Research on Project Knowledge Management Risk Early Warning Based on Bp Neural Network

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Abstract: On the premise of analyzing various evaluation methods and means and constructs the comprehensive evaluation model of external knowledge transfers risk of transformation enterprises. BP network has robustness and fault tolerance, it is distributed storage of information, local damage will be a certain degree of reduce the network performance, does not result in a catastrophic risk, tolerance with a larger error in the input value, and even individual errors exist, at the same time each activity unit has the independence of the information processing, which can realize the parallel computing, improve speed.

Key words: BP Neural Network, Engineering Projects, Knowledge Management, Risk Early Warning

1. Introduction
BP network has self-adaptive and self-learning habits, which means that the network can adjust its own performance according to changes in the external environment [1-3]. For example, when a new sample is introduced into the network, the network can automatically modify the parameters, adjust the mapping, and meet the new expected output [4-6].

2. Basic principle of BP neural network
To Propagation, you can perfectly solve the problem of multi-level neural network learning algorithm, which greatly promotes the vigorous development of neural networks. That's BP neural network. BP network is different from general linear neural network in that it can solve the problem of linear inseparability, which is closely related to its multiple intermediate layer structures. Historically, the exploration of neural networks has been at low ebb, and the key reason is that it cannot solve the learning algorithm of multi-layer networks.

2.1. Main ideas of BP neural network
In terms of structure, BP network is similar to multi-layer perceptron, and both belong to multi-layer feed forward neural network. It is the core of forward network and the essence of the whole artificial neural network system. It is widely used in practice because of its advantages, such as simple structure, many algorithms, rich optional parameters and high controllability. According to the analysis of
relevant literature, BP network or its variant is used in 8-90% of the model construction of neural network.

BP network contains three or more layers of neurons, specifically: input layer, middle (hidden) layer and output layer. The connections between adjacent levels are fully connected, while the neurons of the same level are independent of each other. The following is the most representative three-layer structure, namely the neural network with and only one hidden layer, as shown in Figure 1 below.

![Figure 1. Engineering project system based on BP neural network.](image)

BP network belongs to typical supervised learning, the learning of any training samples, and a signal corresponding to the teachers, the signal represents the environmental information, and use it as the expected results, calculate the expected results and actual values when learning differences, and to the direction of the deviation and deviation degree for according to fixed network weights, so that to make it accord with the preset accuracy standard. BP algorithm is mainly composed of two parts: forward signal propagation and reverse error propagation, in which memory training and learning convergence activities are continuously carried out.

2.2. Applicability of BP network to risk assessment of external knowledge transfer in enterprise transformation

Risk assessment of external knowledge transfer of enterprises in transition is the primary basis for all kinds of prevention and control. Only by making assessment and prediction in advance, including the time of possible outbreak and the magnitude of impact, can we make good preparations for the next stage of prevention and management, and reduce the probability of occurrence and damage caused by risks at a small cost.

However, when these methods are used for evaluation, many weight allocation and setting are set artificially because of their subjective components, which reduce the accuracy of decision making. In view of this, it is difficult to construct a perfect and accurate analysis model.

3. BP neural network based external knowledge transfer risk assessment model of transformation enterprises

3.1. Risk research on knowledge management of engineering projects

Comprehensive transformation enterprise external knowledge transfer risk prediction model construction practice, and finally determined the BP neural network modeling reasons are as follows: transformation of enterprise belongs to the typical nonlinear complex system, its external knowledge transfer activity, the risk is also the nonlinearity and BP activity inhibition or activation state of the unit, on behalf of the mathematical relationship is nonlinear relationship, the knowledge stored in the connection weights of the BP network, which can realize all kinds of nonlinear mapping, without the
need of human risk factors for enactment right weight;

3.2. Model construction
Because BP neural network is based on the teacher's learning model, the first task is to set training set for it when it is used to deal with and solve problems in a practical situation. The work of designing a practical BP network is embodied in: determining the number of layers, the number of nodes in each layer, learning parameters and methods, and activation functions.

3.3.1 Number of network layers
Multiple intermediate layers can be selected for BP network. However, it is found by practice that the network with only one middle layer can increase the number of active units to complete the mapping of arbitrary nonlinear. So, for most practices, a single hidden layer will do the trick. This paper also selects a three-layer BP network which can approximate any nonlinear function to construct the comprehensive evaluation model of external knowledge transfer risk of transformation enterprises.

3.3.2. Determination of the number of nodes in the input layer
The dimension of the input vector directly affects the number of nodes in the input layer. When dealing with specific problems in practice, it is necessary to abstract out a model after analyzing the problems and determine the input and output space. It is not difficult to see that the dimension of the input vector will be limited by the representation form of the sample. The index system obtained in this paper is based on a total of 17 risk factors, and the number of nodes in the model input layer is indeed set as 17, as shown in Figure 2 below:

![BP network structure for project knowledge management.](image)

4. Risk prevention and control of engineering projects based on BP neural network
The ultimate purpose of risk identification, assessment and prediction is to control risks and reduce losses caused by risks. Transformation of external knowledge transfer of risk prevention and control is to minimize the external knowledge transfer can lead to the risk of loss in the process, transformation of enterprises through risk strategy choice, adopt various forms of the risk management measures with pertinence, design risk prevention mechanism in order to more comprehensive, have a room to deal with all kinds of risks. The above research results, namely the BP network risk prediction model, are used to evaluate the magnitude and degree of the comprehensive risks faced by the organization, and then effective prevention and control strategies are selected according to the respective characteristics of each risk. Specifically, there are several risk management strategies.

4.1. Risk Acceptance
During the inter-organizational knowledge transfer activities in the process of organizational transformation, some risks are less likely to occur and cause less harm. Moreover, it is difficult to impede the development of core competitive advantages of enterprises in transformation, and it will not affect the smooth progress of knowledge transfer and industrial transformation. In this case, the organization can adopt an acceptance strategy, for example, not because of its reasons, but because of who I am to transfer the content itself tacit, enterprise cultural background differences between the objective factors, such as the transformation of enterprise should correctly recognize the existence of the risk, and choose the attitude of tolerance, especially in the imparting of knowledge is close to the party and the transformation of enterprise, trust each other.

4.2. Risk transfer
Risk transfer strategy refers to the transfer of risks, which is a means for enterprises to transfer part of risks to other third-party individuals and organizations in the form of signing contracts or non-contracts. In fact, this strategy does not take measures to reduce the possibility of causing risks and the impact of adverse consequences, but only by contract and other means to pass on to others. Of course, when choosing this strategy, it is necessary to transfer risks appropriately according to the scope of its risk bearing capacity and the actual level of risk management, and at the same time give benefits consistent with its contribution. For example, in the process of external knowledge transfer, enterprises in transition are faced with relatively large risks in the development of new technologies. In this case, enterprises in transition can use the risk transfer strategy to cooperate with other enterprises with strong capital and scientific research strength or scientific research units for development, so as to transfer some risks.

4.3. Risk Mitigation
Risk mitigation strategy refers to that enterprises in transition are faced with risks that cannot be completely avoided or controlled by the organization in the process of external knowledge transfer. They are able to cope with such risks from financial and technical aspects with a proactive mind and try their best to reduce the impact of damage. For example, for the external knowledge transfer of enterprises in transition, opportunism is difficult to be eradicated. However, as long as enterprises in transition make active use of effective constraint mechanism or formulate reasonable income distribution system and other means, the probability of opportunism can be reduced.

5. Conclusion
All in all, external knowledge transfer activities in transition period, the risk faced with complex diversity, what kinds of risks specific transformation of enterprises should take what kind of prevention and control measures, enterprises need to transition according to oneself circumstance and the requirement of the external environment, coordinate various management means, to reduce the incidence of risk and its maximum damage.

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