Human Resource Allocation Management Based on Network Data Quality

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Abstract. With the arrival of large data age, there are more and more data generated in the development process of enterprises, which promoted the application of the human resource distribution management system in the enterprise development process. However, in the actual operation of enterprises, there are still many problems in the quality of network data in human resource allocation management. This paper studies the problems of network data quality in the human resource allocation management system and puts forward the corresponding solutions. Besides, an experiment was carried out which showed that the improved human resource system could greatly enhance the quality of network data, so as to optimize the allocation and management of human resources and improve the competitiveness of enterprises.

Keywords: human resource management, information data management, network data quality

1 Introduction

As information technology is constantly improving with the development of society, competition between enterprises has begun to become increasingly fierce. Human resource allocation management is an important part of enterprise development. Information-based human resource allocation management can provide convenient and efficient information for enterprise managers and improve overall work efficiency. Informatization has been more and more widely used in human resource allocation management. Barzoki et al. [1] demonstrated the feasibility of implementing human resource information management through experiments with Cronbach's alpha method. Yu [2] used the case analysis method to review and study the impact of human resources management information system on human resource management and found that the human resource management system not only introduced some important theories in other fields, but also promoted the globalization of human resource management, accelerated role transfer and changed the way of thinking and behavioral pattern of human resource management. In order to strengthen the construction of human resources informatization, Ben et al. [3] designed a human resources management information system which could effectively enhance the information coverage and improve the internal and external information support ability of human resources business. Jie [4] deeply studied and analyzed Struts2, Spring and Hibernate, summarized the advantages and methods of Struts2, Spring and Hibernate integrated technology framework, and determined the overall structure of system construction to strengthen the the network data management ability and security of the human resource system. Li [5] analyzed the theory and knowledge base of enterprise human resource management system, expressed the functional requirements of human resource Web application framework, and described the design and implementation of application development environment and core technology at all levels. However, from the perspective of current practical application, there are some inconsistencies and incompleteness of data in human resource information management, which can seriously affect the work efficiency and decision-making reliability of enterprises. Therefore, this study focused on the quality of network data, analyzed the data quality existing in the current human resource allocation management, and put forward corresponding solutions. The human resource allocation

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management system of an enterprise in Hunan was taken as an example to carry out the experiment, which proved the effectiveness of the method. This study provides some references for how to improve the quality of network data, optimize the management of human resources allocation and improve the competitiveness of enterprises and is conducive to the further development of human resources information management.

2 Human Resource Allocation Management

2.1 Human Resource Management and Informatization

Human resource management refers to the general term for a series of activities applied to realize the allocation of human resources inside and outside an enterprise through recruitment, training and other means under the guidance of economics and humanistic thought in order to meet the development needs of the enterprise and realize the common development of the enterprise and individuals [6].

2.2 Importance of Network Data Quality

Information management center. Network data (Table 1) can help to realize the informatization of the allocation of human resources between departments of an enterprise. Centralized management and control of information allows departments to browse real-time staff and department information [7]. Through the establishment of information standards between departments and employees, enterprises can reduce the cost of information sharing, and enhance the security of shared information, which greatly improves human resource distribution management efficiency as well as information application and service quality, enables human resource management to create more values and improves the competitiveness of enterprises.

Table 1. Network data in human resource allocation management

Data form	Main data indicator	Network data type
Basic data	Age, education, professional skills, current duties	Structured data
Capacity data	Ability assessment data, training ability, skills competition award	Semi-structured and unstructured data
Efficiency data	Work efficiency, task completion time, task failure rate	Structured and semi-structured data
Potential data	Upgrading frequency of professional titles, operational capacity improvement, income growth	Structured and semi-structured data

Process management center. The human resources distribution management information system manages the enterprise behavior with the network data of recruitment, employment, training and scheduling of staffs [8]. The network data of the system can accurately manage the whole process of human resource scheduling in the enterprise. The system is also able to combine the head office with its subsidiaries to facilitate a comprehensive understanding of the company's human resources allocation management so that the management layer can make the right decisions quickly. For example, the system can help the finance department to pay salaries more efficiently and assist staff scheduling as well.

Standard management center. The system can achieve the standardization of enterprises and employee coding and is the only source of business-related data [9]. The scientific standard information established based on the system connects each business and realizes integration management and data processing between departments, which enables the management layer to achieve unified management of subordinate departments. Data information standardization is an important part of information management [10].

Report management center. The system can automatically generate the corresponding data report, and develop a custom report according to the relevant content, with which human resources allocation management activities and statistical tables used in the statistical process can be inquired. The system can also reasonably analyze the personnel scheduling problem, carry out scientific salary management, personnel management and organization management and develop the corresponding indicators. Meanwhile, it can carry out accurate analysis according to different time, place and organizations and present the analytical results in forms so that the management staff can make prompt and comprehensive

decisions on human resource allocation and management. Through the use of network data and information collection, collation and distribution, it enables the managers to effectively carry out enterprise human resource management decision-making.

3 Human Resource Allocation Management System

The human resource allocation management system refers to an information system applied by an enterprise to collect and deal with the internal human resources network data, which can digitalize the workflow such as staff management approach and performance appraisal system and facilitate the allocation and management of human resources [11]. The network data generated by the system can meet the needs of enterprises in the allocation and management of human resources and allows business executives and employees to participate in the allocation and management of human resources. The network data of the human resources distribution management information system is mainly used in recruitment, staff training, job management, staff reward and punishment management, etc. In the actual operation of enterprise human resource management, the system's network data plays a huge role.

3.1 Module Design of Human Resource Allocation Management System
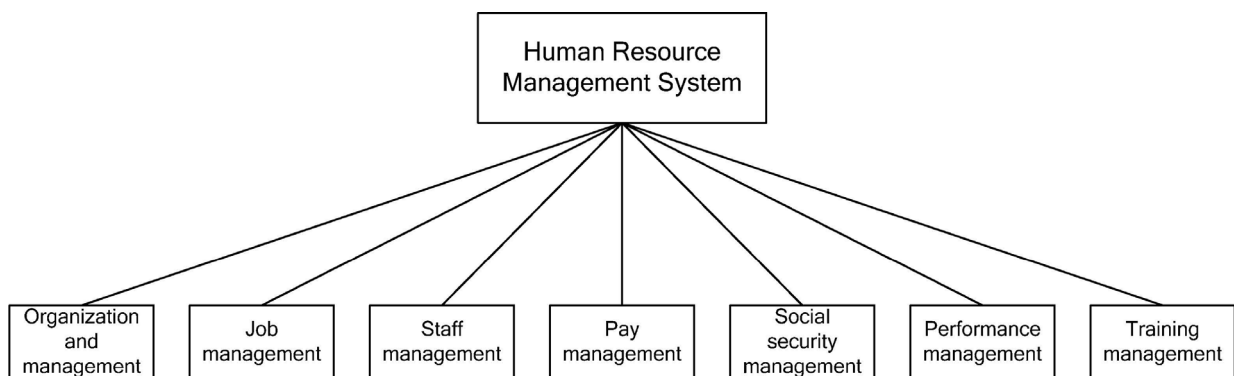
There are 7 modules in the system (Fig. 1), as follows:

Fig. 1. Human resource allocation management system architecture

Organization management. Organizational management is the skeleton of the system and the organizational structure of the enterprise to build the correct development strategy. The system can run normally only when the system structure, position and job system are well built.
Position management. Position management can provide enterprises with a complete job system management program and information about employee position transfer in the enterprise.
Staff management. Staff management is mainly responsible for providing users with different levels of basic information management and personnel transactions and complete staff data and recording the change data for each business.
Salary management. salary management mainly refers to the construction of salary system and performance encouragement system which conform to the positions to realize effective encouragement to employees and economic labor cost.
Social insurance management. with the system, the social security amount of the insured units and insured employees is recorded to achieve social insurance management of staffs.
Performance management. Performance management is an effective evaluation method for the contribution of employees. The performance management system can affect the employee's sense of belonging and satisfaction to the enterprise, thus affecting the competitiveness of the enterprise.
Training management. Training management can improve the quality of staff and inspire their potential. The system provides a curriculum-based training system to realize comprehensive staff training management.

3.2　Database Design

The database is mainly responsible for collecting the information of employees and enterprises, which will directly affect the system application efficiency. The design of the database mainly includes: employee information table, department information table, resume information table, attendance information table, evaluation information table, salary information table and staff capacity information table.

(1) The staff information table is mainly responsible for the collection and storage of basic data of employees, including employee number, name, gender, ID number, educational information, etc.

(2) The department information table is mainly responsible for the collection and storage of employee department information, including department number, department name, department type, company name, etc.

(3) The resume information table is mainly responsible for the collection and storage of staff job resumes, including staff number, work start and end time, position, etc.

(4) The attendance information table is mainly responsible for the collection and storage of staff attendance information, including attendance month, attendance days, leave days, etc.

(5) The evaluation information table is mainly responsible for the collection and storage of staff evaluation information, including month, performance results, evaluation level, bonus coefficient, etc.

(6) The salary information table is mainly responsible for the collection and storage of staff salary information, including salary month, employee number, basic salary, bonus, etc.

(7) The staff capacity information table is mainly responsible for the collection and storage of staff capacity information, including employee number, skill level, career interest, etc.

By collecting and storing the above information, the allocation and management of human resources can be realized.

3.3　System Security Design

Permission control. The security design of the system mainly includes landing security and employee rights security. Firstly, the login account and password are set up on the user login page to verify the legitimacy of the user's identity so as to judge user rights. If the user's identity is legal, the user enters the system. In addition, according to the judged user rights, corresponding content will be displayed. The relevant operational flow chart is shown in Fig. 2.
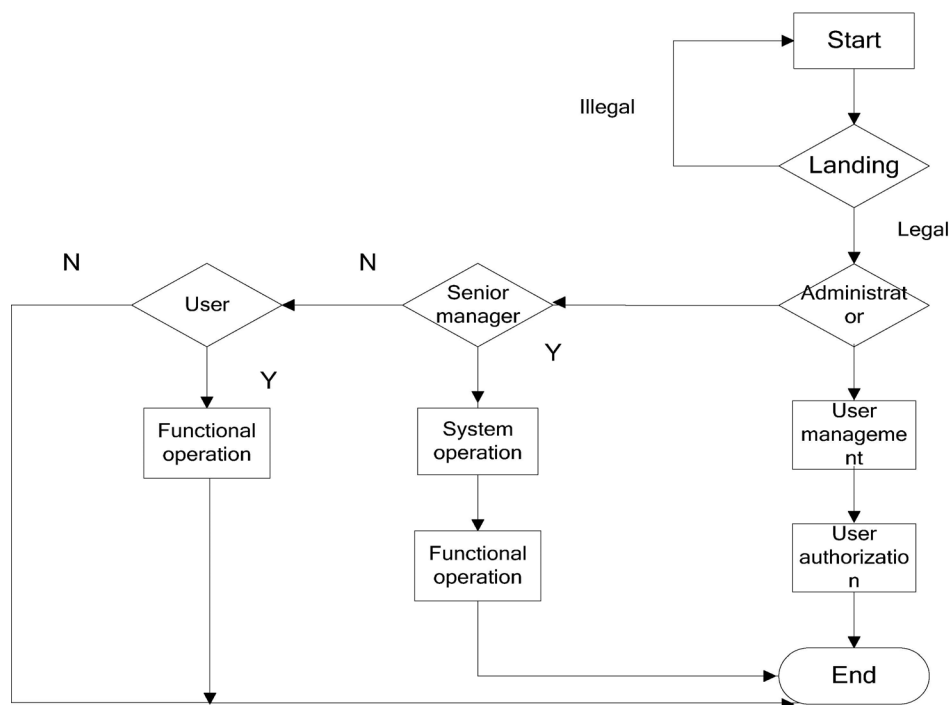

Fig. 2. User management process

Network data security.

(1) Strict authorized operation. Personnel using the system must operate in strict accordance with the authorization. The system administrator must carry out security authorization for each employee strictly in accordance with the superior management system. The system staff needs to follow their own authority to operate and can not use third-party software for malicious operation of the system.

(2) Strict user access. System administrators need to actively control the access threshold for employees and approve the new employees. When it comes to network data security, it is necessary to obtain authorization from the higher level leader and the head of the human resources system.

(3) Strengthening of employee awareness of confidentiality. During the system operation, data security information for each employee should be strengthened and the employee's operating habits are regulated, with information security training provided for them. A practical system should be established to ensure network data security of the system during each operation of the employees.

4 Analysis and Solution of Network Data Quality Problems

4.1 Analysis of Network Data Quality Problems

(1) As employees do not pay enough attention to the entry of information and various departments of the enterprise put different emphasis on information material, there is the phenomenon of missing information in the information system.

(2) In the allocation and management of human resources, incorrect operation of employees can lead to inaccurate network data.

(3) In many enterprises, employees have no access to the human resource allocation and management system and thus cannot participate in the maintenance and updating of the system, which leads to the failure of prompt updating of human resource information.

(4) The logical problem of data information [12] is common in the system due to the different sources of information. Since different departments collect information independently, data contradiction problems are easily found in data summarization.

4.2 Solutions to Network Data Quality Problems

Improve emphasis on the system, realize decentralized maintenance of system data. Human resources allocation management system is a comprehensive information management system [13] with functions of human resource management assessment and personnel dispatch coordination. In order to improve the quality of network data, we must follow the principle of "whoever uses the data is responsible for maintaining the data" for information maintenance. Meanwhile, with employee right set up, the network data information is queried and used within the scope of permission and completeness and correctness of network data are ensured.

Full staff participation in network data management. Full staff participation in network data management can meet the needs of human resource allocation management business, make the human resources management system more close to the enterprise's human resources distribution management system, speed up the update of network data and avoid data mismatch.

Classification application of network data. Encourage the staff to participate in human resource allocation management to increase the enthusiasm of employees. Make the enterprise decision-making level obtain the network data of enterprise human resource through the system and complete human resource allocation management. Through the system, the management layer can complete the corresponding human resources management and optimize the efficiency of enterprise human resource management. In addition, employees can independently query the company's human resources policy through the system, which enhances employee motivation, thereby improving the quality of network data.

Strengthen assessment, ensure system application effect. Enterprises should take network data quality maintenance as one of the human resources assessment indicators for staff, develop appropriate assessment criteria and include data quality improvement to conventional work. Combined with the supervision and evaluation, with standardized processes and compliance operations, the enterprise network data quality management level can be further enhanced.

5   Actual Application of Human Resources Allocation Management System

After improving the quality of the network data of the human resources management system, the system is applied to the human resource management of an enterprise in Hunan. Taking the company's network recruitment as an example, whether the system can improve the efficiency of the enterprise is detected.

5.1   The Recruitment Situation of the Enterprise

The main recruitment channel for the enterprise is recruitment websites. When the enterprise needs to recruit new employees, it will release job information on several large recruitment sites. After job seekers post their job-seeking information, the human resource department selects the information and then informs the qualified candidates for an interview. Then, the candidates who passed the interview will take a professional ability test, from which the successors will be chosen to enter the re-test. Such recruitment process often takes at least half a month. Sometimes, due to the unconformity of the applicant resume and the actual situation or other reasons, the enterprise cannot find its wanted staff timely, which causes a lot of waste of manpower and resources.

5.2   Improvement of the Recruitment System of the Enterprise

A corresponding social network recruitment platform should be established, which can provide communication space for employees and allows the employers to provide enterprise information for job hunters. Through the use of their own recruitment platform for recruitment, companies can improve the degree of matching with the candidates, greatly improving the efficiency of recruitment. Candidates can have access to the company information through the platform, which effectively reduces the quit rate after their entry.
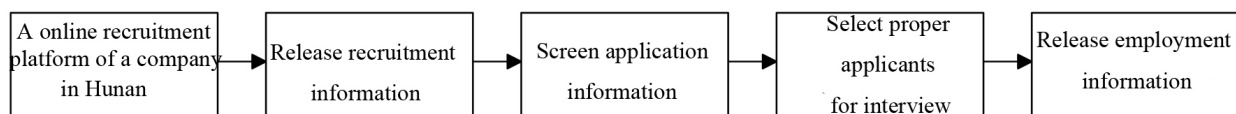

Fig. 3. Recruitment improvement map of the enterprise

After applying the system to the recruitment process, we can see the role of network data in the system. When the recruitment information is published, the network data is collected; when the application information is selected, the processing and integration of the network data are carried out; choosing the right person for an interview is an analysis of the network data while announcement of the results of the recruitment is an explanation of the network data. Therefore, the quality of network data plays an important role in human resource management.

5.3   Selection of Right Candidates

In the recruitment system, the most important thing is to choose the right candidates. An assessment of the candidates should be conducted after the completion of the initial screening, which is a process of network data analysis that can help enterprises screen right staffs. This study analyzes the candidates with three steps.

Build a competency model. This study assesses the applicants form nine aspects, which are professional background, professional impact, friends match, personality, career orientation, workplace, job demand, trust relationship and behavior pattern, with which a competency model [14] is established. After the establishment of the model, the nine indicators are divided into evaluation subitems to assess the candidates. For example, the evaluation subitems of professional background are number of years of work and job level. According to this, the remaining evaluation subitems are listed and scored to intuitively show whether a candidate is suitable for the enterprise.

Establishment of job weight coefficient matrix. After the division of assessment content, a competency weight coefficient matrix should be established according to the different impact of each evaluation

subitem on competency to ensure the correctness of the recruitment data. The weight coefficient K_{nm} is shown in Table 2.

Table 2. Weight coefficient table

K_{nm}	m=1	m=2	m=3
n=1	0.03	0.02	0.02
n=2	0.04	0.02	0.01
n=3	0.01	0.02	0.01
n=4	0.03	0.01	0.03
n=5	0.04	0.04	0.05
n=6	0.05	0.03	0.05
n=7	0.03	0.03	0.03
n=8	0.02	0.02	0.02
n=9	0.02	0.04	0.04

Calculation of competency score. According to the weight coefficient of the job, the competency score of each candidate can be calculated according to the following equation:

$$HQ_n = \sum_{nm} K_{nm} \tag{1}$$

5.4 Comparison Before and After Improvement

Talent management. Firstly, the recruitment system designed in this study was used for the calculation of the competency score of four interviewees. Scores of the four interviewees are shown in Table 3.

Table 3. Scores

Content	Interviewee A	Interviewee B	Interviewee C	Interviewee D
Professional background	0.22	0.18	0.21	0.21
Professional influence	0.21	0.18	0.22	0.12
Friend matching	0.08	0.05	0.05	0.06
Personality	0.14	0.12	0.18	0.11
Vocational tendency	5.97	5.13	5.64	5.27
Workplace	0.32	0.18	0.26	0.18
Job requirement	0.21	0.19	0.18	0.16
Trust relationship	0.61	0.12	0.41	0.51
Behavioral pattern	5.27	3.27	4.32	4.17
Total score	13.03	9.42	11.47	10.79

It can be seen from Table 3 that the score of interviewee A was the highest, followed by C, D and B, indicating that interviewee A met the recruitment requirement best. To further verify the effectiveness of the system, the four interviewees were employed at the same time and followed up. The three-month follow up suggested that the performance of the four employees conformed to their scores, employee A had excellent performance, and employee D and B have left, indicating that the system was reliable.
Recruitment condition. To further analyze the effectiveness of the system, the information of the employees who were employed three months before the improvement of the system and the information of the employees who were employed three months after the improvement were collected, and the results are shown in Table 4.

Table 4. Comparison of recruitment before and after improvement

Period	Number of interviewees	Number of employees	Number of employees who left within three months
Three month before improvement	31	11	4
Three month after improvement	35	21	0

As shown in Table 4, though the number of candidates did not increase after the recruitment system was improved, the number of entry increased significantly and the number of quit decreased, due to the recruitment platform established which greatly improved the matching degree of the applicants and the enterprise as well as the network data quality. Moreover, according to the weight coefficient, we found that the applicants with higher score performed better after the improvement.

6 Conclusion

Under the background of big data, the information distribution management of human resources is of great value. This study mainly focused on the problem of network data quality existing in the existing human resources distribution management system and put forward some solutions. Then, the recruitment system of an enterprise in Hunan was taken as an example, the system was improved, and the effectiveness of the method was proved through experiment. It is worth promotion and application in enterprises and is conducive to improving the human resources management level and enterprise working efficiency. But there are still some limitations in the research methods and contents. In the future work, this method will be further improved and demonstrated through more experiments.

Acknowledgements

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