Research Article

Human Resource Management of Energy Companies Based on Big Data Analysis

Peng Gui[1] and Min Zhang [2]

[1]*GongQing Institute of Science and Technology, Gongqingchengshi, Jiangxi 332020, China*
[2]*Dean's Office of Henan Polytechnic University, Henan Polytechnic University, Jiaozuo, Henan 454000, China*

Correspondence should be addressed to Min Zhang; hejunyi@hpu.edu.cn

Human resource management mode refers to a comprehensive summary of management objectives, processes, content, methods, and other elements. The more common two modes are control mode and commitment mode. The enterprise human resource management model has many different types. The generation pair promotes the development of enterprise human resource management from the traditional model to the platform model, processing complex data with the help of data-based technical means, and realizing the integration and sharing of resource data. This paper takes an energy company as an example to carry out a detailed study. The article takes the big data as the background and the company as the research object. From the perspective of human resource management, this paper tries to find out the performance management, compensation and benefits management, and other issues of the company in human resource management under the background of the big data era and puts forward corresponding solutions for the current problems. In particular, the company gave certain opinions on how to build a human resource management system in the context of the current big data era. By conducting field research on the company and issuing questionnaires, this paper finds out the current problems of the company in human resource management and proposes corresponding solutions for these problems.

1. Introduction

Big data and Internet information technology coexist, and the development of Internet information technology further promotes the application of big data in various industries. In the context of big data, the traditional human resource [1] performance management model has changed. Human resource performance management in the context of big data can use data analysis instead of relying solely on the subjective consciousness of human resource managers [2]. Performance management can effectively mobilize the enthusiasm of [3] employees and bring economic benefits to enterprises. However, there are many problems in [4] the implementation of traditional performance management. Therefore, in the context of big data, optimizing the mode of human [5] resource performance management is the key countermeasure to [6] conform to the social trend and promote the healthy development of the enterprise.

The term big data comes from "Big data" in English. It was first proposed in 2008, by renowned information processing experts Victor Mayer-Schonberger and Kenneth Cookyer. With the popularization of the Internet and the high-speed increase of end users, the amount of information in the online world continues to increase [7] geometrically. How users or search engines can effectively search for correct and effective [8] information in massive data has become an effective way to play in the new era. Traditional search engines usually provide users with corresponding data by means of commercial promotion or ranking based [9] on clicks, which cannot meet the needs of [10] users in the current environment [11]. At the same time, due to the involvement of commercial factors, the search scope is limited, and the searched information is difficult to be true

and [12] objective. Therefore, in the future development of the Internet [13], using reasonable big data analysis to enable users to obtain effective information will become the goal that experts strive to pursue.

Talent is the lifeblood of an enterprise [14] and it maintains the operation of the enterprise. With the development of society, the demand of enterprises for high-tech talents will increase. The quality of human resource management can even [15] determine the rise and fall of an enterprise. Enterprises should use big data technology to improve the quality of human resource management. Whether big data technology can be better integrated [16] with talent recruitment, training, and management system is an important test for enterprises. This paper takes S Energy Company as an example. On the one hand, it systematically points out the [17] existing problems in the company's human resource management. On the [18] other hands, it designs a plan for how S Energy Company can effectively apply big data to human resource management. At the same time [19], the human resource management level of S Energy Company provides a certain reference for other energy companies.

2. Research Objects and Methods

S Energy Company is located in the Economic Development Zone of X City, Shanxi Province. It is a comprehensive energy enterprise with coal production, processing, sales, and power generation as its main business. In the early days of establishment, through overall planning and step-by-step implementation, it was found that 1.011 billion tons of coal could be mined in the company's three wells with a total area of $169.11 \, \text{km}^2$, accounting for 66% of the total reserves. In this way, after the establishment of the supporting coal preparation plant, the output of more than one million tons can be formed and sold to the whole country. This paper surveys nearly 3,000 employees of the company by means of a questionnaire survey and analyzes the results. We surveyed 3000 employees and received around 2950 feedbacks.

2.1. Reliability Analysis.
The Cronbach coefficient is the most used reliability measure, and its calculation formula is as follows:

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum S_i^2}{S_x^2}\right), \qquad (1)$$

α is the reliability coefficient, K is the number of test items, S_i is the variance of the scores of all subjects on item i, and S_x is the variance of the total scores obtained by all subjects.

This paper uses the SPSS to test the reliability of all data. The experimental results show that the reliability coefficient of this questionnaire is 0.81, which is greater than 0.8, indicating that the questionnaire method used in this paper has good reliability.

2.2. Statistical Analysis.
The formula used for statistical analysis is as follows:

$$p = \frac{m_i}{n}, \qquad (2)$$

p_i is the th proportion, m_i is the number of people who answered the ith answer, and n is the sum of the total number of people who answered all the people.

3. Results and Discussion

3.1. Problems in Human Resource Management of S Energy Company

3.1.1. Human Resource Planning Issues.
From Figure 1, only 9% of the human resource managers believe that big data has a great impact on the company's human resource management, and 25% of the respondents believe that big data have a relatively large impact on human resource management. 38% of respondents believe that big data have an average impact on human resource management, and 28% of respondents believe that big data have no impact on human resource management. It can be seen from this that the company's human resource managers and corresponding employees have not yet formed a more mature big data awareness. They believe that the current big data technology has not had much impact on the field of human resource management. But we all know that in order to better apply big data technology to the company's human resource management, human resource management personnel must have large data awareness. Only when most of the internal managers of the enterprise are in a leading position in the formation of data awareness can ordinary employees be better influenced, thereby promoting the formation of data awareness among employees of the entire enterprise.

From Figure 2, we can see that 78% of the interviewed employees of the company say that the company should establish a big data platform for human resource management, and 20% of the interviewed employees say that the company's human resource management does not need the support of the big data platform. The company's employees' demand for a big data platform is in contradiction with the company's lack of a big data platform for human resource management.

3.1.2. HR Recruitment Issues.
From Figure 3, we can see that 35% of the company's talent recruitment is still using campus recruitment, 40% of the talent recruitment comes from social on-site recruitment, and 9% of the talent recruitment comes from headhunting. The proportion of offline recruitment is still as high as 84%, while the current company's online recruitment only accounts for 12%. At present, companies mainly use offline recruitment methods in talent recruitment and use less online recruitment methods, which is inconsistent with the current change in talent recruitment methods in China under the background of big data. Since the company still adopts more traditional recruitment methods in talent recruitment, it has a strong subjectivity in the process of talent recruitment. In the initial test, HR conducts preliminary interviews with candidates. However, HR is not very clear about the job requirements, which will also lead to the loss of some available talents in the
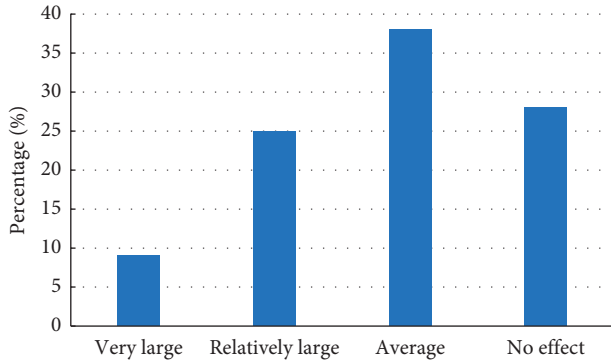
Figure 1: Views of stakeholders on the importance of applying big data to human resource management.
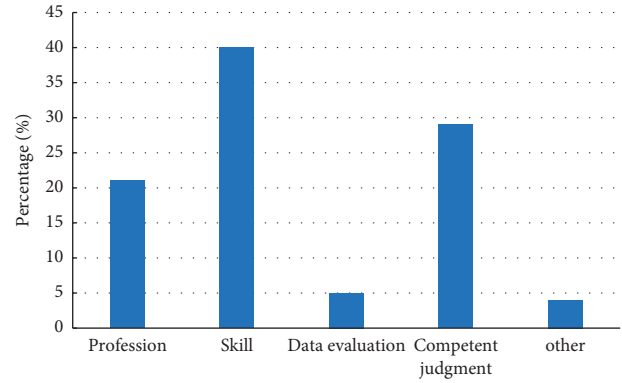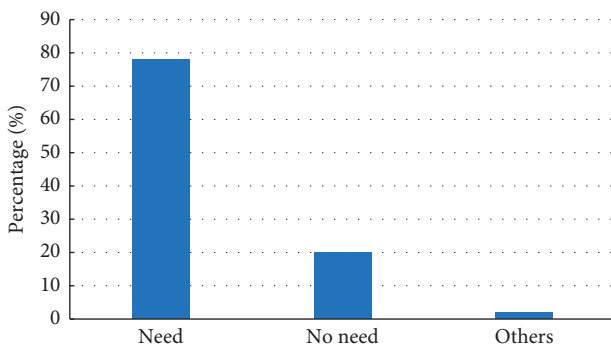

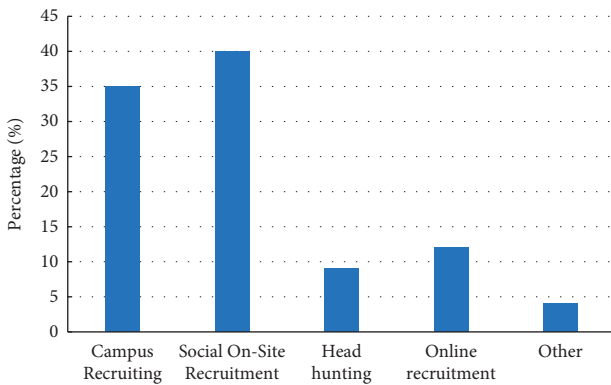Figure 2: Whether companies should build a big data platform for human resource management.

Figure 3: Analysis of the company's talent recruitment channels.

process. In the reexamination stage, the department leaders conduct interviews with the interviewers. Since this interview is only conducted verbally, the professional skills of the interviewers cannot be well displayed, which will cause those who are good at speaking but have no real skills to mix in. The company has not recruited any real available talents.

3.1.3. The Problem of Human Resource Allocation.
From Figure 4, we can see that at present, the company's talent allocation is mainly based on the skills of the employees themselves, accounting for 40%. However, we can also notice that the proportion of talent allocation based on the

Figure 4: The company's talent allocation.

subjective judgment of department leaders is also relatively high, at 29%. In addition, 21% of employees are allocated talents based on their majors, while only 4% are allocated based on employees' career data assessments. It can be seen from this that the company still has strong subjectivity in talent allocation, and the data evaluation and application technology of talent allocation are relatively weak.

3.1.4. Human Resource Training and Development Issues.
From Figure 5, we can see that when the company formulates the company's training plan, 80% of the plans are formulated according to the arrangement of the relevant departments of the company, 10% are formulated according to the wishes of the company's employees, and only 5% are formulated based on the analysis of the employee's work data. It can be seen from this that the company does not actually understand the real needs of the employees when formulating the training plan for the company employees but only trains the employees from the company level, which makes the company's training plan not really recognized by the employees. The human resources department's analysis of training needs is not in place.

3.1.5. Human Resource Performance Management Issues.
From Figure 6, we can see that when a company formulates the performance plan, 44% of the companies take the their business goals as the basis for the performance plan, and 38% rely on the managers' own experience and intuition. Only 15% of management objectives are used as the basis for performance planning. It can be seen from this that there is still a certain deviation and gap between the performance plan and the company's strategic goals when the company is formulating performance plans, which makes the formulation of performance plans lack the support of data in the context of big data. A performance plan; that is, inconsistent with the strategic goal will hinder the realization of the strategic development of the enterprise.

From Figure 7, we can see that when the company evaluates employees, 32% comes from mutual evaluation among employees, 40% comes from the evaluation of superiors to subordinates, 20% comes from self-evaluation of employees, and only 5% comes from employees' daily work.
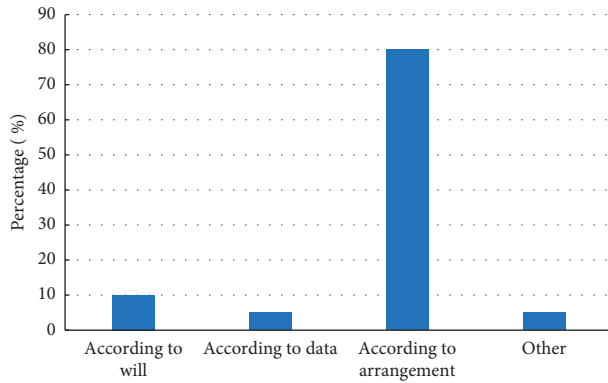
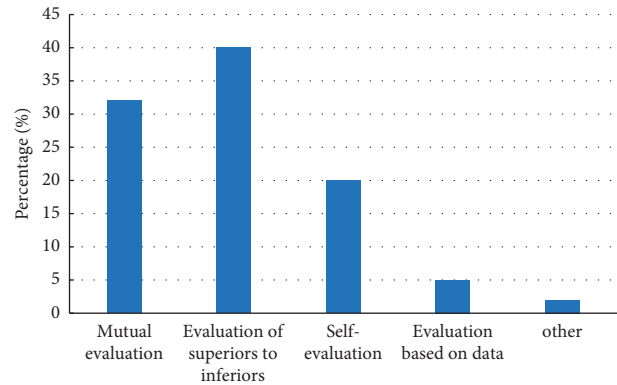FIGURE 5: The basis for companies to develop training programs.

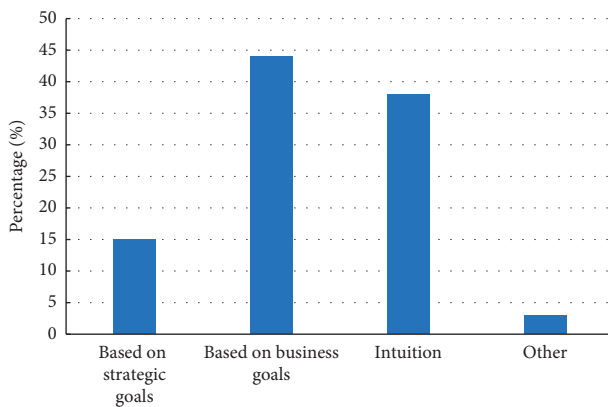FIGURE 7: Analysis of the form of company performance appraisal.

FIGURE 6: The basis for companies to develop performance plans.
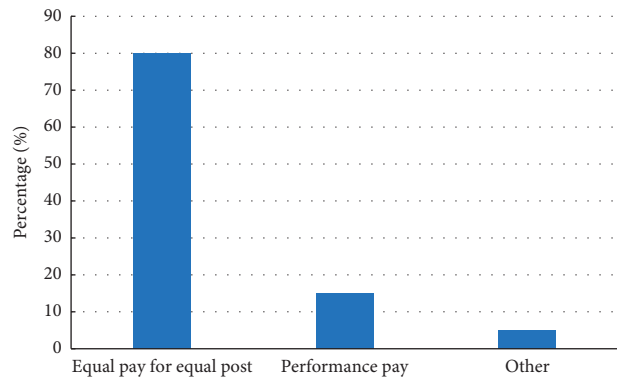

FIGURE 8: The company's salary distribution management.

It can be seen from this that the company still has a lot of subjectivity in the performance appraisal of employees, and the performance appraisal lacks the support of data. For example, in the mutual evaluation among employees, it is very likely that the two employees will give each other favorable comments because of the good relationship between them, or they may give each other negative comments because of some nonwork conflicts between two employees, which wipes out the employees themselves. Due performance is not conducive to the company's more objective performance management of employees.

3.1.6. Human Resources Compensation and Benefits Management Issues. From Figure 8, we can see that 80% of S Energy Company adopts the management system of equal pay for the same position, and only 15% adopt the performance-based salary management system. It can be seen from this, that at present, when the company conducts salary management for employees, it is mainly managed through equal pay for the same position, and the proportion of salary distribution by employee performance is relatively small. However, in the same position, different people can play different values in the same position. If the same position is given the same salary, it will cause those with high ability to be reluctant to give full play to their talents. Reducing their enthusiasm for work is not conducive to the long-term development of the company.

3.2. The Strategy of Enterprise Human Resource Management Mode in the Era of Big Data. In order to solve the above problems in the company's human resource management, we need to design a human resource management system and make a reasonable plan through in-depth research on big data.

3.2.1. Forming Awareness of Big Data. Promoting the company's employees to form big data awareness is an important step in the company's current big data development. Only when the internal employees of the company have formed a strong sense of data, can they consciously analyze the data during data collection rather than perfunctory. This requires the company to strengthen the training of the company's internal employees' big data awareness in their usual work, mainly through the following two aspects: first, the company needs to invite external well-known big data lecturers to train the company's employees, mainly to train employees big data awareness, tell them the importance of applying big data to their daily work and how to apply big data at work to better handle their work. The second is to carry out a big data seminar within the company to bring together employees from relevant departments so that everyone can discuss examples of applying big data to specific work in their own work and give material rewards to those who have a better application, which can cultivate employees' big data awareness through two ways of combining internal and external.

3.2.2. Build a Big Data Information Platform. At present, in the process of company development, human resource management can generate a large amount of data, such as external industry salary data, internal labor cost data, talent market supply and demand information, salary and welfare data, performance appraisal, as well as management data, and employee demand analysis. Therefore, in order to let the company's managers get out of the complex data, it is necessary to build a huge data information platform in accordance with the principle of unified planning and step-by-step and place the company's internal information on the data platform, so as to better solve problems in the company's human resource management process. The specific methods and steps are as follows.

(a) *Do a Good Job oF Planning in the Early Stage of Platform Construction.* S Energy Company has a certain information foundation and uses many information management systems in the management of the enterprise, but there is no corresponding information management system in human resource management, which leads to the human resource management system used by the company and its business segments. The system cannot achieve effective docking, resulting in combined data, which cannot be transmitted and shared in real-time. Therefore, S Energy Company should step up the construction of the big data platform at the moment to realize its operability of the big data platform. At the same time, with the growth of S energy's data, the company also has a long-term plan for the infrastructure of the data center to ensure that the data information on the big data platform can be effectively used to achieve the goal of the human resource management data center, as shown in Figure 9.

Therefore, the platform planning must be fully considered, and the design is reasonable. On the other hand, the economic aspects of platform construction should also be considered. Specifically, S Energy Company should make a scientific and reasonable estimate of the company's data volume in the next 3–5 years according to the company's current development. The actual development of the situation to do specific optimization.

(b) *Three Levels of Building a Big Data Platform.* At present, the construction of the company's big data platform can be constructed in accordance with the "3 + 1" model; that is, in the order of collection and storage platforms, mining and analysis platforms, processing and decision-making platforms, and data security platforms covering the world, which can be shown in Figure 10 below.

The main task of the collection and storage platform is to collect and store the company's big data. The ultimate purpose of the mining and analysis platform is to analyze the big data information collected by the enterprise and mine the company's data to realize the development of the company's big data. The decision-
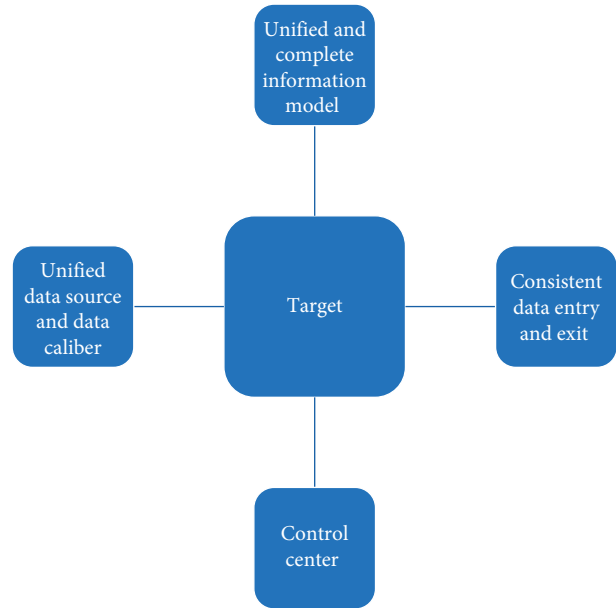

FIGURE 9: S Energy Company human resources and big data center construction goals.
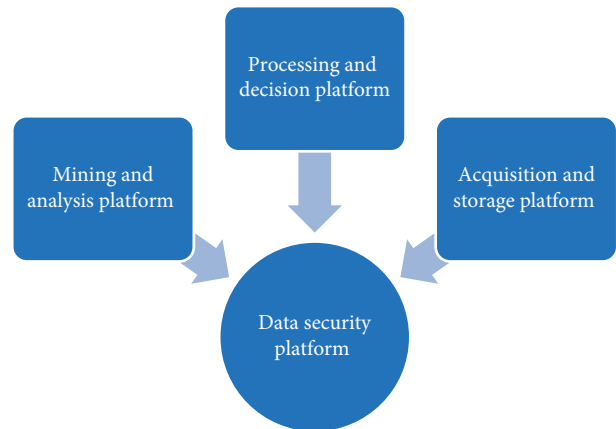

FIGURE 10: Three levels of big data for human resource management in companies.

making platform mainly uses the analysis results of big data to give a certain reference to the company's decision-making and adopts corresponding policies according to the corresponding data display. The main purpose of the data security platform is to ensure the security of data within the company. Only by ensuring the security of the company's data we can ensure that the company's assets are not infringed and can promote the development of the company's big data. Companies do not have their own big data analysis and mining platforms, so they can rent third-party professional tools. However, they must have the corresponding processing, decision-making, and action capabilities. At the same time, the company must also have its own data platform to store data within the company and ensure the company's ownership of the data. Based on making full use of the enterprise's

big data platform, the human resources department only needs to extract key data from the information system and analyze the corresponding data according to its own the work efficiency of the company's human resources management and can make the company's human resource management more scientific.

3.2.3. Improving the Basic Management Level of Big Data Applications.
For the application of S Energy's big data, the most critical step is to build a good big data platform, to realize the structured collection, storage, processing, analysis, and application of the company's data, and enrich the company's data resources. After the company's data are mined, the next most critical link in the maintenance of this data. At present, there are not many big data talents in the company, so the management of big data is still relatively lacking. Only by maintaining data management and supervising various processes of data processing can personnel meet the needs of human resource management in the big data environment.

In the future, S company should actively cultivate the company's big data talents and realize the overall security of the company's database through the establishment and management of enterprise database security by big data talents.

4. Conclusion

(1) At present, S Energy Company does not use big data enough in human resource management, and there are many problems. First, in terms of big data awareness, the company's human resource managers and company leaders have not formed a big data management awareness; second, there is no professional data system in talent recruitment, and talent recruitment has strong subjectivity; third, in terms of talent allocation, due to the lack of data evaluation of talents, the company's talent allocation needs do not match the company's development strategy; fourth, in terms of talent resource training and development, the content of talent training is inconsistent with talent needs; fifth, there was no data evaluation in human resources performance management, and there was a strong subjectivity; and sixth, in terms of human resources compensation and welfare management, both compensation and welfare management lacked data support.

(2) Under the background of big data, S company can build a big data platform for human resources and a data-based management system to realize scientific human resource management and solve the existing problems. In this system, the company can effectively carry out talent resource planning, use the big data platform for talent screening, use the data model for talent allocation, use data analysis to mine employee training needs, and use the company's internal data for effective performance management.

Data Availability

The data used to support the findings of this study are included in the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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