A Three-Dimensional Performance Evaluation Model Based On Grey Fuzzy Iterative Algorithm

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Abstract. With the increasing number of enterprises, the importance of performance evaluation has been gradually highlighted. Accurate performance evaluation is the basis for the serious work of enterprise personnel. However, there are still some problems in performance evaluation nowadays, which affect the accuracy of performance evaluation. In order to improve the accuracy of performance evaluation by using grey fuzzy iterative algorithm, this paper tests the improvement degree of performance accuracy after using grey fuzzy iterative algorithm through experiments, the highest is 17%, and the lowest is 11%, which indicates that grey fuzzy iterative algorithm does have the effect of improving the accuracy of performance.

Keywords: Performance Stereo Evaluation, Gray Fuzzy, Iterative Algorithm, Model Research

1. Introduction

With the development of The Times, enterprises gradually attach importance to performance, and always judge the performance of an employee or the whole enterprise through performance. Therefore, the evaluation of performance is very important. Only when the evaluation of performance is accurate, can the performance of employees and the enterprise be accurately judged.

Many scholars have studied performance appraisal. Murphy K R believes that when a wide range of performance appraisal systems are used in organizations, almost all of them fail [1]. Tieland M believes that work influence, namely home office working environment and job insecurity do affect employees' performance, but to different degrees. However, the direction and strength of this influence may vary depending on the performance indicators and job implications analyzed [2]. Jia H believed that through coordination based on the principle of performance-based aid distribution, performance would be defined as the result adjusted according to the influence of environmental factors [3]. Although performance evaluation is widely used, there are still some problems.

Nowadays, grey fuzzy iterative algorithm is used more and more in performance evaluation, and the accuracy of performance evaluation is very important. In this

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paper, the three-dimensional performance evaluation model based on grey fuzzy iterative algorithm is studied, and the improvement degree of performance accuracy after using grey fuzzy iterative algorithm is tested through experiments. It can be seen from the experimental data that the grey fuzzy iterative algorithm does have the effect of improving the accuracy of performance evaluation.

2. Research on Three-dimensional Performance Evaluation Model based on Grey Fuzzy Iterative Algorithm

2.1 Factors Affecting Enterprise Performance

Performance, usually refers to the company's performance, efficiency and so on. From the management level, it refers to the achievement of an organization at all levels to achieve certain goals. Company performance refers to the company's operating efficiency and the performance of its manager[4-5]. The most important factor to measure a company's value is its performance, which is the ultimate goal of the company's operation. The better the company performs, the better the company operates.

The factors that affect corporate performance mainly include: technical factor, incentive factor, environmental factor and opportunity factor. Among these four elements, incentive is the most important one. Motivation factor is the most active factor in an enterprise. When the enthusiasm of employees in an enterprise is improved, the business performance of the enterprise will be improved [6-7]. However, the influence of these factors on the company is not fixed, but changes with the change of the internal system or external environment. In order to realize the sustainable development of the company, the company must constantly improve its performance to adapt to the change of the company's environment.

Among the factors affecting enterprise performance, enterprise performance evaluation refers to the objective, fair and accurate comprehensive evaluation of the operating benefits and operator performance of an enterprise during a certain period of operation through quantitative and qualitative comparative analysis based on mathematical statistics and operational research principles, specific index system, unified standards and certain procedures.

2.2 The influence of Managers on Corporate Performance

Manager succession is an important research subject in company management theory. It is found that manager resources have great influence on company performance. This paper focuses on the influence of senior executives and executive successors on the performance of central enterprise groups, and makes an in-depth analysis of its causes. Through the empirical analysis of the change of top executives in central enterprises, we find that: the change of top executives in central enterprises has a significant negative impact on short-term and long-term performance. In an enterprise, the source of board members has no significant impact on the business performance of the enterprise [8-9]. On this basis, it can also be found that: in the central enterprises, the

successor of the chairman of the board has no direct impact on the business performance of the central enterprises, but it has an indirect impact on the business performance of the central enterprises. If the general manager of the company is rotating, the higher the ratio of management reorganization, the lower the performance of the company. The salary performance sensitivity of rotating general manager is lower than that of domestic general manager. On this basis, the adjustment plan is as follows:

First of all, when the company is in good operating condition, the management promoted from within the company will have a positive impact on the development of the company; At the same time, Chinese enterprises have strong initiative and initiative in operation and management due to their own position and status. In sharp contrast, in enterprises, internally promoted chairmen tend to form a situation of "one's own words", and the deviation of the chairman's function will affect the full play of the general manager's function, and then have a certain impact on the overall business performance of state-owned enterprises [10-11].

Second, with the increase of the proportion of enterprise management restructuring, the instability of enterprise management will be further reduced, and the newly appointed general manager's status in the enterprise will be reduced, which will affect his performance in the enterprise, and then reduce the overall business performance of the enterprise. Frequent changes of managers are not conducive to the improvement of corporate performance. Based on the above analysis, it can be seen that in Chinese enterprises, how to choose appropriate succession mode is the key to improve the performance of Chinese enterprises, and in Chinese enterprises, the management should maintain relative stability and adopt appropriate job rotation mode in Chinese enterprises, so as to better play the advantages of Chinese enterprises [12-13].

2.3 Influence of Human Resources on Enterprise Performance

Human resource management mode has a great impact on enterprise performance. Different human resource management modes have different impacts on enterprises, and the level difference is also different.

(1) The growth period of the company. The development of the company is a long-term process, in each stage of the development of the company, its requirements for human resources are also different. Therefore, the company must formulate different human resource tasks according to the development stage of the company, and the support for human resources varies with different requirements [14-15]. Therefore, the company must reasonably adjust the management mode of human resources according to its actual situation and give full play to the role of human resources. Only in this way can it effectively promote the development of the company, choose the human resources management mode suitable for the growth and development stage of the company.

(2) Corporate business strategy. Both the short-term strategy and long-term strategy of an enterprise are the key points to choose the enterprise's human resource management mode. Strategic positioning determines the enterprise's talent demand

plan. Can better play the role of enterprise strategy, continuous formation of a driving force, to ensure that the performance of the enterprise can be completed quickly. Corporate positions of human resources are shown in Figure 1:

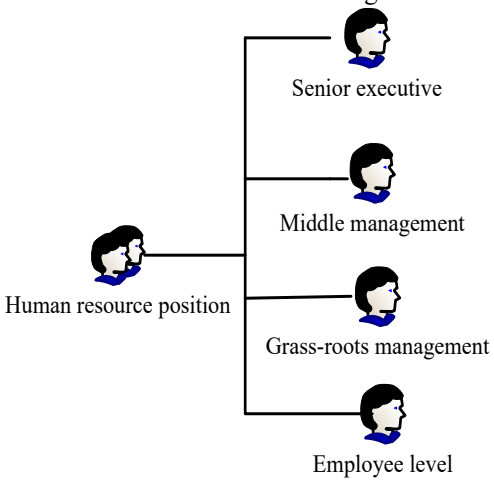

Fig.1 A corporate position in human resources

2.4 Strategies of Human Resources for Improving Enterprise Performance

Enterprises should pay enough attention to the construction of human resources, and use different modes to guarantee the healthy development of enterprises. Enterprises should choose a human resources mode suitable for their own development situation according to their own development situation, so as to ensure that the performance of enterprises can be rapidly improved.

Strengthen position management of employees: In the market, the enterprise is the main body, each position is closely related to its purpose to achieve, and whether each position can play an effective role will directly affect the development of the enterprise. There are two levels to grasp. One is to do a good job of scientific design for all positions, to ensure that positions and the actual operation of the enterprise match. Scientific post setting is an important guarantee for the development of enterprises, post setting should be based on the long-term and short-term strategic planning of enterprises, to do the job simplification and not miscellaneous, to carry out the standard design of each post, to refine the job responsibilities, to ensure that the post in the development of enterprises to play its due role. Second, the implementation of efficient post mobility, to ensure the all-round development of workers; If the enterprise wants to carry out the overall promotion of employees, it needs to do a good job exchange, so that the resources of the enterprise and the goals of employees can be effectively matched, to ensure the improvement of work efficiency. Therefore, enterprises need to have a comprehensive understanding of the situation of employees and do a good job of job rotation.

Strengthen the assessment of enterprise performance: in the process of human resources management, performance management is a very important part. The internal structure of performance should be designed scientifically to ensure that

performance management can better bring out performance. Performance management specifically includes planning, implementation, evaluation, reflection and improvement. Grasp the consistency of each link as a whole to improve the performance of the company. The strategies and methods of human resources for improving enterprise performance are shown in Figure 2:

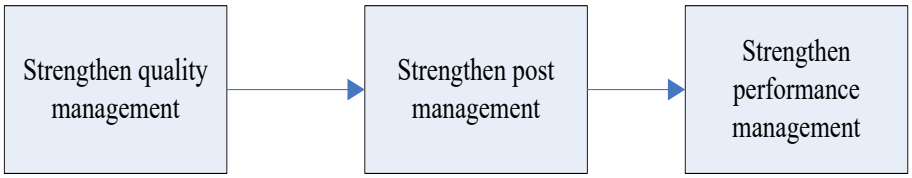

Fig.2 .Strategies and methods of human resources to improve corporate performance

2.5 Establishment of Grey Fuzzy Iterative Evaluation Model

In the traditional grey fuzzy evaluation process, the following contents are included: 1) The membership matrix of each classification is constructed through second-level grey fuzzy discrimination. 2) According to the difference of grey ambiguity degree and grey ambiguity principle, grey dependency degree operator is generated. 3) The classification weight coefficient is set according to the dependency information between categories. 4) The average subordination relationship is used to evaluate the targets in each classification system. The key of this method is that the membership degree operator is used to magnify the differences of various information in the system and weaken the similarity between them, so that the membership degree matrix obtained has obvious differences, and then the final average membership is defined to make the evaluated objects have better discrimination.

However, the membership matrix determined by this method after one run is not optimal and does not expand all kinds of information in the system completely. In order to completely expand the differences between the information, it is necessary to carry out several iterations of the previous step to output a satisfactory membership matrix.

2.6 The Use of Grey Fuzzy Iterative Algorithm in Performance Evaluation

For a given data set, the grey fuzzy iterative algorithm is the attribute value of the T-th sample and the corresponding marker value. The linear function definition of the linear attribute classifier is shown in Formula 1:

$$f(p) = g * p + m \tag{1}$$

In Formula 1, both g and m are unknown parameters. The loss function can calculate the difference between the predicted value and the real value, denoted as M; the value of function D is also called the experience loss value, denoted as B; the calculation method of the experience loss value is shown in Formula 2:

$$B = \frac{1}{n}\sum_{t=1}^{n} M \tag{2}$$

It can be seen from the empirical risk minimization strategy that the empirical minimization model is actually the optimal model, so solving the optimal model is to find the minimum values of g and m to minimize the empirical loss. The solution method of g and m is shown in Formula 3:

$$(g,m) = \arg\min D \tag{3}$$

3. Performance Evaluation Simulation Experiment of Grey Fuzzy Iterative Algorithm

This paper will test the real effect of grey fuzzy iterative algorithm on improving the accuracy of performance evaluation through experiments. Five groups of enterprises are selected in this paper to test the accuracy of performance evaluation after using grey fuzzy iterative algorithm. The test results are shown in Figure 3.

As can be seen from the experimental results in Figure 3, the accuracy of performance evaluation increased by 17% at the highest and 11% at the lowest after using grey fuzzy iterative algorithm, which proves that grey fuzzy iterative algorithm has a good improvement in the accuracy of performance evaluation, indicating that grey fuzzy algorithm has a good fit with enterprise performance evaluation.

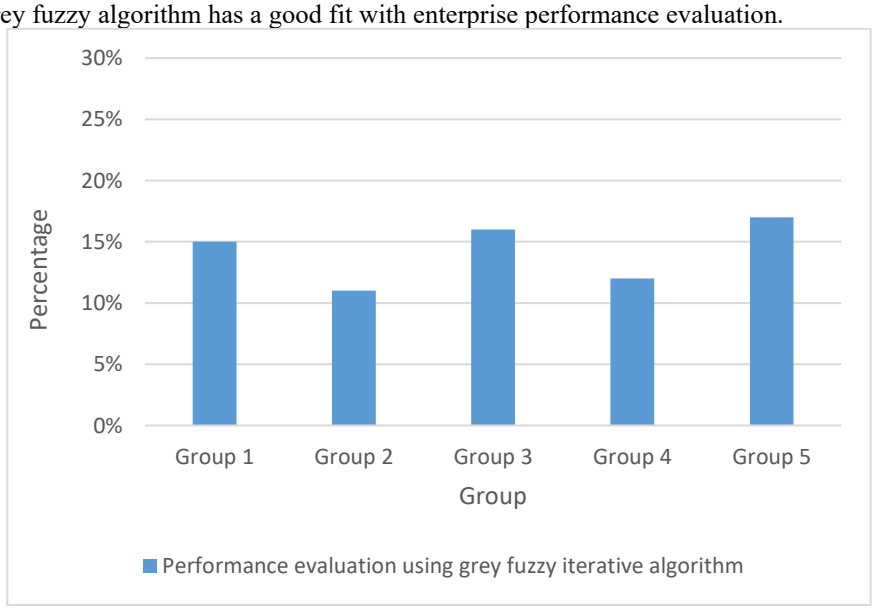

Fig.3 The improvement effect of performance evaluation accuracy after using grey fuzzy iterative algorithm

4. Conclusion

The core of performance evaluation is accuracy. If the performance evaluation data is not accurate, employees will inevitably complain. This paper aiming to improve the accuracy of performance evaluation through grey fuzzy iterative algorithm. This paper tested the accuracy improvement of performance evaluation by using grey fuzzy iterative algorithm through experiments, and found that the improvement was good. Due to the length of this paper, the number of experiments was not enough, so we will continue to explore more on performance evaluation in the future, and finally wish the performance evaluation could be better and better.

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