation and management of unified coordination is a very worthwhile research. Against this background, Zhao's [6] paper proposes a single network operations management system based on SSH Framework. The network operator alone is a collection of a series of network operations tasks. This model is based on NMS layer, a series of network operation tasks to the network operator as a single form of managed objects by means of an integrated network operations tasks to achieve unified management as a service to provide users with single operator uniform implementation and management. Meanwhile, using the model analysis of the technology architecture and principle of operation and the system model based on the SSH framework of the whole functional analysis module division and structural design, in which the operator task management, process management, design and implementation of a detailed description. The basic framework of SSH fuzzy model is shown in the following figure 1.

The process of evaluating enterprise human resource management, as a crucial part of enterprise human resource management evaluating system, is mainly affected by enterprise's production [7-8]. So it would be more efficient for us to make a comparison in evaluation between enterprise human resource management systems, enabling enterprise human resource management evaluating system to be objective and evaluating basis and results more persuasive. Because the recorded problems existing in management of different enterprises, even same with each

other, have different complex causes, the comprehensive study of these problems through fuzzy mathematics method can make evaluating model fully reflect the causes, so that providing a strong support for improving enterprise human resource management.

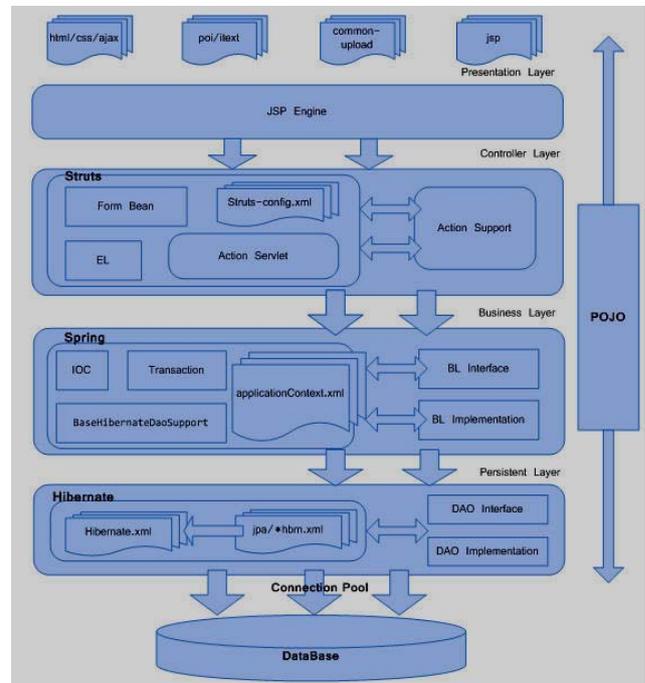


Figure 1. The basic framework of SSH fuzzy model.

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The way of concluding the evaluation of enterprise X's management system is to classify production indexes, then to conclude their common, making us more familiar with enterprise's production level. For example, we can classify an index to one of five classes: first, second...fifth class, according to information about enterprise's current production situation. By this way we can not only evaluate enterprise human resource management but also find questions reflected by the classifying of a certain index. Through comparing X's production index with same kind of indexes of other enterprise, we can clearly see distinct

differences (as shown in Table 1). Fuzzy comprehensive evaluation can make a comprehensive analysis of all indexes, which cannot be borne by traditional mathematics methods, so that making it possible to do a scientific analysis of enterprise's management.

Because there are many factors influencing enterprise human resource management, so the study of these factors is playing an important role in enterprise human resource management. The scientific evaluation of enterprise through the comprehensive assess of indicators provides guarantee to enterprise's management and development, making enterprise human resource management evaluating system more scientific to meet the need for development of enterprise and society. The fuzzy evaluating of enterprise indexes through fuzzy mathematics method can provide a data support for the building of enterprise human resource management evaluating system, making its importance in promoting development of enterprise and

society more persuasive.

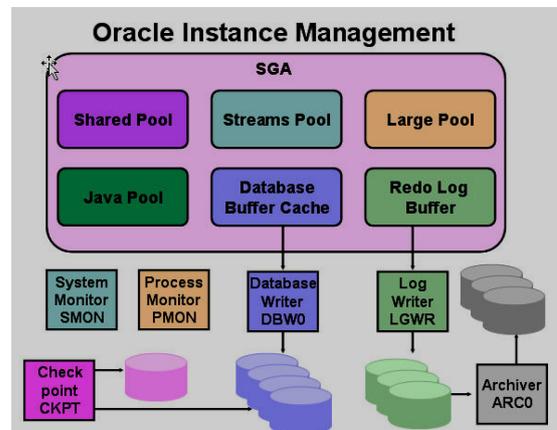


Figure 2. The Oracle instance data management frame.

TABLE I X'S DEGREE OF COMPLETING ITS UPGRADING INDICATORS IN XX AND THE COMPARISON WITH THAT OF PEER ENTERPRISES( PART OF DATUM)

Degree of completion	A	B	C	D	E	Ranking of X among peer enterprises		
						F	G	
I	0.18	0.10	0.10	0.08	0.19	0.18	0.12	4
II	3.68	5.38	2.69	1.4	4.10	1.64	2.63	4
III	1.11	0.93	0.03	0.68	1.33	1.01	0.40	2
IV	686	690	809	587	539	546	621	4
V	14	15.9	14.91	22.66	13.88	41.8	13.99	2
VI	51.85	53.96	53.73	51.09	57.58	45.06	55.02	2
VII	50.07	42.66	41.4	41.77	41.66	41.05	44.54	6
VIII	31.48	31.3	31.6	30.6	31.26	28.34	33.26	1
IX	80.14	77	79.96	77.2	77.57	76.03	80.21	1
X	80.31	78.2	80.73	80.1	81.30	79.4	80.14	4
XI	100	58.41	100	100	100	100	98.96	6
XII	3.7	3.55	3.22	3.6	3.81	5.98	2.01	7
XIII	135061	84493	121258	63801	103685	37750	126403	2
XIV	20.16	11.9	22.6	17.8	17.3	17.8	22.90	1

The meaning of make a fuzzy comprehensive evaluation and judgment of enterprise indicators is that the scientific test of every index in enterprise human resource management system is helpful to form an accurate evaluating process. For reaching this, we should build a relation matrix and the way of building  $r_{ij}$  is described as below:

The  $r_{ij}$  represents the subordinate level of enterprise's indicator of  $i$  to the class  $j$  (enterprise can be represented by  $K$ ), which is more clear and persuasive. However, in the process of comparing there is no value of  $K$ 's indicator of  $i$  in the class  $j$ , so the value of  $r_{ij}$  is equal to 0. On contrary,  $K$ 's indicator of  $i$  can coordinate to the value in class  $j$ , and

so the span can be represented by  $x_{j+1} - x$ . Classifying the span into five intervals, in each of which the left endpoint's membership value should be within 0.6-1, among of which 0.1, as an indicator representing corresponding membership, divides every interval into ten parts, so that we can test the accuracy of membership percentage. For example, in the process of conducting fuzzy comprehensive evaluation of enterprise  $K$ , through the calculating the membership of a  $K$ 's indicator in the second class, we get the span is between 58 and 68 and this indicator is 61. Through the method introduced above we can get that the membership of this indicator in second class is 0.650.

Through the introduction above we can see that the way of building fuzzy relation matrix can accurately calculate

and the membership of an indicator in secondary class. And what's following is that we will, based on 14 production indicators in list below showing the degree of enterprise completing its upgrading indicators, build their fuzzy

relation matrix. And in this process, we have efficiently explored indicators of six classes and seven fuzzy relations. The datum is shown in Table 2. This paper just takes two of them as examples and does some studies.

TABLE II THE LIST OF ENTERPRISE'S UPGRADING INDICATORS

value	superfine	first grade	second grade	third grade	preparatory grade	out of grade
I	0.21	0.23	0.25	0.27	0.30	lower than value of preparatory grade
II	2.96	3.04	3.12	3.20	3.78	
III	0.54	0.72	0.83	0.90	0.99	
IV	600	540	480	420	365	
V	—	14	16	18	20	
VI	≥58	≥50	≥45	≥40	≥35	
VII	≥50	≥40	≥35	≥30	≥25	
VIII	≥35	≥30	≥25	≥20	≥15	
IX	≥80	≥75	≥70	≥65	≥60	
X	≥80	≥75	≥73	≥69	≥65	
XI	100	95	85	80	78	
XII	6.0	4.5	4.0	3.0	2.0	
XIII	131210	129911	128625	127351	124804	
XIV	20	15	10	5	0	

Through comprehensively evaluating  $M(\bullet, +)$  among five fuzzy comprehensive evaluation models, we can calculate the fuzzy operator  $M(\bullet, +)$  when . The fuzzy evaluating results of seven enterprises studied in this paper are below:

$$B1=(0.3759 \ 0.1148 \ 0 \ 0.0525 \ 0.04335 \ 0.068) \ \Sigma=0.65455$$

$$B2=(0.2047 \ 0.2282 \ 0.0839 \ 0.0469 \ 0.1356 \ 0.1356) \ \Sigma=0.7673$$

$$B3=(0.4391 \ 0.1904 \ 0.0525 \ 0.0427 \ 0 \ 0.021) \ \Sigma=0.7457$$

$$B4=(0.3451 \ 0.2736 \ 0 \ 0.049 \ 0 \ 0.125) \ \Sigma=0.793$$

$$B5=(0.1561 \ 0.3574 \ 0 \ 0.056 \ 0 \ 0.165) \ \Sigma=0.7345$$

$$B6=(0.26625 \ 0.2253 \ 0.0945 \ 0 \ 0 \ 0.1517) \ \Sigma=0.7431$$

$$B7=(0.3538 \ 0.2485 \ 0 \ 0 \ 0.0357 \ 0) \ \Sigma=0.6381$$

The datum above have shown that there is distinct difference in managing level between different enterprises, which can be more clearly reflected through building the fuzzy evaluating model, so that to reveal the problems existing in enterprise's management.

The result achieved when indicators in every grade lean to the right end are close to 0.5, so the evaluating results is not very distinct. By contrary, when they lean to the left end would be close to 1, which cause the abrupt rising or decreasing of enterprise's evaluating value, so the final value would have some deviation. This deviation can reach above 15%, which can affect negatively enterprise's evaluating indicators. So we study the normalizing of the evaluating results, shown below.

$$B1'=(0.574 \ 0.175 \ 0 \ 0.080 \ 0.066 \ 0.104)$$

$$B2'=(0.267 \ 0.297 \ 0.109 \ 0.061 \ 0.089 \ 0.177)$$

$$B3'=(0.589 \ 0.255 \ 0.070 \ 0.057)$$

$$B4'=(0.435 \ 0.345 \ 0 \ 0.062 \ 0 \ 0.158)$$

$$B5'=(0.213 \ 0.487 \ 0 \ 0.076 \ 0 \ 0.225)$$

$$B6'=(0.358 \ 0.303 \ 0.127 \ 0 \ 0 \ 0.211)$$

$$B7'=(0.555 \ 0.389 \ 0 \ 0 \ 0.056 \ 0)$$

#### IV. CONCLUSION

At present, cross-boundaries HRM practices have emerged in large numbers of enterprise, which is much more important for HR managers to balance the different demands coming from stakeholders inside and outside enterprise. It is valuable to exploring the new HRM functional roles from the perspective of beyond organizational boundaries. Many researchers have explored the HRM roles transformation mechanism with dynamic analysis methods, however, most researches still focus on how to change HR managers' behavioral pattern to meet up with roles expectation. By evaluating production quota of an enterprise, it can make a scientific comparison in human resource management level between different corporations. The evaluation model, as the result of applying SSH fuzzy mathematics method, can reflect the fuzzy relations between production quotas clearly through relation matrix, making evaluation index analysis more comprehensive. Corporate social responsibility as a human resources management of the antecedent, improve human resources management efficiency, the functions of the human resource management as an important functional departments to fulfill social responsibility to employees, to corporate social responsibility into the practice of human resource management, human resource management has more legitimacy foundation, thus is advantageous to the human resources management and corporate social responsibility to improve organizational performance. The test result shows that the performance of human resource management system can be improved by using SSH fuzzy framework.

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