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Research on the Synergy between Economic Returns and Safety Investments in Enterprises

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Abstract: Coal, as a key input factor to ensure China's economic growth, plays an important role in the orderly development of its industry. The safety guarantee of production link is the only way to ensure the stable development of the industry, so it is in urgent need of the investment of safety funds and effective implementation to protect it. As a high-risk industry, the coal industry has a poor working environment, difficult working conditions, backward safety technology, and endless hidden dangers. In the process of development, the coal industry blindly pursues benefits while ignoring safety investment, which is exactly a common problem in China's coal enterprises and also the deep cause of coal mine safety accidents. This paper uses relevant theories to analyze the effect of coal enterprises' safety investment on economic benefit and determine its equilibrium point of safety and economic benefit. From micro level of building model, neural network model for coal enterprise economic benefit is explained variable, safety input as explanatory variables, core number of coal production, labor, labor productivity, and fixed assets and intangible assets investment as a intervening variable, such as inspection cause nonlinear relationship between safety investment and economic benefit are intermediary variables, measure the influence of different variables on economic benefit enterprise security mechanism, which integrated the result of theoretical analysis and empirical research, puts forward coal enterprises safety investment economic efficiency maximization of promotion strategy.

Keywords: Safety input; Economic benefits; Coal enterprises

1 Introduction

Coal has always played a dominant role in China's primary energy production and consumption structure, and is an important pillar for the rapid, sustained and healthy development of China's national economy. But as a result of China's coal mining, geological conditions and the working environment is poor, China's coal mine production safety situation is very serious, often happens in the coal mine production safety accidents in China, coal mine safety accidents to frontline staff's life safety coal enterprises constitutes the great threat at the same time, also the production and business operation of the coal mining enterprises caused great economic losses. In addition, as a result of coal mine accident caused by personnel disability, occupational disease and stop-production and other indirect economic losses are more difficult to estimate. At the same time, the negative impact of coal mine safety accidents in China is not only confined to the economic category, but also brings great social and political impact. How to effectively improve and strengthen the input of coal mine safety production, reduce the potential safety risks, reduce coal mine safety accidents, and ensure the safety production of enterprises and maximize the interests of enterprises has become the industry and academia urgently need to solve the key issues.

The safe production of coal enterprises is an important factor for the healthy and sustainable development of China's economy. Therefore, adequate safety input is an indispensable prerequisite and guarantee for the safe and stable development of coal enterprises at present. Coal enterprises may ignore the importance of safety investment, or, based on considerations of their own interests, lack of safety investment leads to a large number of hidden dangers.The study on the relationship between safety investment and economic benefits in coal enterprises is conducive to ensuring the steady and orderly work safety and safety management in coal enterprises, and improving the management level and competitiveness of coal enterprises. It is conducive to reducing safety accidents, stabilizing social order, promoting social health and progress, and realizing sound and rapid economic development.

Based on the data of domestic coal listed companies and from the perspective of safety input, this study uses THE BP neural network model to specifically study the equilibrium relationship between safety input and enterprise interests, so as to provide suggestions for the economic decision of safety input in the coal industry.

2 Literature Review

Michael S Baram(1979) proposed the cost-benefit theory and defined the sum of favorable attributes as benefits and unfavorable attributes as costs. Cost-benefit analysis can be regarded as net benefits (benefits minus costs) or the ratio between benefits and costs [1]. Walter Y. Oi(1976) pointed out that the safety expenditure of an enterprise not only includes the identifiable cost of safety input, but also includes the implied opportunity cost of safety input [2]. In this model, the decision rule is simple, that is, the safety input cost is lower than the profit generated by risk reduction (Mark Geistfeld, 2001)[3]. Michael Behm, Anthony Veltri, touro K.K leinsorge (2004) cost of activities can be divided into prevention, detection, the internal faults and external faults, when the prevention cost + found < internal fault spending + external failure costs, achieve security into the best balance point[4], but Panopoulos, g. D., & Booth, r. t. (2007) by American and British security business case analysis, points out that the best safety investment balance does not guarantee safety accidents number 0 [5]. Nicholas A. Ashford(2007) made use of the early warning principle to carry out cost-benefit theory and pointed out that the theory tends to invest heavily in the present to prevent such future harm, because discounted cost and benefit flow will be generated over time [6]. Elias Ikpe, Felix Hammond, David Prosperity (2008) Based on the analysis of safety costs in the construction industry argue that decision makers will be able to identify potential improvements and measure differences between gains and losses if cost-benefit analysis is employed. Reducing accident costs will yield significant benefits, such as reduced casualties and property losses; And better health and safety, and increased productivity [7].Arieh Gavious, Shlomo Mizrahi, Yael Shani, and Yizhaq Minchuk(2009) formulated safety costs and believed that the total cost of industrial accidents is the sum of its direct cost, indirect cost, other expenditure cost and inestimable cost [8]. Eun Jeong Cha(2019) emphasizes the relationship between BRC index and managers' risk preference, and uses this index to establish a value function. When managers are willing to take increasing risks, the value function becomes more concave. When the manager is neutral, the value function is straight line. When managers constantly tend to avoid risks, the convexity of value functions becomes more obvious [9].

Jiangdong Bao, Jingdong Zhang,Fei Li, Shuiping Shi(2016), it uses fuzzy analysis method to compare the social benefit level of OHSAS between China and Sweden, whose main indexes include: influence on humanization, influence on comprehensiveness, influence on sustainability, influence on social economy, influence on natural resources, influence on ecology and environment [10]. Yan Fu,Wang Biao Li,Tao Qin and Biao Zhang(2018) combined probabilistic prediction based on system dynamics with cost-benefit analysis, and substituted accident occurrence probability into cost-benefit analysis to estimate dynamic accident loss and dynamic safety benefit [11]. Linlin Wang, Qinggui Cao, Lujie Zhou(2018) combined DEMATEL and ISM methods to analyze the relationship between various factors affecting coal mine safety production. According to the causal relationship, these factors can be divided into cause factors and influence factors. According to the centrality, the importance of various factors in the system can be determined. Influence factors can be divided into root cause, important cause and direct cause. The factors affecting coal mine safety production are very complicated and there is a hierarchical system. Factors with a greater causal relationship are at the top of the hierarchy. Safety supervision and safety concept are the root cause of mine accidents [12].

As for the current situation of China's safety investment, it is generally recognized that safety investment is seriously insufficient, which is manifested in lack of system, weak consciousness, insufficient scale and unreasonable structure (Chen Kegui et al., 2016[13]). China has not yet established a legal system for coal mine safety investment. The existing legislation is chaotic, the government has insufficient supervision, the implementation of enterprises is vague, and sometimes there is no money investment or even deliberate non-investment (Weng Yifei and Gao Shuangxi, 2010)[14], the safety investment of industrial and mining enterprises in

China still shows a decreasing trend, which is not consistent with the development level of economic growth (Wang Tao, 2010)[15].

Therefore, a large number of scholars launched research on the influencing factors of safety investment. Zhang Feiyan et al. (2014) concluded that the strategic safety investment benefit of coal enterprises was not only closely related to the size of investment, but also closely related to the investment structure based on the nonlinear optimization model of safety investment decision-making of coal enterprises, which maximized safety benefit [16]. Yu Ji'an et al. (2014) explored the causes of insufficient safety investment in coal mining enterprises by establishing the game model of coal mine technology and cost variables, and the results showed that, to a certain extent, it was caused by low technical conditions and high safety investment cost [17]. Zheng Yi, Yin Yuwen and Ying Liying (2017) used empirical research methods to explore the impact of financing constraints on the safety input of coal enterprises. The empirical results show that the degree of financing constraint in coal enterprises is negatively correlated with safety input; The level of short-term borrowing is negatively correlated with safety investment, that is, with the increase of short-term borrowing, the level of safety investment decreases. The long-term borrowing level of coal enterprises has no direct relation with safety input; Safety investment is positively correlated with internal cash flow. Therefore, improving the financing environment of enterprises is conducive to enhancing the intensity of safety investment of enterprises [18]. Wang Kezun (2018) established a simple BP neural network model, and selected the number of million-hour accidents and million-hour casualties as the prediction indicators for processing, so as to analyze and predict the safety production status and development trend of enterprises in a province [19].Meng Xiaona, MiaoChengLin li-yan sun, xiang-long zhang 13 coal enterprises (2019) built in 2012-2017 panel data of listed companies, the Malmquist - DEA method to empirical research the restriction under the influence of safety training and internal management efficiency of China's coal enterprises safety index change trend of rising up - down -, and analyzes the factors affecting the development of coal enterprises safety efficiency, at the same time show that accelerate the progress of China's coal enterprises safety efficiency are the main factors of technical efficiency [20]. Yu Xiaoyan, Yao Qingguo, Chen Qi, etc. (2019) using the three stage DEA model to China 17 coal safety input and output efficiency of listed companies is analyzed, the conclusion is as follows: environment variable has a significant influence on the coal mine enterprise's safety input and output efficiency, enterprise scale, staff labor productivity, and the education degree have positive influence on safety input and output efficiency [21]. The system dynamics method is adopted to construct the system dynamics model of safety investment and performance of construction projects, and then the simulation is carried out. It is concluded that the higher the safety level of construction enterprises, the faster the expected safety performance can be achieved. In the long run, increasing safety investment has a significant promoting effect on the safety performance of construction enterprises. Increasing safety investment in labor protection has a more obvious effect on improving safety performance [22].

3 Determination of Safety Benefit Guarantee Points

The benefits of safety investment projects are not easy to be intuitively understood. They are presented in the form of "recessive", such as: improving the stability of personnel, equipment and production technology can guarantee the safety and continuity of production; Reducing the probability of accidents can reduce the loss of enterprises. In addition, the safety benefit also has "uncertainty" and "lag". All these characteristics increase the difficulty of safety benefit evaluation. In the scientific evaluation of safety investment projects, "with or without comparison" should be carried out, that is, by objectively predicting the accident losses of enterprises under the two conditions of "with safety investment projects" and "without safety investment projects" respectively.

Technical and economic indicators can be used to evaluate the benefits of safety investment projects and calculate the net present value, internal rate of return and other indicators of safety investment projects. Only when all indicators meet the set value, the scheme is feasible. In the evaluation, the expected reduction in accident losses is treated as an investment gain. The evaluation process is as follows:

First, determine the effective service life of the investment project;

Secondly, the calculation of the system annual accident loss expected value E specifically includes the following steps: Determine the types of possible accidents in the system year, such as mechanical injury, fire, etc.; (2) Each type of accident is classified by severity; (3) Calculate the probability P and economic loss C of grade i accident in a year; Calculate the expected value of each type of accident loss $\overline{E}$, the expected value of system annual accident loss, as shown in Equation (2-6) (2-7).

$$E = \sum_{j=1}^{4} P_j C_j \quad (2\text{-}6)$$

$$\overline{E} = \sum^{k} P_k E_k \quad (2\text{-}7)$$

Where, p is the probability of occurrence of type k accident in the current year; k is the type of accident. Then, the expected reduction of accident losses in any year during the service life of the investment project is calculated as:

$$Mj = \overline{E}_{j0} - \overline{E}_j \quad (2\text{-}8)$$

Where, M_j is the investment return in the j year, i.e., the reduction of the expected accident loss whether the investment is made or not, and M_j is the expected accident loss in the j year after the safety investment of the system is made; Is the period value of accident loss in the j year without safety investment. Finally, the net present value and yield of safe investment projects are calculated. The net present value of safe investment projects is:

$$NPV = \sum_{j=0}^{n} (-K_j + M_j)(1+i_c)^{-j} + K_L(1+i_c)^{-n} \quad (2\text{-}9)$$

Where, n is the service life of the security investment project; K_j is the investment amount in the j year of the safety project; j is the year (j=0 is the base year); i_c as the benchmark investment rate of return; K_L is the residual value of a security investment project at the end of its service life. If NPV≥0, the safe investment project is economically feasible. The internal rate of return of the safe investment project is:

$$\sum_{j=0}^{n} (-K_j + M_j)(1+i_k)^{-j} + K_L(1+i_k)^{-n} = 0 \quad (2\text{-}10)$$

When $i_k = i_c$, it indicates that from the perspective of corporate financial management, the security investment project has reached the break-even point of safety and economic benefits. When $i_k > i_c$, the security investment project is economically viable.

3 Construction of safety and economic benefit model

3.1 Research design and data sources

3.1.1 Variable design

The three decisive factors (economy, management, technology) for the sustainable development of the coal industry are important observation indicators. The core of which is to ensure the stable development of enterprise operations, and the acquisition and maintenance of safety indicators are the normal production and operation of all links. Prerequisites. Therefore, based on the previous factors affecting the economy of the coal industry, combined with the "iron triangle" of the stable development of coal enterprises, and the availability of data, this article selects safety input, labor force, coal production, labor productivity, enterprise scale, and fixed assets and The input of intangible assets is used as an input variable, and the intermediate variable is a hidden variable. I will not analyze it in this article. The profit-to-cash ratio (NCPR, namely net operating cash flow/net profit) is used as the output variable. The specific selection basis is as follows:

Safety investment (SI): The realization of safety production depends on investment guarantee as the foundation. Improving the level and ability of safe production requires economic costs. The cost of safety is both a price and a benefit. This article selects the debit amount of the financial statement subject "special reserve" as the safe input amount.

Coal production (Q): The process of coal enterprises to achieve their social value creation and wealth accumulation is to rely on market demand and rely on the expansion of the production chain to achieve profit goals. This core economic source guides enterprises to pursue the ultimate goal of maximizing profits. Expand market share and capacity supply. Therefore, the economic benefits of safety input belong to the accompanying production output, that is, to provide insurance for production activities and profit. Only when the safety conditions are met can the safety production task be completed and the enterprise's goal of pursuing profits can be achieved. This paper adopts the revised raw coal production at the end of each company's annual reporting period as a reference value.

Number of labor force (L): In the final analysis, labor production is based on employee productivity. Coal enterprises are labor-intensive enterprises in economic development. The working status of employees is directly related to the productivity and benefits of the enterprise. At the same time, labor also carries part of the production cost. The proficiency, innovation, and improvement of the production process are the most vivid manifestations of the vitality of the enterprise, and also the embodiment of the greater value source of the enterprise. The redundancy of human resources and the frequent occurrence of safety accidents accompanying economic development will not only bring about The huge social costs will also severely restrict the stable development of coal companies. Therefore, rational allocation or regulation of corporate human resources can not only reduce accident risks, but also effectively promote the growth of corporate economic benefits. This article uses the number of employees at the end of each company's annual report period to add up its labor force.

Labor productivity (P): The advancement of modernization, the simplification of production processes, the safety of the working environment, and the improvement of employees' operational capabilities can better improve the labor productivity of enterprises. The effective implementation of safety investment has greatly increased the degree of mechanization of the enterprise, which not only helps workers "free their hands" and reduces the incidence of safety accidents, but also effectively enhances workers' labor skills and proficiency, thereby improving overall efficiency and promoting Corporate economic growth. However, because it is difficult to count the length of labor hours, this article uses the ratio of internal output to the number of employees to measure the labor productivity of the enterprise. Investment in fixed assets and intangible assets (T): Under the premise of market demand and the needs of the times, the industry has gradually carried out structural reforms of production methods. The crude production methods have been unable to meet the high requirements of the intensive society. At this time, technological innovation The type of enterprise and its ability to create value are particularly important. The stronger the overall scientific research ability of coal enterprises and the higher the technological level, the higher the efficiency of safe production, which brings unlimited space for the increase of marginal productivity of coal enterprises . This paper selects the fixed assets and intangible assets of various companies as indicators to measure technological progress.

Enterprise size (S): The total size of the enterprise is closely related to the extraction and use of economic benefits and safety input costs of the enterprise. When the internal economies of scale reach the standard, there is sufficient space for resource allocation and technological development. At the same time, it also has a certain market share and better responds to the regulatory policies of the central and local governments . In order to exclude the effect of scale-based benefits of enterprises on the relationship between observed variables (safety investment and economic benefits), this paper selects the scale of listed companies as the control variable. According to the selection criteria of many scholars at home and abroad, refer to the indicators that measure the size of the enterprise: the total assets of the enterprise at the end of the period, fixed assets, and sales in the audit year. Here, this article selects the net fixed assets of the enterprise at the end of the period as the reference value of the scale variable.

3.1.2 Data sources

With the surplus of coal production capacity in China, some coal mining enterprises with lower approved production capacity have been in the phase of suspension or closure, and the dominant position of large coal mines has gradually become prominent. Therefore, when selecting samples in this article, the Shanghai and Shenzhen A-share listed coal companies from 2010 to 2019 are selected as the research samples.

The reason why these coal mines are selected as samples is that the annual production capacity and safety characteristics of these coal mines are different, which can better reflect the overall impact of safety investment on coal mine safety and economic benefits. On the other hand, due to the sensitivity of coal mine safety management data, many companies are unwilling to provide internal information, which limits the number of samples to be selected. However, the selected 20 coal mining companies can meet the current computing needs. The specific production capacity and big data status are shown in Table 3-1. In terms of the time limit of the data, this paper selects a total of 10 years of data from 2010 to 2019.

Based on the 2012 edition of the China Securities Regulatory Commission's industry classification standards, this paper screened the coal mining and dressing industry and eliminated sample companies with missing key data. A total of 180 sets of data were obtained from 18 companies. The above data comes from the RES database. The specific company names are shown in the table below.

Table 3-1 List of Listed coal enterprises in China

Company Name	Stock Code	Company Name	Stock Code
Jingyuan Coal	000552	AnYuan Coal	600397

PingZhuang Energy	000780	Shanghai Energy	600508
Jizhong Energy Resources	000937	Turbine Coal	600971
Xishan Coal and Electricity	000983	Datong Coal	601001
Open-air Coal	002128	China Shenhua Energy	601088
Zhengzhou Coal	600121	HaoHua Energy	601101
Shanxi Lanhua Sci-Tech Venture	600123	Pingdingshan Coal Group	601666
Yanzhou Coal Mining Company	600188	Lu'an Environmental Energy	601699
Yangquan Coal	600348	China Coal Energy	601898

3.2 BP neural network model construction

Based on the related theories of BP neural network, this paper establishes a coal mine safety management efficiency evaluation model based on BP neural network. Firstly, neural network training is performed by selecting representative input and output indicators. Secondly, after normalization, the training set is brought into the untrained BP neural network model for repeated iterative training, and then the test set is used for model verification. Finally, according to the results of multiple quasi-recognitions, the pre-recognition results of the model are revised to obtain the final recognition results of the economic benefits of coal mine safety management. The specific operation process steps are as follows:

Step 1: Sorting out related input and output data.

Step 2: The dimensions of the input and output indicators are different. Before inputting to the BP neural network for training, the normalization process should be performed first, and the convergence speed of the network training can be improved after the normalization process. The specific normalization method adopts the z-score standardization method. This method standardizes data based on the mean and standard deviation of the original data. The original value of NCPR is normalized to x* using z-score. The method formula is as follows:

$$x^* = \frac{x - \bar{x}}{\sigma} \qquad (4\text{-}1)$$

Step 3: Establish a training sample set and a test sample set. Before using the BP neural network, two parts must be extracted from the sample for the purpose of network learning, namely: training set (Trainset) and test set (Testset). The function of the training set is to train the network, and the function of the test set is to test whether the network trained by the training set can achieve the expected performance. This study uses 2010-2018 data as the training set and 2019 data as the test set.

Step 4: BP neural network parameter setting. Since the input and output indicators of the coal mine safety management efficiency evaluation model are not complicated, a 3-layer BP neural network is first used for analysis, and includes an input layer, an output layer and a hidden layer. There are 6 input indicators, namely *SI*, *L*, *T*, *Q*, *P*, *S*, so the input nodes of the neural network are set to 6. There is one output indicator, namely the profit to cash ratio (NPCR). When NPCR>1, it indicates that the security investment is sufficient to create better cash flow and economic benefits for the enterprise; when NPCR≤1, it indicates that the security investment of the enterprise is insufficient, resulting in the enterprise's insufficient economic benefits; or it indicates that the enterprise security investment is excessive. Affect corporate cash flow and profits. At present, the safety awareness of Chinese enterprise managers needs to be improved, and there is almost no situation of excessive safety investment. Therefore, when NPCR≤1, it is judged that the company's security investment is insufficient.

Step 5: Use the BP neural network model for sample training and predict the results.

Using the BP neural network toolbox in MATLAB (2016a) software to analyze the above data, it is found that when the number of hidden layer nodes in neural network training is 8 layers, the optimal prediction accuracy requirement is achieved. See Figure 4-1 for details

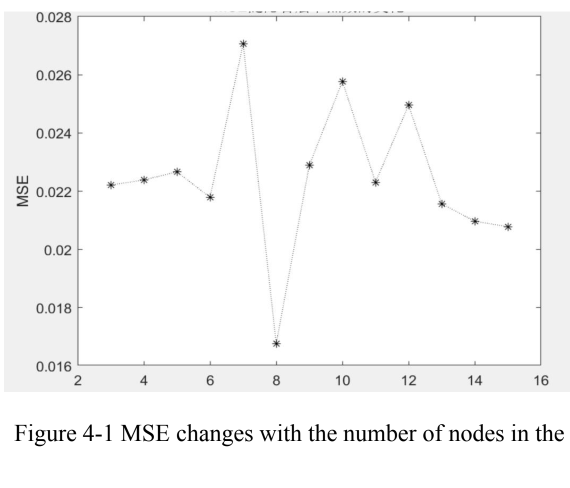

Figure 4-1 MSE changes with the number of nodes in the

hidden layer

Then, bring in the input index data for 2019 for calculation to test the reliability of the model. The specific results are shown in Table 4-2. Judging from the prediction results, the prediction accuracy of the BP neural network without the introduction of new input indicators is 72.22%, and the prediction results of five coal mining enterprises are wrong. It shows that the BP neural network model needs to be improved.

Table 4-2 Test results of BP neural network model data

Company Name	Stock Code	Actual Results	Predicted Results	Company Name	Stock Code	Actual Results	Predicted Results
Jingyuan Coal	000552	Insufficient	Insufficient	AnYuan Coal	600397	Insufficient	Insufficient
PingZhuang Energy	000780	Sufficient	Insufficient	Shanghai Energy	600508	Insufficient	Insufficient
Jizhong Energy Resources	000937	Insufficient	Insufficient	Turbine Coal	600971	Insufficient	Insufficient
Xishan Coal and Electricity	000983	Insufficient	Insufficient	Datong Coal	601001	Insufficient	Sufficient
Open-air Coal	002128	Insufficient	Insufficient	China Shenhua Energy	601088	Insufficient	Sufficient
Zhengzhou Coal	600121	Insufficient	Insufficient	HaoHua Energy	601101	Insufficient	Insufficient
Shanxi Lanhua Sci-Tech Venture	600123	Sufficient	Insufficient	Pingdingshan Coal Group	601666	Insufficient	Sufficient
Yanzhou Coal Mining Company	600188	Insufficient	Insufficient	Lu'an Environmental Energy	601699	Insufficient	Insufficient
Yangquan Coal	600348	Insufficient	Insufficient	China Coal Energy	601898	Insufficient	Insufficient

4.3 Evaluation and analysis of economic benefit of coal mine safety

The BP neural network is used to evaluate the safety and economic benefits of coal mines. The prediction results show that the safety efficiency prediction results of 13 coal mine enterprises are consistent with the actual results, and the accuracy rate is 72.22%. Among the 18 coal mining companies, only two have achieved sufficient safety investment, namely Pingzhuang Energy and Shanxi Lanhua Sci-Tech Venture and Technology. The remaining coal mine enterprises have insufficient safety output and cannot create economic benefits for enterprises through safe production.

For the 16 coal mines with insufficient output, it shows that these coal mines are not strictly controlling accidents and hidden dangers in their coal mine safety management. Due to insufficient safety investment, the management efficiency of accidents and hidden dangers is low, resulting in the failure of various input indicators. Give full play to its due role, and therefore fail to achieve optimal efficiency. In addition, in the process of data collation, it was discovered that Chinese listed coal companies lacked R&D expenditures, lacked the awareness of technological improvement, and could not make good use of technological means to conduct security calendars. At the same time, it was also discovered that although three of the five coal mines adopted data mining and information methods in the optimization of the basic structure of miners and safety training, none of the five coal mines adopted big data and information management methods to realize the prevention of accidents and accidents. The management of hidden dangers has led to a slight lack of control over the output indicators of these coal mines. Therefore, in order to achieve the most effective configuration of coal mine safety management, these coal mine enterprises should increase safety investment, increase the detection rate of hidden dangers in coal mines, reduce the number of accident casualties, and reduce safety losses.

5 Research conclusions and recommendations

5.1 Research conclusion

It analyzes the long-term equilibrium relationship between enterprise safety investment and economic benefits from the economics level, and explains the reason why profit is used as the financial indicator of coal enterprise safety investment, and further analyzes from a qualitative perspective based on the detailed content of coal enterprise safety investment The corresponding relationship between its safety investment and profit.

Increase investment in safety technology development. From the relationship between safety investment and economic performance, we can also know that the amount of enterprise safety investment is closely related to the effect of safety investment. If safety investment is good for improving safety, enterprises will increase investment, otherwise they are unwilling to invest. The government should increase investment in safety research departments, actively introduce advanced foreign technologies, and actively promote advanced and reasonable safety technologies to local coal mining enterprises

Using the BP neural network model, the construction of a "model + data" hybrid-driven coal mine safety economic benefit evaluation model is realized, and the coal mine safety management effectiveness evaluation and prediction method is improved. An empirical study of 18 coal mining companies from 2010 to 2019 using this model found that due to insufficient safety investment by listed coal companies in China, they cannot bring sufficient safety and economic benefits to companies.

5.2 Suggestions

5.2.1 Improve the level of economic development and promote the increase of safety investment

From the promotion of economic benefits to profits, we can know that the level of social and economic development will restrict the safety investment of coal enterprises to a certain extent. When the economic development of a country or region is slow and the profit margin of the enterprise is very low, it is difficult to guarantee the quantity and quality of safe investment funds. Therefore, maintaining the current economic growth rate and achieving sound and rapid economic development is the prerequisite and basis for safe investment.

5.2.2 Formulate corresponding policies to increase government security investment

The importance of government policies on safety will have a certain impact on the safety investment of enterprises. Therefore, when formulating policies, the central government should take into account that the hysteresis of safety investment makes it difficult for companies to see benefits in the short term. In view of the long-term equilibrium relationship between safety investment and economic benefits, the government should try to avoid policy effects. The ups and downs of the industry.

When economic development is in a period of high-speed operation, the economic conditions of the coal industry will achieve good economic benefits driven by the overall economy. At this time, relevant policies should be formulated to ensure that the profit rate of the coal industry is not lower than that of other industries to further ensure safe investment of funds When the economic development is at a low point, the economic status of the coal industry will also be greatly affected. The company will lose money, and the economic efficiency will drop sharply. At this time, corresponding subsidies and preferential policies should be formulated to ensure The stability of security investment funds will not be significantly different from the previous ones, and prevent enterprises from failing to withdraw security expenses.

We should also learn from similar experiences in developed countries, increase government investment in enterprise safety, and further improve the legal and regulatory guarantee system for coal mine safety production investment, clarify the main status of coal enterprise safety investment, and ensure that safety special funds can be used in actual production and management. The activities are truly implemented, and the special funds are dedicated.

5.2.3 Establish a scientific concept of safety investment and enhance awareness of safety investment

The scientific safety investment concept can have a positive effect on employees in actual production management activities. That is to say, in daily production activities, enterprises should recognize the lagging impact of safety investment on economic benefits, change their concepts, strengthen the awareness of safety investment, look at problems from a long-term and dynamic perspective, and correctly understand "safety is the best economic benefit. "The deep meaning of "in other words, safety can guarantee normal production and management activities, and economic benefits cannot compensate for the direct and indirect losses caused by lack of safety. Only when relatively sufficient safety investment is made in peacetime can the coal enterprises Production management activities form an effective guarantee to obtain economic benefits.

5.2.4 Establish a complete safety production, management and supervision system to ensure the effectiveness of safety investment

The various safety rules and regulations of coal mines are the institutional guarantee for safety investment, because safety rules and regulations are indispensable for the continuous production or the long-term survival and development of the entire coal enterprise. The safety system should have a certain degree of operability and must play the role it had when it was formulated, otherwise the safety investment will not have a significant effect on the economic benefits of the enterprise. Therefore, it needs to be formulated within the enterprise and the current production management status of the enterprise Comply with safety production, management and supervision systems, and conduct necessary supervision and inspection on the use of safety inputs in production and management to ensure the effectiveness of safety inputs.

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