A Study of the Virtual Enterprise Risk Control is based on the Smart-Optimized Technology

Wei Luo

Guangzhou Panyu Polytechnic, Guangzhou, Guangdong, 511483, China
Corresponding author's e-mail: luow@gzpyp.edu.cn

Abstract
The virtual enterprise has been a new product developed in the form and management model of the modern corporate organization and has been a product of a rapid response to the market, there has been also a lot of risk, so the virtual business has got the desired profits you must avoid the risk that may occurred. This article has analyzed virtual business and analyzed the risk characteristics and risk factors of virtual business, comparing them to traditional companies, which have been more of a management risk. In addition, study how to manage the risks of virtual enterprises. The control methodology for the classification of risk-sharing in the virtual enterprise sector has been discussed and has been optimized the risk of enterprise decisions to reduce the cost of risk.

Keywords: *GLS algorithm; Genetic algorithm;Intelligent optimization*

1. INTRODUCTION

In the new global economic market, virtual companies are evolving in tandem with the iterative process of information technology. There are already a lot of companies in this way to organize the resources that the company have and seize the opportunity to change quickly. [1] There are now many enterprises have established the model of virtual enterprise, will further reinforce the cooperation between enterprises, in order to avoid risks due to market uncertainty caused by using fewer resources to gain the competitive advantage, but also to prevent the enterprise scale puffiness, allow enterprises to keep safe state. [2] There are also some companies, such as Jiangsu Little Swan and Zhejiang Gao Bang Clothing Group Co., Ltd, which has also established a virtual business to manage its core business, and its core business has also been successful to complete the rapid rise of modern enterprise. Virtual business has very good flexibility and competition. [3] However, while the virtual business has allowed companies to have more success, it has also increased the risk of the unknown, and business management has become more volatile and unmanageable. So, if you want to get the virtual company to reach the management goals, which were set before, you have to manage the business risk better. Now, with the depth of the study of risk management, and the deepening awareness of the virtual business, there is a better understanding of how risk management has been conducted. [4]

2. STATE OF THE ART

As early as the 30s of last century, there were risk management related research work. Then, after twenty years of development, with formal academic research institutions, and in the seventy years of last century, foreign developed countries have set up their own risk management research departments. Now the theory of risk management is more mature, both economists and enterprise managers pay great attention to risk management. [5] The basic definition of the virtual business is to use various methods to analyze risks pertinent, and formulate corresponding management measures to control and avoid risks in business process. This model of managing risk in advance can minimize the risk-control costs, reduce the adverse consequences of risk, and ensure that the firm's established planning works smoothly. [6] It is also the core goal of risk management. The risk of virtual enterprise is the general term for the unstable factors that the virtual enterprise may face in the market environment. Because of the varies changes in the external market, the management risk cannot be fully avoided, coupled with the rapid development of science and technology today, the social productivity is greatly improved, but also greatly enhance the ability of manufacturing products, whether the product type, size, or production efficiency is a qualitative improvement, the product requirements are more high standards and more demand. This creates more

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space for business, and makes companies more risk-averse. [7] In order to better predict business opportunities and risks, one of the models of virtual enterprises is born.

3. METHODOLOGY

3.1.GLS algorithm

The guidance type local search (GLS) can get rid of the local minimum value, and can solve a variety of combinatorial optimization problems.Dynamic GLS and tabu search method to modify the community structure is different, GLS is the search structure in the continuous transformation, which makes the search to escape from the local minimum problem, that is to say the structure and neighborhood structure search solutions in the process of change, change is the objective function. GLS can be regarded as a new search algorithm. With the help of the concept of feature and penalty, it can identify all kinds of information by itself, and calculate the best search plan to avoid local minimum.

GLS is a search for logic analysis， which is based on the principle of the solution characteristic. The solution characteristic can analyze the differences between each solution. In the process of analysis, there is a cost value of c_i. And the result of all the analysis are grouped together $M=\{1,2,\ldots,m\}$, That is to say, the analysis results s can be described using a solo sign. The result of the analysis can be expressed in a function expression $I_i(s)$ as:

$$I_i(s)=\begin{cases}1\\0\end{cases} \tag{1}$$

After defining the characteristics of the solution, the penalty function is added to the previous function expression, and the specific content of the penalty item can be expressed by m, so the function is changed. The new function formula is:

$$h(s)=g(s)+a\sum_{i=1}^{m}p_iI_i(s) \tag{2}$$

In this formula: $h(s)$ represents the results that has changed in the objective function, $g(s)$ is the primitive objective function, the penalty function $I_i(s)$ solution by all indexes weighted and multiplied by a total of standardized coefficient a, the weight of p_i is called the penalty coefficient, the integer value represents the result of in the constraint of the solution features of i, specifically the number of characteristics of i accept the punishment.

The parameter a is modulated by a relative relationship between the penalty and the initial function. The original value of p_i was 0. In the search process, $util_i(s)$ is used to measure the usefulness of each solution S and every feature i.

$$util_i(s)=I_i\frac{c_i}{1+p_i} \tag{3}$$

Among them, c_i is the loss relative to each feature $i\in M$ .The penalty in the search analysis is characterized by the highest value of the useless value $util$, adding 1. of its penalty value.

When the local optimal value is obtained, the above method will not stop the search, and will continue to change the energy function to break the current local optimal value. To obtain more local optimization values, the optimal solution is searched by continuous calculation. For the most convenient way to finish the model, we simulated the situation. If every member enterprise has all kinds of risk and control methods, risk control measures are still changing during operation. Multiple measures can be used to control the same risk (but each method can only control one risk). Each measure has multiple levels of debris to control different levels of risk.

In this paper, the above problems are solved by two levels of planning. The mathematical model of this problem is as follows:

The upper level model is specifically described as:

$$\max E\left\{G\times\prod_{m=1}^{M}O_m\left(\hat{R}_m\right)-\sum_{m=1}^{M}C_m\left(\hat{R}_m\right)\right\} \tag{4}$$

The upper level model is specifically described as: $\hat{c}_{ml}\le C_m^{\max}$

The objective function (1) represents the alliance profit. The constraints (2) refers to every member of the risk control of the investment must be less than or equal to the maximum amount of investment alliance. Parameters used in the model: ① $R_m^*\in[0,1]$ the best risk control level m of the member enterprises; ② M ： the number of members; ③ $G>0$ ： total revenue of the alliance without risk; ④ $C_m^{\max}>0$ ： the largest investment m of the member enterprises; ⑤ $V^{\max}$ ： risk evaluation level; ⑥ v_l evaluation of the risk assessment of the level l of the corresponding value.

$$O_m\left(\hat{R}_m\right)=\begin{cases} o_{ml}\left(\hat{R}_m \le v_1\right) \\ o_{ml}\left(v_{l-1} < \hat{R}_m \le v_l\right), l = 2,\ldots,v^{\max} \end{cases} \tag{5}$$

Function effect on the total income risk alliance m members. $o_{ml} \in [0,1]$ said the m members when the risk rank of l when the union rate of return.

The optimal solution of the model is for the upper levels of $\{R_m^*(\forall m)\}$ the optimal risk control of member enterprises.

The lower layer model is specifically described as:

$$\min E\left\{\sum_{n=1}^{N_m}\sum_{i=1}^{B_{mn}}\sum_{t=1}^{D^{\max}}\left(x_{mni}^t \times d_{mni}^t\right)\right\} \tag{6}$$

The following constraints exist in the above formula:

$$\sum_{n=1}^{N_m}\sum_{i=1}^{B_{mn}}\sum_{t=1}^{D^{\max}}\left(x_{mni}^t \times d_{mni}^t\right) \le C_m^{\max} \tag{7}$$

$$x_{mni}^t = \begin{cases} 1 & c_{mni} = t \\ 0 & otherwise \end{cases} \tag{8}$$

$$R_m \le R_m^*(\forall m) \tag{9}$$

Among them:

$$F_{mnj}\left(c_{mni}\right) = \begin{cases} f_{mni}^t & c_{mni} = t \\ 0 & otherwise \end{cases} \tag{10}$$

Among them:

$$\left(0 < f_{mnj}^1 < \ldots < f_{mnj}^t < \ldots < f_{mnj}^{D^{\max}} \le 1\right) \tag{11}$$

$$\left(0 < d_{mnj}^1 < \ldots < d_{mnj}^t < \ldots < d_{mnj}^{D^{\max}}\right) \tag{12}$$

The function $G_{mnj}\left(c_{mni}\right)$ and $F_{mnj}\left(c_{mni}\right)$ have the same structure. Target function (3) describes the minimum investment. Constraints condition (4) indicates that the m member enterprises must invest less than or equal to the largest amount of investment in the union ;(5) x_{mni}^t indicates that the i mark m measures the n risk by members of the t section of the capital; (6) is the level of actual risk control among all members. (7) Function $F_{mnj}\left(c_{mni}\right)$ indicates that the m member enterprises use the n risk of the i measures to control the degree of the risk, and in terms of probability, $G_{mnj}\left(c_{mni}\right)$ the impact on the outcome.

3.2. Genetic algorithm

A genetic algorithm is a computer algorithm model derived from the genetic laws of nature. The specific implementation steps of the genetic algorithm are shown in Figure 1.

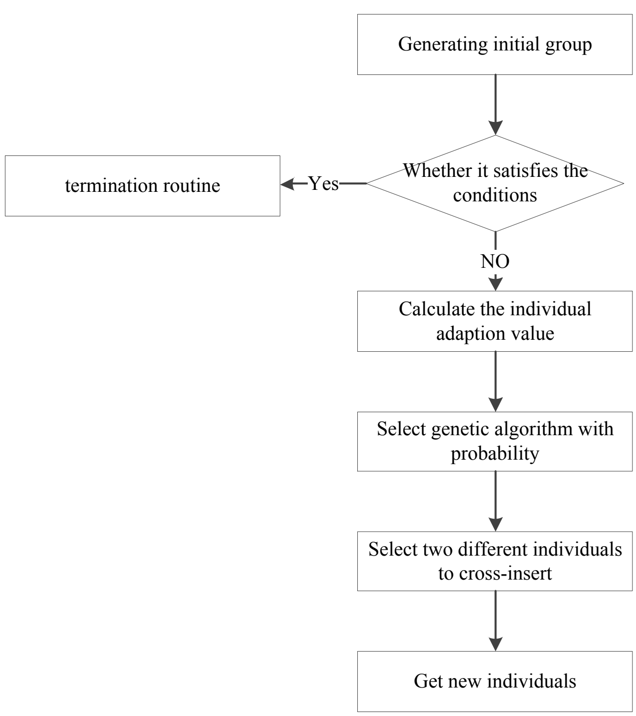

Fig. 1 The specific implementation steps of genetic algorithm

$A(t)$ is a group of groups in the t generation, and using $A_j(t)(j=1,2,\cdots,n)$ to represent the t individual string of the j generation group. The number of successful samples in the t generation population $A(t)$ is m ,and it is recorded as $m(H,t)$. Therefore, in the selection process of the next group of group individuals, a string A_j is complex with probability $P_j = f_j / \sum f_i$, f_j refers to the specific fitness $A_j(t)$ of the individual. The genetic number of the whole generation of population genetic generation is n , and there is a degree of inconsistency between the characteristics of the individuals in the group and the H number of samples in the $t+1$ generation:

$$m(H,t+1) = m(H,t)n\frac{f(H)}{\sum f_i} \tag{13}$$

In the formula, $f(H)$ is at the t moment corresponding to the pattern of a string of average fitness.

Setting the average fitness for the group as $\bar{f} = \sum f_i / n$, so

$$m(H,t+1) = \frac{m(H,t)\, f(H)}{\bar{f}} \tag{14}$$

Assume that the model H is higher than the average fitness of the population pattern part $c\bar{f}$, c is constant, there are,

$$m(H,t+1) = m(H,t)\frac{\bar{f}+c\bar{f}}{\bar{f}} = (1+c)m(H,t) \tag{15}$$

Suppose that from the beginning of the $t=0$, c keeps the constant value, then there is,

$$m(H,t+1) = m(H,0)(1+c) \tag{16}$$

The crossing point of the current mode H is only in the probability of survival under simple crossover $P_s = 1-\delta(H)/(t-1)$. The definition of mode H1 is 4. When the intersection point is randomly generated at 6-1=5 locations, the probability of H1, which is destroyed is $P_d = \delta(H_2)/(m-1) = 1/5$,the probability of survival is 4/5.

And the intersection itself is in a certain probability P_c, so the survival probability of the pattern H is

$$P_s = 1 - P_c P_d = 1 - P_c \cdot \delta(H_2)/(m-1) \tag{17}$$

Now we consider the possibility of cross occurring within the definition of the distance, and the mode H is not destroyed. If the string crossover with the A is on the position 2,6, one is the same as that of the A , then H1 will be retained. Considering this, the survival probability given by formula (6) is only a lower bound.

$$P_s 1 - P_c \cdot \delta(H)/(m-1) \tag{18}$$

It can be seen that patterns in the short length of the crossover operator will increase.

It is assumed that the probability of a change in a position of a string is P_m , the probability of location invariant is $1-P_m$, so the probability of keeping the pattern H unchanged is $(1-P_m)^{o(H)}$, Where $o(H)$ is the order of the pattern H . When $P_m << 1$, the survival probability in the H model under the action of the mutation operator

$$P_s = (1-P_m)^{o(H)} \approx 1 - o(H)P_m \tag{19}$$

To sum up, the sample number of the sub generation of the pattern H is

$$m(H,t+1) \geq m(H,t)\frac{f(H)}{\bar{f}}[1-P_c\frac{\delta(H)}{l-1}][1-o(H)P_m] \tag{20}$$

Type (19) ignores the minimal term $P_c \cdot \delta(H)/(l-1) + o(H)\cdot P_m$ .The realization process of the whole pattern theorem can be completely deduced by the formula (20)

4. RESULT ANALYSIS AND DISCUSSION

The virtual enterprise is a new production mode, which based on Dynamic Alliance agile manufacturing, and creatively summed up a new business model called "virtual organization". Compared with the traditional business mode, the new business mode has the advantages of high quality, low cost and fast response to the market, but it has high operational risk. This paper adopts the design of intelligent computer algorithm and implement the risk control model of a virtual enterprise, each kind of algorithm in computer science has its own characteristics and the inherent shortcomings, so in order to achieve better effect often requires a combination of the advantages of the two or more than two kinds of intelligent algorithm to some original algorithms are optimized to to improve the practical ability of the algorithm to solve the problem in order to form a kind of improved algorithm. This advantage can not only give full play to advantages and disadvantages, but also give full play to the advantages of all kinds of intelligent algorithms, and at the same time, it can also guarantee the overall quality of the final results obtained by intelligent algorithm. Based on the above reasons, this article will using the GLS algorithm and genetic algorithm to design and implement a risk fuzzy comprehensive evaluation risk evaluation model of virtual enterprise is evaluated, in order to implement the virtual enterprise risk control. The risk assessment process is shown in Figure 2.

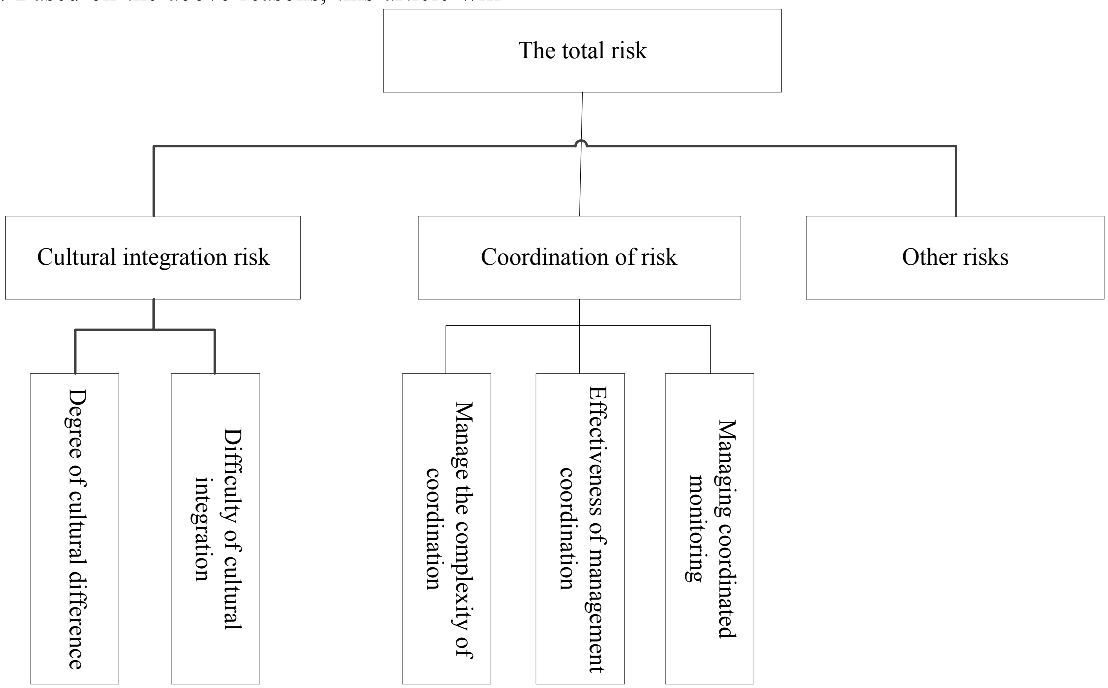

Fig. 2 Risk assessment process

First, a virtual enterprise is a production project, the project processes have different completion time, corresponding to the different cost of completion and completion probability, and the completion of the project completion time, and cost and completion probability is different. The decision makers according to their actual situation chose suitable measures. The problem studied in this paper is in the cost and schedule requirements of users under certain conditions, to minimize the maximum completion probability of each process project. So before the risk assessment of virtual enterprise, the mathematical model of Mark off is adopted to solve the different production process of the virtual enterprise by transfer matrix. The fruit is as follows:

The results of solving the task plan transfer matrix are as follows:

$$P=\begin{pmatrix} 0 & 0.24t & 0.05t & 0.24-0.05t & 0.76-0.24t & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.27t & 1-0.27t \\ 0 & 0 & 0 & 0 & 0 & 0.2t & 1-0.2t \\ 0 & 0 & 0 & 0 & 0 & 0.15t & 1-0.15t \\ 0 & 0 & 0 & 0 & 0 & 0.1t & 1-0.1t \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad (21)$$

The result of the solution of the transfer matrix of technical design is as follows:

$$P=\begin{pmatrix} 0 & 0.07t & 0.015t & 0.26-0.015t & 0.74-0.07t & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.08t & 1-0.08t \\ 0 & 0 & 0 & 0 & 0 & 0.06t & 1-0.06t \\ 0 & 0 & 0 & 0 & 0 & 0.04t & 1-0.04t \\ 0 & 0 & 0 & 0 & 0 & 0.02t & 1-0.02t \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \quad (22)$$

The result of the solution of the transfer matrix of mechanical assembly design is as follows:

$$P=\begin{bmatrix} 0 & 0.08t & 1-0.08t & 0 & 0 \\ 0 & 0 & 0 & 0.08t & 1-0.08t \\ 0 & 0 & 0 & 0.02t & 1-0.02t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad (23)$$

The result of the solution of the transfer matrix of electrical assembly design is as follows:

$$P=\begin{bmatrix} 0 & 0.16t & 1-0.16t & 0 & 0 \\ 0 & 0 & 0 & 0.16t & 1-0.16t \\ 0 & 0 & 0 & 0.03t & 1-0.03t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \quad (24)$$

The results of the purchase transfer matrix of raw materials and purchased parts are as follows

$$P=\begin{pmatrix} 0 & 0.07t & 0.022t & 0.294-0.022t & 0.706-0.1t & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.12t & 1-0.12t \\ 0 & 0 & 0 & 0 & 0 & 0.09t & 1-0.09t \\ 0 & 0 & 0 & 0 & 0 & 0.06t & 1-0.06t \\ 0 & 0 & 0 & 0 & 0 & 0.03t & 1-0.03t \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \tag{25}$$

The result of the solution of the transfer matrix of the mechanical assembly process rules is as follows:

$$P=\begin{bmatrix} 0 & 0.12t & 1-0.12t & 0 & 0 \\ 0 & 0 & 0 & 0.12t & 1-0.12t \\ 0 & 0 & 0 & 0.03t & 1-0.03t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{26}$$

The result of the solution of the transfer matrix of the part design is as follows:

$$P=\begin{bmatrix} 0 & 0.082t & 1-0.082t & 0 & 0 \\ 0 & 0 & 0 & 0.08t & 1-0.08t \\ 0 & 0 & 0 & 0.02t & 1-0.02t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{27}$$

The result of the solution of the transfer matrix of the electrical assembly process regulations is as follows:

$$P=\begin{bmatrix} 0 & 0.4t & 1-0.4t & 0 & 0 \\ 0 & 0 & 0 & 0.4t & 1-0.4t \\ 0 & 0 & 0 & 0.15t & 1-0.15t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{28}$$

The results of making the material quota matrix are as follows:

$$P=\begin{bmatrix} 0 & 0.27t & 1-0.27t & 0 & 0 \\ 0 & 0 & 0 & 0.4t & 1-0.4t \\ 0 & 0 & 0 & 0.15t & 1-0.15t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{29}$$

The solution of the transfer matrix of parts machining is as follows:

$$P=\begin{pmatrix} 0 & 0.12t & 0.26-0.03t & 0.03t & 0.74-0.12t & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.12t & 1-0.12t \\ 0 & 0 & 0 & 0 & 0 & 0.09t & 1-0.09t \\ 0 & 0 & 0 & 0 & 0 & 0.06t & 1-0.06t \\ 0 & 0 & 0 & 0 & 0 & 0.03t & 1-0.03t \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \tag{30}$$

The result of the solution of the transfer matrix of mechanical assembly is as follows:

$$P=\begin{pmatrix} 0 & 0.0375t & 0.24-0.009t & 0.009t & 0.76-0.0375t & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.0375t & 1-0.0375t \\ 0 & 0 & 0 & 0 & 0 & 0.027t & 1-0.027t \\ 0 & 0 & 0 & 0 & 0 & 0.018t & 1-0.018t \\ 0 & 0 & 0 & 0 & 0 & 0.009t & 1-0.009t \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \tag{31}$$

The result of the solution of the transfer matrix of electrical assembly is as follows:

$$P=\begin{bmatrix} 0 & 0.4t & 1-0.4t & 0 & 0 \\ 0 & 0 & 0 & 0.4t & 1-0.4t \\ 0 & 0 & 0 & 0.15t & 1-0.15t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{32}$$

The results of the debug transfer matrix are as follows:

$$P=\begin{bmatrix} 0 & 0.4t & 1-0.4t & 0 & 0 \\ 0 & 0 & 0 & 0.4t & 1-0.4t \\ 0 & 0 & 0 & 0.15t & 1-0.15t \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{33}$$

After solving the transfer matrix of different production processes of a virtual enterprise, we need to describe the specific process of its production process in detail. At present, the virtual enterprise mainly produces a vehicle, and its specific production process is shown in Table 1.

Table.1 Process risk planning results

A The name of the process	The corresponding time for each process	Completion probability	Completion cost
B Technical appointments	2	0.3972	359
	3	0.7257	325.5
C Technical design	8	0.4896	3084
	9	0.5913	3045
	10	0.702	3006
D Mechanical assembly design	8	0.4672	2180
	9	0.5688	2140
	10	0.68	2100

E Electrical assembly design	4	0.4528	545
	5	0.67	525
F Purchase of raw materials and purchased parts	5	0.4356	4561
	6	0.58068	4432
	7	0.74508	4303
G Mechanical assembly process specification	5	0.42	1080
	6	0.5688	1056
	7	0.7392	1032
H Parts design	8	0.475	2172
	9	0.578	2132
	10	0.692	2090
I Electrical assembly process specification	1	0.25	224
	2	0.7	208
J Material quota	2	0.3836	557.5
	3	0.7131	523.75
K Parts processing	5	0.4755	897
	6	0.63	852
L Mechanical assembly	16	0.4623	4128.8
	17	0.508	4061.1
	18	0.555	3993.4
	19	0.605	3925.7
	20	0.6558	3858
M Electrical assembly	1	0.25	224
	2	0.7	208
N Debugging	1	0.25	310
	2	0.7	270

Through the coordination and analysis of the risk of the above processes, the set of elements of the evaluation is obtained as follows: U={ The complexity of management coordination, the effectiveness of management coordination, and the monitoring of management coordination }, Because of their different effects on risk, they have different weights in different reasons: $A=(\omega_1,\omega_2,\omega_3)$ The evaluation set of the factors is: $V=\{$ Low, low, medium, high, high $\}$, And the value of each element is given to the evaluation set: $V=(0.1,0.3,0.5,0.7,0.9)$; Then, according to the above elements, we finish the evaluation work and put all the evaluation results in the interval of $[0,1]$, so we know the arrangement of fuzzy relation matrix. $H=\begin{bmatrix} h_{11} & h_{12} & h_{13} & h_{14} & h_{15} \\ h_{21} & h_{22} & h_{23} & h_{24} & h_{25} \\ h_{31} & h_{32} & h_{33} & h_{34} & h_{35} \end{bmatrix}$ Then, the fuzzy comprehensive evaluation is completed, $B=A\cdot H$ and do the normalization processing of B. Finally, the risk factors are adjusted: $r=B\cdot V^T$ According to the risk of risk, give the corresponding right vector of each risk $Z=(z_1,z_2,\ldots,z_n)$.According to the weighted average method, the risk management model can be obtained as follows:

$$\max\{\min b_i(t_i)\ i=1,2,\cdots,N\} \tag{34}$$

$$s.t.\ \sum_{i=1}^{N} C_i(t_i)\le C_0 \tag{35}$$

$$\sum_{i=K} t_i \le T_0 \tag{36}$$

In this formula, the variable t_i represents the completion time of the process i ;the variable $b_i(t_i)$ represents i process completion time as t_i corresponds to the probability of completion; the variable $C_i(t_i)$ represents i process completion time as t_i corresponding to the cost; the variable K represents a key process set; the variable N represents the number of processes; the variable T_0 represents the provisions of the project completion time; the variable C_0 represents provisions of the project completion cost.

Matlab software static analysis algorithm for the model, we obtain the following results: in evolutionary algebra GN, effect of the number of individual adjustment of initial population of Pop-size Pc crossover rate and mutation rate of Pm under the same condition of success rate. Each adjustment do 50 experiments, the results obtained are shown in table 2:

Table.2 The influence of the initial population Pop-size on the yield

Pop-size	GN	Pc	Pm	best rate
50	200	0.7	0.1	100%
40	200	0.7	0.1	95%
30	200	0.7	0.1	80%
20	200	0.7	0.1	55%
10	200	0.7	0.1	35%

It can be clearly seen from this table that the small number of individuals in the initial population will result in too few sampling points, which seriously affects the optimization performance of the algorithm.

The evolutionary algebra is adjusted in the case of the number of individuals, the cross rate and the variation rate of the initial population: 50 experiments are done each time, and the results are shown as shown in Table 3.

Table.3 The influence of the evolution algebraic GN on the yield

Pop-size	GN	Pc	Pm	best rate
50	200	0.7	0.1	100%
50	160	0.7	0.1	95%
50	120	0.7	0.1	85%
50	80	0.7	0.1	70%
50	40	0.7	0.1	50%

From this table, it is clear that too little evolutionary algebra may lead to incomplete evolution of the algorithm, thus reducing the probability of the appearance of the approximate optimal solution.

The cross rate is adjusted in the case of the number of individuals, evolutionary algebra and mutation rate in the initial population: 50 experiments are done each time, and the results are shown as shown in Table 4.

Table.4 The impact of cross rate Pc on the yield

Pop-size	GN	Pc	Pm	best rate
50	200	0.7	0.1	100%
50	200	0.6	0.1	98%
50	200	0.5	0.1	89%
50	200	0.4	0.1	80%
50	200	0.3	0.1	65%

It can be clearly seen from this table that the low cross rate may lead to the stagnation of the algorithm, which makes the algorithm incomplete evolution.

The variation rate is adjusted in the case of the number of individuals, evolutionary algebra and cross rate of the initial population: 50 experiments are done each time, and the results are shown as shown in Table 5.

Table.5 Effect of Pm on rate of yield

Pop-size	GN	Pc	Pm	best rate
50	200	0.7	0.1	100%
50	200	0.7	0.06	98%
50	200	0.7	0.02	93%
50	200	0.7	0.005	88%
50	200	0.7	0.001	80%

From this table, it is clear that the variation rate may lead to the lack of individual diversity in the algorithm, which makes the algorithm fall into local optimal.

Based on the above data, we can get the approximate optimal solution: 1. Completion probability is 0.5866; second, completion time is 57 days; third, completion cost is 19513.95 yuan; 4, process combination: 3-9-9-5-7-6-9-2-3-6-19-2-2..

5. CONCLUSION

Due to the progress of algorithm and the more powerful computing power of computers, computing algorithms are more and more mature, and practicability is stronger and stronger. They can reduce people's workload in many ways, which makes machine algorithm get a lot of application in real life. With the development of computer technology, all kinds of algorithms are optimized, and their applications in all aspects have also been expanded. In the new global economic market, virtual enterprises are evolving synchronously with the iteration of information technology. There have been many companies in this way to further organize the resources that the enterprise owns and seize the opportunity for rapid change. It is very urgent to control the risk of the introduction of advanced computer algorithms. In this paper, we use GLS algorithm and genetic algorithm to design and implement a fuzzy comprehensive evaluation risk assessment model to evaluate the risk of virtual enterprise, so as to achieve the purpose of risk control for virtual enterprise.

Author

Wei Luo, Doctor of Economics, Associate Professor. Graduated from the Jinan University in 2012.Worked in Guangzhou Panyu Polytechnic. His research interests include enterprise tax risk management.

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