Evaluation of the Impact of Human Resource Innovation Performance Based on Regression Analysis

Yuhong Bai

Guangzhou Huali College; Guangzhou, China

Corresponding Author e-mail: 738725157@qq.com

Abstract. In order to improve the ability of dynamic quantitative evaluation of the impact of human resource innovation performance under the background of high-yield human capital, this paper puts forward an evaluation model of the impact of human resource innovation performance based on regression analysis. Under the traditional modes of human capital investment, such as talent introduction, education and training, the index parameter set which can effectively reflect the influence of enterprise human capital and human resource innovation performance under the background of high returns is constructed. Considering the investment cost and future returns, as well as knowledge updating, experience accumulation, skills and other factors, the statistical sample sequence model of index parameter regression analysis is established. Combined with the statistical big data analysis method, The performance evaluation and characteristic analysis of human resource innovation in the context of high-yield human capital of enterprises are carried out. Through the fuzzy index parameter fusion, the horizontal parameter distribution and equilibrium control model of knowledge and comprehensive ability are adopted, and the quantitative regression analysis model and Markov model are established in the process of impact evaluation. The impact evaluation of human resource innovation performance in the context of high-yield human capital of enterprises is realized by using regression analysis learning method, big data fusion and adaptive optimization method. The empirical analysis results show that the dynamic balance of the impact assessment of human resource innovation performance under the background of high returns of enterprise human capital is good, the convergence of the impact assessment of human resource innovation performance is high, and the confidence level of the assessment results is improved.

Keywords: regression analysis; Enterprise human capital; High-yield background; Human resources; Innovation performance; Evaluation of influence

1 Introduction

Human capital investment refers to the activities to increase people's own resources so as to increase future monetary or material income, that is, the investment to improve people's value, mainly including the investment in people's physical strength, ability and intelligence. By analyzing the influencing parameters of human resource

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innovation performance under the background of high-return of enterprise human capital, and combining with the distribution of evaluation indexes, an analysis model of influencing parameters of human resource innovation performance under the background of high-return of enterprise human capital is established to improve the ability of innovation performance evaluation. With the different stages of economic development, the role of human capital changes, and the requirements for human capital investment will also change. From the existing literature, the research on human capital investment is mostly focused on education and health investment, and now scholars begin to further expand the related composition of human capital investment. The content of human capital investment should be broader. All activities that are conducive to enhancing the quality and ability of human capital, the investment in labor productivity of human capital, and the economic behaviors that are conducive to improving the knowledge stock, technical ability and health level of human capital belong to the investment of human capital [1].

Through the accurate mining and feature extraction of the statistical big data of human resource innovation performance influence under the background of high-yield human capital of enterprises, the evaluation of human resource innovation performance influence under the background of high-yield human capital of curriculum enterprises can be realized [2]. Among them, a statistical evaluation method of human resource innovation performance influence under the background of high-yield human capital of local area network enterprises based on coding fusion is proposed in [3], which expands the statistical sequence space of human resource innovation performance influence under the background of high-yield human capital of enterprises in high dimensions, resulting in high calculation cost; In the [4], a particle swarm optimization (PSO)-based method for evaluating the impact of human resource innovation performance under the background of high-yield human capital of enterprises is proposed. Because the statistical data of the impact of human resource innovation performance under the background of high-yield human capital of inter-domain enterprises have strong redundancy from end to end, there is a problem of poor convergence when using PSO to evaluate the impact of human resource innovation performance of curriculum enterprises under the background of high-yield human capital. In literature [6], a prediction algorithm of human resource innovation performance influence based on improved association rule characteristic analysis method is proposed. Average mutual information method and false nearest neighbor method are used to reconstruct the phase space of human resource innovation performance influence information under the background of enterprise human capital high return, and the constraint function of association rule directional characteristics of human resource innovation performance influence statistics big data under the background of enterprise human capital high return is constructed [5]. This paper extracts the correlation dimension characteristics of the statistical big data of human resource innovation performance impact under the background of high-yield of enterprise human capital, but the adaptability of this method to evaluate the impact of human resource innovation performance under the background of high-yield of enterprise human capital is not good.

To solve the above problems, this paper puts forward an impact evaluation model of human resources innovation performance based on regression analysis. Firstly, it

establishes the index parameter model of impact evaluation, as well as factors such as knowledge update, experience accumulation and skills, and establishes the statistical sample sequence model of index parameter regression analysis. Combined with statistical big data analysis, it adopts regression analysis learning method, through big data fusion and adaptive optimization method. The impact evaluation of human resource innovation performance under the background of high-yield human capital of enterprises is realized. Finally, the simulation test analysis shows the superior performance of this method in improving the accuracy of impact evaluation of human resource innovation performance [6].

2 Statistical Analysis of Big Data in Human Resource Innovation Performance Impact Assessment

2.1 Big data mining for impact assessment of human resource innovation performance under the background of high-yield of enterprise human capital

In order to realize the impact assessment of human resource innovation performance under the background of high-yield of enterprise human capital, under the environment of mobile cloud platform and Internet of Things, the statistical characteristics of human resource innovation performance impact under the background of high-yield of enterprise human capital are mined by big data, and the data of human resource innovation performance impact under the background of high-yield of enterprise human capital is divided into topological structure. The vector quantization feature coding model of the impact data of human resource innovation performance under the background of high-yield of enterprise human capital is built with the nearest neighbor as the center. The performance correction analysis of the impact evaluation of human resource innovation performance under the background of high-yield of enterprise human capital is carried out by statistical sample regression analysis model, and the collected impact data of human resource innovation performance under the background of high-yield of enterprise human capital is decomposed by nonlinear time series [7]. The submodel of the link state model T of the impact data of human resource innovation performance under the background of high-yield of enterprise human capital is that the main characteristic quantity of the correlation degree of the impact data of human resource innovation performance under the background of high-yield of enterprise human capital is:

$$OF(p) = \frac{|IS(p)| \cdot c\_dis\ tan\ ce(p)}{\sum_{o \in IS(p)} c\_dis\ tan\ ce(o)} \tag{1}$$

Wherein, I is the data set of human innovation evaluation, and $S(p)$ is the sample regression analysis set that explains the influence of human resource innovation performance under the background of high-yield of enterprise human capital. In the neighborhood of the k-th distance, obtains the characteristic space of human resource innovation performance influence data under the background of high-yield of enterprise human capital, and makes time series analysis on training samples and test sets. For a

given positive integer K, the big data characteristic decomposition model of human resource innovation performance influence under the background of high-yield of enterprise human capital is constructed as follows:

$$\begin{cases} f_i(t) = \dfrac{K}{t_0 - t} = \dfrac{K / t_0}{1 - t / t_0} = \dfrac{f_{\max} f_{\min}}{f_0}\left(1 + \dfrac{t}{t_0} + \dfrac{t^2}{t_0^2} + \cdots\right) \\ \quad | t | \leq \dfrac{T}{2} \end{cases} \tag{2}$$

Where K is the characteristic parameter of joint index, t_0 is the statistical characteristic quantity of evaluation, $f_{\min}$ is the minimum evaluation period, $f_{\max}$ is the maximum evaluation period and T is the maximum time interval. It automatically evaluates the influence and satisfaction of human resource innovation performance in the context of high-yield human capital of enterprises. The statistical time series X obtained in the refined teaching evaluation management is a data object in set X, so there is a data object Y in the state link set Y of human resource innovation performance influence data in the context of high-yield human capital of enterprises, which makes the correlation degree the main feature.

2.2 Statistical analysis of the influence of human resources innovation performance

On the basis of big data mining on the impact of human resource innovation performance under the background of high-yield of enterprise human capital, this paper analyzes the impact of human resource innovation performance under the background of high-yield of enterprise human capital with sample regression analysis method, adopts questionnaire and sample monitoring method to sample the statistical sample sequence of the impact of human resource innovation performance under the background of high-yield of enterprise human capital, and combines the statistical big data analysis method. The related factors in the process of evaluating the impact of human resource innovation performance under the background of high-yield human capital of enterprises are detected. According to the personalized demand data mining of course learning, the calculation formula of semantic trust evaluation value is obtained as follows:

$$DOI_{a,b} = \frac{|I_{a,b}|}{|I_a| + |I_b| - |I_{a,b}|} \tag{3}$$

Wherein, I_a is the main body balance parameter, I_b is the human resource evaluation parameter, and $I_{a,b}$ is the cross-correlation quantity. According to the theory of human capital investment, human capital investment should be divided into pre-formation investment and post-formation maintenance investment. First, human capital needs to be cultivated in various ways, such as education and training, medical care, etc. Second, if the human capital is short of later maintenance, its value will continue to depreciate. As the main body of enterprise human capital investment, the purpose is to improve the

output efficiency of the enterprise. Through continuous investment, enterprises can improve the comprehensive level of knowledge, experience, skills, ability and health of existing human capital, and make it form an economic value that can bring economic and social benefits to enterprises [8]. This kind of economic value will drive the continuous growth of enterprise benefits with the continuous improvement of enterprise investment. Regression analysis is adopted, and the correlation degree of common evaluation is as follows:

$$CPC_{a,b} = (\sum_{i=1}^{|I_{a,b}|}(d_{a,i} - \overline{d}_a) \times (d_{b,i} - \overline{d}_b)) / (\sqrt{\sum_{i=1}^{|I_{a,b}|}(d_{a,i} - \overline{d}_a)^2} \times \sqrt{\sum_{i=1}^{I_{a,b}}(d_{b,i} - \overline{d}_b)^2}) \tag{4}$$

In the above formula, $\overline{d}_a$ is the knowledge incentive parameter of human capital, $\overline{d}_b$ is the contribution degree, $CPC_{a,b}$ is the identification feature of enterprises' healthy investment in human capital, $d_{a,i}$ and $d_{b,i} \in [1,5]$ are quantitatively evaluated by semantic ontology feature directional clustering method.

Using the fuzzy comprehensive evaluation method, the activity of the characteristic components of human resource innovation performance impact evaluation is calculated as follows:

$$Trust_{a \to b} = \begin{cases} DTrust_{a \to b} & \beta_d = 1 \\ ITrust_{a \to b} & 0 < \beta_d < 1 \end{cases} \tag{5}$$

Wherein, D is the qualitative evaluation parameter of capital investment, $Trust_{a \to b}$ is the joint trust degree, and β_d is the statistical characteristic quantity. The statistical analysis model of the impact of human resource innovation performance under the background of high-yield human capital of enterprises is constructed, and the innovation effect value model is described as:

$$ITrust_{a \to c} = \frac{\sum_{b \in adj(a,c)} DTrust_{a \to b} \times (DTrust_{b \to c} \times \beta_d)}{\sum_{b \in adj(a,c)} DTtrust_{a \to b}} \tag{6}$$

Where, $dj(a,c)$ represents the number of characteristic distribution of human capital labor input from the correlation characteristic solution, and $\beta_d \in (0,1]$ is the elasticity coefficient of capital output.

3 Human resources innovation performance impact assessment optimization

3.1 Quantitative regression analysis of impact assessment of human resource innovation performance

This paper proposes an evaluation method of the impact of human resource innovation performance based on big data analysis under the background of high returns of enterprise human capital. Using semantic feature extraction method, this paper analyzes the satisfaction level of human resource innovation performance influence under the background of high-yield human capital. In the evaluation model of human resource innovation performance influence under the background of high-yield human capital, the data semantic of human resource innovation performance influence evaluation under the background of high-yield human capital is obtained by principal component analysis. It is assumed that the scalar time series of human resource innovation performance influence evaluation under the background of high-yield human capital. The convergence rule evaluation method is used to make quantitative regression analysis on the influence of human resource innovation performance under the background of high return of enterprise human capital [10]. The error vector F-measure of evaluation on the influence of human resource innovation performance under the background of high return of enterprise human capital is defined as:

$$F-measure=\frac{2\times S_n\times PPV}{S_n+PPV} \tag{7}$$

Wherein, S_n represents the components of human resource innovation performance influence under the background of high-yield human capital, and PPV represents dynamic characteristic parameters. Principal component analysis is carried out according to the forecast results, and correlation integral matching is carried out by combining the mutual information of human resource innovation performance influence under the background of high-yield human capital, so as to realize the status identification and data characteristic analysis of human resource innovation performance influence data under the background of high-yield human capital, and the control variables of human resource innovation performance influence evaluation under the background of high-yield human capital are obtained as follows:

$$Sn=\frac{\sum_i^n max_{j=1}^m t_{ij}}{\sum_{i=1}^n n_i} \tag{8}$$

Wherein, t_{ij} is the key factor among many factors, and n_i is the input factor of salary, welfare and social security as the production function. At a certain initial stage, the characteristic parameters are $\hat{A}_0=\{y_i\}$. Based on the multiple regression model, this paper empirically studies the impact of human capital investment on innovation output, and obtains the close degree of correlation between the two innovative indicators. The dynamic propagation state function is constructed as follows:

$$BWPR(u_i) = d + (1-d)\sum_{v_j \in F_o(u_i)} B_w(u_i, v_j)^* BWPR(v_j) \tag{9}$$

Wherein, u_i , v_j are static description and dynamic reflection control parameters, $B_w(u_i, v_j)$ is fuzziness, $BWPR(v_j)$ is sampling time interval, d is embedded dimension of quantitative regression analysis, and education and training, scientific and technological development, salary and welfare and social security are the first-class index system. Therefore, quantitative characteristic parameters of human resource innovation performance impact evaluation under the background of high-yield human capital of enterprises are extracted, and the dynamic characteristic solution of human resource innovation performance impact evaluation is constructed by quantitative regression analysis.

3.2 Output of impact assessment of human resource innovation performance

Combined with the statistical big data analysis method, the performance evaluation and characteristic analysis of human resource innovation in the context of high-yield human capital of enterprises are carried out. Through fuzzy index parameter fusion, the quantitative regression analysis model in the process of impact evaluation is established by adopting the horizontal parameter distribution and equilibrium control model of knowledge and comprehensive ability. The solution space basis function of the impact data of human resource innovation in the context of high-yield human capital of enterprises can be described as:

$$I_{i,j}(t) = \frac{\sum D''_{i,k}(t) D''_{k,j}(t)}{\sum D''_{i,k}(t)} \tag{10}$$

Wherein, $D''_{i,k}(t)$ is the degree that enterprises attach importance to human capital, and $D''_{k,j}(t)$ is the result reflection parameter of enterprise human capital investment. According to the adaptive weight of C^*_{uv}, information is weighted, and the information mining function of the influence of human resource innovation performance under the background of high-yield enterprise human capital is obtained as follows:

$$\omega(e) = \frac{\omega(e_s)}{OutDeg(u, e_s)} \tag{11}$$

Wherein, $e_s \in E_s$ is the quantitative characteristic parameter, $\omega(e_s)$ is the weighting coefficient of evaluation, and $OutDeg(u, e_s)$ is the confidence level of capital and human capital invested in innovation output. In the network structure, under the background of high capital return, the average mutual information characteristic quantity of human resource innovation performance influence is:

$$p(R|U,V,\sigma_R^2) = \prod_{i=1}^{n}\prod_{j=1}^{m}\left[N(R_{ij}|g(U_i^T V_j),\sigma_R^2)\right]^{I_{ij}^R} \tag{12}$$

Wherein, $N(x|\mu,\sigma^2)$ represents the confidence function of evaluating the impact of human resource innovation performance under the background of high-yield human capital of enterprises, and the correlation variable μ of the impact of human resource innovation performance under the background of high-yield human capital of users obeys a normal distribution with mathematical expectation and standard variance of σ^2. Combined with descriptive statistical analysis results, big data feature extraction and correlation description are carried out, and the extracted statistical features of human resource innovation performance influence under the background of high-yield human capital of enterprises are used for pattern recognition and feature screening by the average mutual information clustering method. Thus, the evaluation output results of human resource innovation performance influence under the background of high-yield human capital of enterprises are described as follows:

$$MSD_{a\to b} = 1 - \frac{\sum_{i=1}^{|I_{a,b}|}\sqrt{(d_{a,i}-\overline{d}_a)^2+(d_{b,i}-\overline{d}_b)^2}}{|I_{a,b}|\times\sum_{i=1}^{|I_{a,b}|}\left[\sqrt{(d_{a,i}-\overline{d}_a)^2}+\sqrt{(d_{b,i}-\overline{d}_b)^2}\right]} \tag{13}$$

Wherein, $MSD_{a\to b}$ is the average level of economic foundation and return on investment, and $d_{b,i}$ is the similarity level of evaluation. Establish Markov model, adopt regression analysis learning method, adopt quantitative recursive analysis method, establish regression analysis learning model of human resource innovation performance influence evaluation under the background of high-yield human capital of enterprises, and combine statistical analysis and regression analysis to realize dynamic optimization evaluation decision of human resource innovation performance influence.

4 Simulation analysis

In order to test the application performance of this method in evaluating the impact of human resource innovation performance under the background of high-yield of enterprise human capital, a simulation experiment was conducted. Matlab simulation software was used in the experiment, and C++ was used to program the impact evaluation algorithm of human resource innovation performance under the background of high-yield of enterprise human capital. The sample number of big data on the impact of human resource innovation performance under the background of high-yield human capital of enterprises is 2,000, and the association rule item is 1,024. Firstly, descriptive statistical analysis is carried out. By the end of 2021, 20 industries classified according to national economic standards are classified and counted. Among the 3,621 sample enterprises whose industry classifications are known, manufacturing enterprises occupy the absolute advantage, accounting for 62.9%; IT ranks second with 269 enterprises, accounting for 7.4%, which is far behind the manufacturing industry. The number of

sample enterprises in other 18 industries did not exceed 200, and the data volume was small, so it was not calculated separately. In terms of control variables, the average size of K1 enterprises was 22.654, indicating that the enterprises were large and representative. The average age of the enterprise K is 19.692, which indicates that the enterprise has been in continuous operation for a long time and has good stability. The distribution of evaluation d

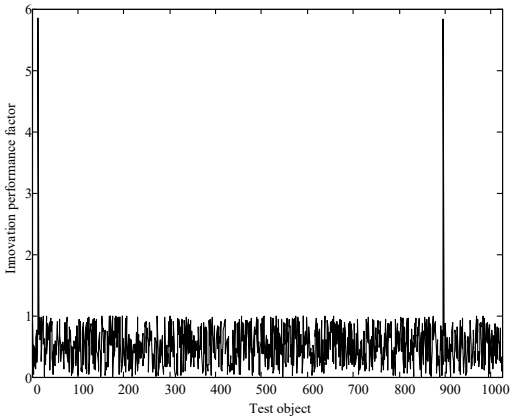

Fig. 1. Evaluation data distribution

1. Taking the graph data as input, build a big data analysis model of human resource innovation performance impact assessment under the background of high-yield human capital of enterprises, extract the characteristic quantity of association rules from the sample sequence of human resource innovation performance impact assessment, and evaluate the impact of human resource innovation performance. The evaluation output is shown in Fig

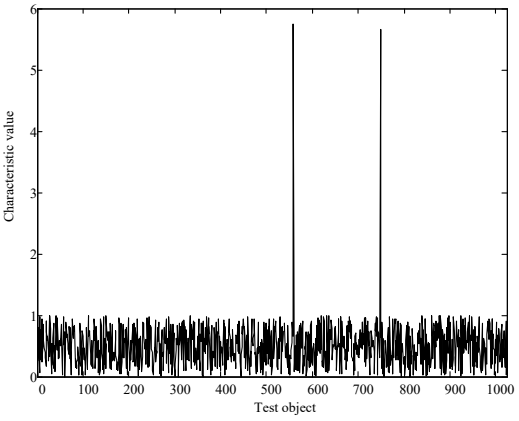

Fig. 2. Prediction output of human resource innovation performance influence

According to the analysis of Fig. 2, this method can effectively realize the impact assessment of human resource innovation performance under the background of high-

yield human capital of enterprises, and the prediction convergence is good. By testing the performance of different methods for the impact assessment of human resource innovation performance under the background of high-yield human capital of curriculum enterprises, the comparison of time and expenditure is shown in Fig.3, and the comparison of confidence level is shown in Fig. 4.

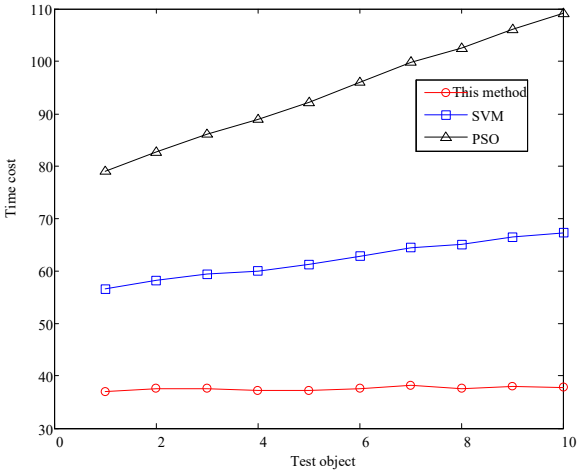

Fig. 3. Comparison of time cost

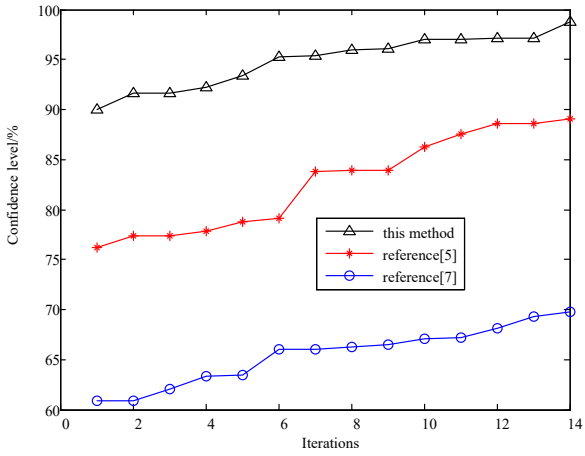

Fig. 4. Comparison of confidence level of evaluation

According to the results of Fig. 3 and Fig. 4, with the increase of the number of samples, the time cost of several methods increases. The time cost of evaluating the impact of human resource innovation performance under the background of high-yield human capital of enterprises in this paper is shorter, with an average reduction of 14.6%. The confidence level of evaluating the impact of human resource innovation performance

under the background of high-yield human capital of enterprises in this paper is higher, which is 26.7% higher than that of traditional methods, and its performance is better.

5 Conclusions

In this paper, a regression analysis-based evaluation model of the impact of human resource innovation performance under the background of high returns of enterprise human capital is proposed. Firstly, the index parameter set which can effectively reflect the influence of human resource innovation performance under the background of high-yield of enterprise human capital is constructed, and the series of statistical samples of human resource innovation performance influence under the background of high-yield of enterprise human capital is sampled by questionnaire and sample monitoring method. Combined with the statistical big data analysis method, the related factors in the evaluation process of human resource innovation performance influence under the background of high-yield of enterprise human capital are detected. This paper extracts the related internal characteristic parameters of the impact assessment of human resource innovation performance under the background of high-yield of enterprise human capital, constructs the index parameter set of the impact assessment of human resource innovation performance under the background of high-yield of enterprise human capital through the method of partial information screening, and reads the statistical sample sequence flow of the impact of human resource innovation performance under the background of high-yield of enterprise human capital. This paper makes a dynamic index regression analysis of the impact of human resource innovation performance under the background of high return of enterprise human capital, establishes a Markov model, adopts regression analysis learning method and quantitative recursive analysis method, establishes a regression analysis learning model of the impact assessment of human resource innovation performance under the background of high return of enterprise human capital, and constructs a big data analysis model of the impact assessment of human resource innovation performance under the background of high return of enterprise human capital. The association rule feature quantity of the sample sequence of human resource innovation performance influence evaluation is extracted, and the self-adaptive evaluation of the statistical sample sequence of human resource innovation performance influence under the background of high profit of enterprise human capital is carried out. It is concluded that the dynamic balance of the impact assessment of human resource innovation performance under the background of high returns of enterprise human capital is good, the convergence of the impact assessment of human resource innovation performance is high, and the confidence level of the assessment results is improved.

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