Construction of Enterprise Legal Risk Prevention and Control System Based on the Rule of Law Environment

Xinyi Wei

Hainan Normal University, Hainan, China

13767497625@163.com

Abstract. Due to the growth of economy, the increasing competition in the reform of enterprise system and the emergence of legal constraints, it is urgent to raise the awareness of legal management in the management activities of enterprises. While facing opportunities, modern enterprises also face many challenges and risks. In the whole process of enterprise management, due to internal and external environmental factors, enterprises may face different legal risks all the time. In this article, the current situation of enterprise legal risk is analyzed, and the back propagation neural network (BPNN) is used to build an enterprise legal risk assessment model, which enriches the basic theory of legal risk assessment and improves the risk prevention and resolution ability and management efficiency of modern enterprises. Noise reduction is added to the algorithm, which optimizes the robustness of data features and improves the data generalization ability of BPNN model. After many iterations, the accuracy of this method is obviously better than that of the traditional BPNN model, with an accuracy of over 96% and an error reduction of 33.64%. Applying the legal risk assessment model based on BPNN can effectively shorten the response time of the system and reduce the incidence of legal risks in enterprises.

Keywords: Legal environment; Legal environment; Risk assessment.

1. Introduction

As a modern enterprise, it is inseparable from the protection and restraint of legal norms from the establishment, daily operation and management to dissolution and liquidation. From investment decision-making to day-to-day operation and management, as long as the adverse consequences are caused by ignorance or violation of laws, regulations and rules and regulations on market operation, industry norms, labor and personnel management systems, they can finally be attributed to the category of legal risks [1]. In China, which is in a rapid social transformation, in the process of social transformation with market economy as the core, the absence and variability of laws increase the environmental legal risks of enterprises [2]. At the same time, the legal palace and administrative law enforcement personnel, who are also economic men, are greatly influenced by economic interests in the process of driving discretion. Based on the requirements of the legal environment, enterprises must strictly abide by relevant laws and regulations, carry out business activities, enjoy legitimate rights and interests in accordance with the requirements of laws and regulations, and perform due duties and obligations [3]. Under the rule of law environment in the new era, it is an effective way for enterprises to seize opportunities, meet challenges, maximize their interests and make their sustainable development on the track of rule of law by minimizing or reducing their legal risks through legal, standardized and scientific management [4]. Only by deepening the popularization of law in enterprises and implementing comprehensive legal risk management can we do a good job in enterprise reform and development. Enterprise risk is value risk, which directly leads to the failure of business activities, rising costs, direct value loss and legal liability, etc. Therefore, the level of enterprise risk management determines the quality of enterprise operating efficiency to some extent [5]. Under the rule of law environment in the new era, enterprises should conform to the development trend of the times, abandon outdated management concepts and speculative psychology, be good at mastering and applying the concept of rule of law, manage enterprises in a legal, standardized and scientific way, take effective methods and measures, prevent various legal risks, resolve enterprise crises, and make enterprises develop sustainably on the track of rule of law [6]. As a kind of enterprise

risk, legal risk is no exception, so it is the proper meaning of enterprise risk management to standardize its management. The legal risk of an enterprise is the possibility that its illegal behavior or unfavorable legal environment will lead to the failure of its purpose, property and non-property losses, legal liability and other adverse legal consequences in the process of business activities [7]. The grim economic situation requires enterprises to shift from the traditional rule of law based on publicity to the establishment of a professional legal risk prevention and control system [8]. This article analyzes the current situation of enterprise legal risk, and uses BPNN to build an enterprise legal risk assessment model, which enriches the basic theory of legal risk assessment and improves the risk prevention and resolution ability and management efficiency of modern enterprises.

2. Methodology

2.1 Main principles of enterprise legal risk prevention and control

With the change of legal environment, the emergence of new types of legal risks, and the change of the scope and intensity of legal risks, the risk prevention and control system of enterprises should be adjusted accordingly. Entrepreneurs in the new era should conform to the development and changes of the times, accurately grasp the characteristics of the new era, be good at mastering and applying the method of rule of law to manage modern enterprises, hire professional lawyers with experience in preventing and managing legal risks of enterprises as legal consultants in time, and establish a legal affairs management system of enterprises under the guidance of lawyers. Good awareness of legal risk prevention and a good legal risk prevention system are important reference to ensure the good growth of enterprises, and are also magic weapons and weapons for the long-term growth of enterprises [9]. Therefore, enterprises must standardize all production and business activities of enterprises according to law and manage the business management behavior of all employees according to law. The market economy is changing rapidly, and the external legal environment of enterprises is also changing constantly. Therefore, the legal risk prevention and control system of enterprises should be a dynamic system. Every link of enterprise management, and the whole process of enterprise management affairs should be monitored in a streamlined and dynamic way. If we only rely on lawyers, legal advisers or internal legal affairs institutions of enterprises to manage the legal risks, the work will have no specific working object, be isolated and helpless, and become a passive relief afterwards, making it difficult to form a legal risk prevention system.

By implementing specific legal management means, enterprise legal advisers constantly improve internal legal management systems and processes, provide legal analysis opinions on specific business management links, conduct legal risk investigation, conduct legal risk demonstration and formulate risk control measures. Under the influence of the legal economy, it is required that the production and business activities of enterprises must abide by the provisions of the law. Only in this way can the whole market economy operate well and the individual growth of enterprises be long-lasting. In order to adapt to the development and changes of the domestic and international environment, leading cadres of enterprises must govern enterprises according to law and effectively improve their ability to govern enterprises according to law [10]. Legal risk prevention needs a feasible regulatory process and clear institutional guarantee, including risk information collection, assessment, prevention and control measures, emergency plans, etc., and there must be clear institutional control. Only under the guidance of professional lawyers, the internal legal affairs organization of the enterprise and all members of the relevant departments or branches of the enterprise consciously integrate and implement legal risk prevention into every link of their respective related work in accordance with the principles of classified management, division of responsibilities, hierarchical management and coordination, and conduct real-time and dynamic monitoring of related work in accordance with relevant processes. Enterprise legal risk management comes from enterprise management. To be integrated into the daily management of enterprises, it is necessary not only to prevent and control important projects and key processes, but also to control legal risks as a whole.

2.2 Enterprise legal risk assessment model

The legal risk prevention and control system of enterprises must be complete, scientific and effective at the same time, so as to truly serve the business growth of enterprises and effectively play the role of escort. The objectivity of risk means that risk is a derivative of human activities, and there is risk in human activities, while law is people's code of conduct and the objective reality of maintaining normal order. The objective reality of law and the objective reality of human activity risk have jointly achieved the objectivity of legal risk. This objective reality is manifested in the objective existence of the subject of legal relationship losing all costs because of the failure to achieve the purpose of behavior, and also in the objective reality of his personal and property damage and legal responsibility. The prevention and control of enterprise legal risks embodies comprehensive principles in terms of participants and fields involved. The prevention of enterprise legal risks requires the participation of all employees, including the management and all employees of the company, covering all aspects of enterprise management and running through the whole process of enterprise management. The BPNN model structure of enterprise legal risk assessment is shown in Figure 1.

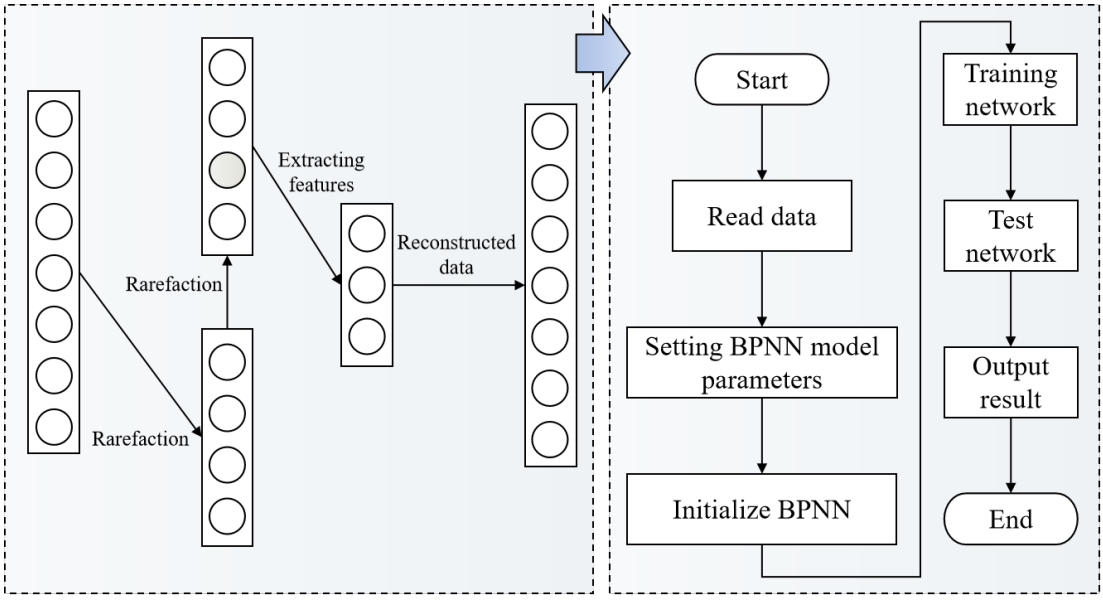


Figure 1. BPNN model

Before inputting the raw data into the BPNN neural network model, sparse constraints are first applied to optimize the data, and then noise is added to deviate from the data manifold to enhance the robustness of feature extraction. The preprocessed data is input into the BPNN model, and the hidden layer encoding process extracts features from the data. In enterprise legal risk assessment, the relationship between the risk level of the enterprise and the enterprise management data used for legal risk assessment is not linear, but nonlinear. For this reason, legal risk assessment must use kernel functions to establish nonlinear correspondence between enterprise management data samples and high-dimensional feature spaces.

With the changes in the economic environment and the degree of risk impact, the risk information database of enterprises should be kept updated, new and changing risks should be reevaluated, preventive measures should be formulated, and the risk management of enterprises should be kept in line with the actual growth of the enterprise. Legal risk prevention and control should start from the source and run through the entire process and various links of enterprise operation and management, achieving full process monitoring and management, and truly integrating legal risk prevention and control into the daily operation and management activities of enterprises.

Assume that the relevant legal risk indicators are set as X, and assume that there are N legal risk indicators. Let $X_1, X_2, \ldots, X_n$ independent variable, legal risk be set to Z, the value of Z is between 0 and 1. Predict the probability of legal risk occurring.

$$\sum(Z_i) = f\left(\beta_1 x_1 + \beta_2 x2 + \ldots + \beta_p x_{ip}\right) \tag{1}$$

When $Z=0$ and $Z=1$, Z is not sensitive to changes in X, and X needs a large change to cause a weak change in Z. Small changes in Z will have large changes in $\partial(p)$, which will change the function.

$$\frac{\partial\theta(Z)}{\partial Z} = \frac{1}{Z} + \frac{1}{1-Z} \tag{2}$$

Available:

$$\theta Z = 1n\left(\frac{Z}{1-Z}\right) = X'\beta \tag{3}$$

Due to:

$$1n\left(\frac{Z}{1-Z}\right) = X^T\beta \Rightarrow \frac{Z}{1-Z} = e^{XT\beta} \Rightarrow Z = \frac{e^{XT\beta}}{1+e^{XT\beta}} \tag{4}$$

Obtain:

$$Z = \frac{e^{X'\beta}}{1+e^{X'\beta}} \tag{5}$$

Enterprise management processes need to be scientifically and effectively designed and restructured, and legal control should be regarded as an indispensable part of internal control, making it a subsystem of systematic management processes that can achieve the self-operation and closed-loop control functions of the system. Enterprises need to dynamically track law firms with business connections and build a wide network of lawyer collaborations, in order to effectively utilize external lawyer resources for legal affairs that require hiring lawyers due to strong professionalism and special requirements of laws and regulations.

3. Result analysis and discussion

The data comes from CSMAR database. If a company has management anomalies, it is selected from its management data in the first two years. The public management data of 50 companies from 2017 to 2022 are selected as the explanatory variables of the model for the experiment, with the management data in 2022 as the true value and the data in 2017-2021 as the training data sample. Set the improved BPNN as a four-layer network structure, the learning rate of forward propagation and feedforward is 0.8, and the number of iterations is 2,000 and 5,000 respectively. The sigmoid function is used as the transfer function, and the particle dimension is set as the weight and threshold number of BPNN. The output node corresponds to the early warning result. In order to verify the accuracy of BPNN's legal risk assessment of enterprises, it is necessary to determine the expected output. If the actual output value differs greatly from the expected output value, the accuracy of the model is poor, otherwise, the accuracy of the model is great. In this article, 50 sample platforms are selected for verification and analysis. Compare the output data of BPNN model with the real financial investment data, as shown in Figure 2.

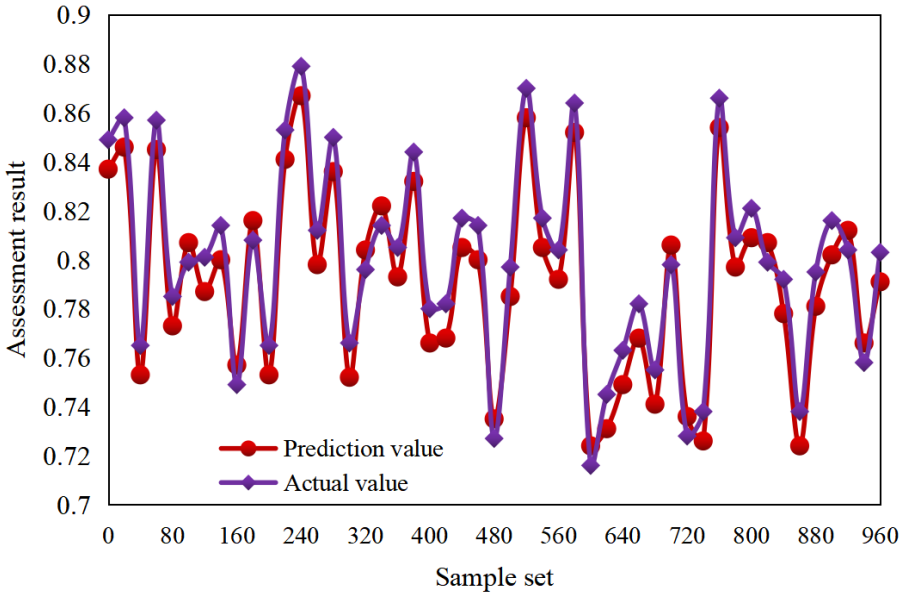


Figure 2. Learning results of BPNN model

BPNN model can well match the learned examples in the prediction of enterprise legal risk data. The legal risk assessment algorithm based on BPNN improves the data generalization ability of BPNN by increasing the noise reduction characteristics of the model input, that is, optimizing the original input data and increasing the robustness of the extracted features. The performance comparison results of enterprise legal risk assessment algorithms are shown in Figure 3.

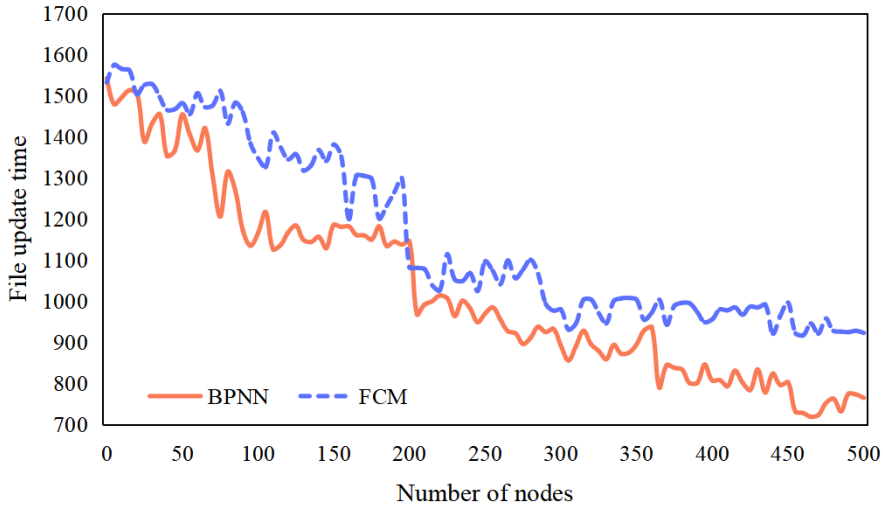


Figure 3. Performance comparison of algorithms

Because risk assessment is a nonlinear problem in essence, it can be transformed into a linear problem in a high-dimensional space by nonlinear transformation. The legal affairs system of an enterprise should be hierarchical. For general corporate legal affairs, it should be solved by the legal adviser of the enterprise, while for extraordinary and professional legal cases, professional lawyers should be hired to solve them. Enterprises form a firewall to isolate legal risks by establishing a legal affairs system combining legal consultants and professional lawyers. The indicators of enterprise legal risk estimation mainly refer to the indicators of the legal environment affecting the operation of enterprises and the indicators of the actual operation of enterprises. The changes of these indicators are usually used to explain the possibility of enterprise legal risk. However, these indicators are an organic whole, and they should be analyzed by comprehensive, related and dialectical methods. Compare the accuracy and MAE of BPNN model and BPNN model, and the results are shown in Figure 4 and Figure 5.

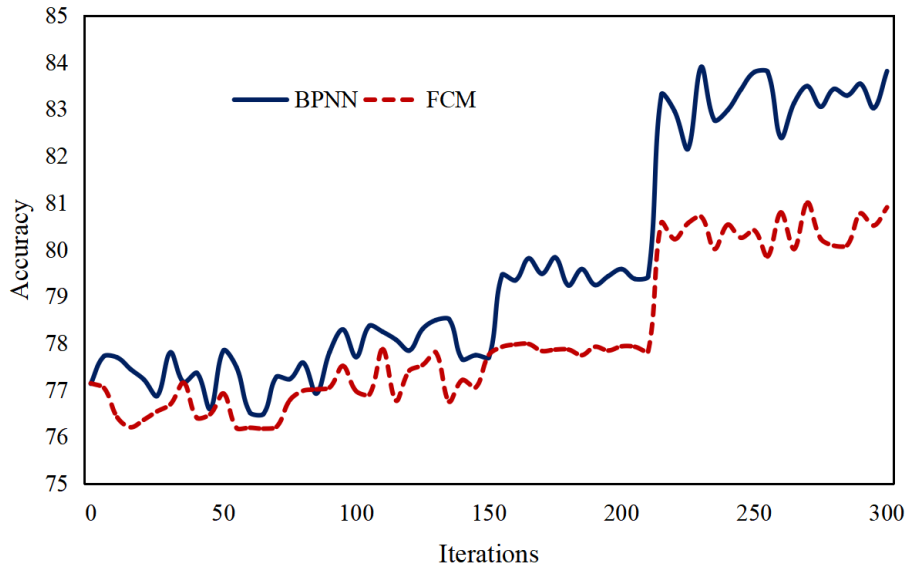


Figure 4. Accuracy comparison

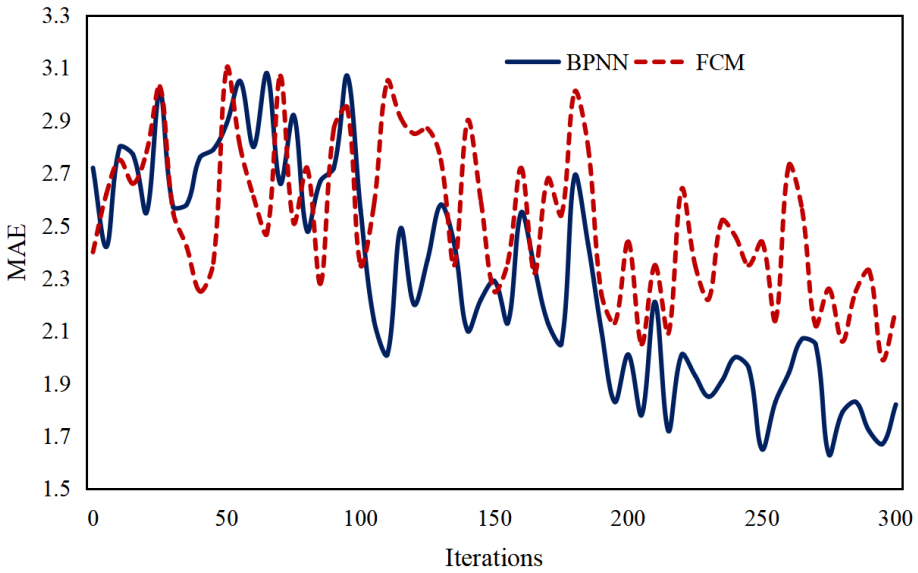


Figure 5. Comparison of MAE

As can be seen from Figure 4 and Figure 5, after many iterations, the accuracy of the proposed method is obviously better than that of the traditional BPNN model, with the accuracy reaching over 96% and the error reduced by 33.64%. The results show that BPNN is effective in legal risk prediction, and the improved BPNN legal risk prediction model enhances the robustness of the model and the rationality of initial weight threshold setting on the basis of maintaining the prediction advantage of neural network, and effectively improves the prediction performance of the prediction model. Enterprises should attach great importance to enhancing employees' legal awareness, vigorously publicize legal education, not only provide professional training for full-time legal personnel, but also strengthen legal risk training for management and key positions, so as to make them realize the potential legal risks in their positions, so as to achieve the purpose of preventing them in advance.

4. Conclusion

Enterprise risk is value risk, which directly leads to the failure of business activities, rising costs, direct value loss and legal responsibility. The grim economic situation requires enterprises to shift from the traditional rule of law based on publicity to the establishment of a professional legal risk

prevention and control system. Based on the requirements of the legal environment, enterprises must strictly abide by relevant laws and regulations, carry out business activities, enjoy legitimate rights and interests in accordance with the requirements of laws and regulations, and perform due duties and obligations. In order to solve the difficulties that the traditional risk assessment model is difficult to deal with highly nonlinear models and lacks adaptive ability, this article applies BPNN to the legal risk assessment system of modern enterprises, and optimizes the original input data by increasing the noise reduction characteristics of the model input. The experimental results show that after many iterations, the accuracy of this method is obviously better than that of the traditional BPNN model, with the accuracy reaching over 96% and the error reduced by 33.64%. The results show that BPNN is effective in legal risk prediction, and the improved BPNN legal risk prediction model enhances the robustness of the model and the rationality of initial weight threshold setting on the basis of maintaining the prediction advantage of neural network, and effectively improves the prediction performance of the prediction model. In the future research, it is necessary to select more sufficient samples to train the network and optimize the parameters of the model to further improve the accuracy of risk assessment.

References

[1] Wilkins D B, Trubek D M, Fong B. Globalization, Lawyers, and Emerging Economies: The Rise, Transformation, and Significance of the New Corporate Legal Ecosystem in India, Brazil, and China[J]. Harvard international law journal, 2020(2):61.

[2] Archimi C S, Reynaud E, Yasin H M, et al. How Perceived Corporate Social Responsibility Affects Employee Cynicism: The Mediating Role of Organizational Trust[J]. Journal of Business Ethics, 2018, 151(4):907-921.

[3] Ferris S P, Javakhadze D, Rajkovic T. An international analysis of CEO social capital and corporate risk-taking[J]. European Financial Management, 2017, 25(1):3-37.

[4] Bai M, Li S, Yu C, et al. The winner's curse in high-tech enterprise certification: Evidence from stock price crash risk[J]. International review of financial analysis, 2022(Jul.):82.

[5] Wang T S, Lin Y M, Werner E M, et al. The relationship between external financing activities and earnings management: Evidence from enterprise risk management[J]. International Review of Economics & Finance, 2018, 58(NOV.):312-329.

[6] Brooks R. An enterprise perspective of performance attribution: Introducing the keel model[J]. Journal of Risk, 2017, 20(2):53-84.

[7] Zhou T, Lu J, Wu C, et al. Distribution Characteristics of Wildfire Warning Risk and Fault Interval for Hunan Power Grid[J]. Automation of Electric Power Systems, 2018, 42(10):135-142.

[8] Beal J, Sakurahara T, Kee E, et al. Integrated Enterprise Risk Management to Synchronize Safety and Profitability Analysis for Nuclear Power Plants[J]. Transactions of the American nuclear society, 2020(Nov.):123.

[9] Gallucci R H. Risk-Reduction Credit for Very Early Warning Fire Detection at Nuclear Power Plants: From FAQ to Fiction[J]. Civil Engineering Journal, 2019, 5(2):309.

[10] Huang X, Liu X, Ren Y. Enterprise Credit Risk Assessment Based on Neural Network Algorithm[J]. Cognitive Systems Research, 2018, 52(DEC.):317-324.