Research on the Theoretical Model of Enterprise Resource Allocation Based on the Optimal Benefit

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Abstract: In the era of economic globalization, the efficient allocation of resources is the core of the competitiveness of enterprises. In this paper, the calculation method and Eviews analysis and Agent simulation modeling based on the experiment, the resource allocation system as a complex system, in the "efficiency first, fairness" principle, put forward some optimization strategies of human resources, material resources and financial resources portfolio allocation. Using the real data of a listed textile enterprise to verify, the resource allocation model can provide some reference schemes for the enterprise to optimize the allocation of resources.

1 INTRODUCTION

The enterprise resource allocation model has timeliness. With the change of times, scholars and experts have a deeper understanding of enterprise resources, and the resource allocation model is also diversified. In this paper, a scientific method of computational experiment is used to model and analyse the three major resources of enterprises.
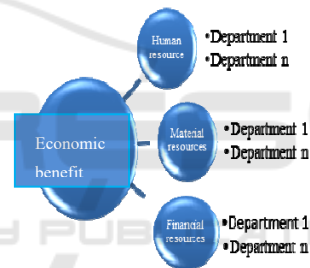
2 THE CONSTRUCTION OF THE MODLE

2.1 An overview of the basic principles of the model

Enterprise resources include human resources, material resources and financial resources in the three parts, because of the complexity of social economic system, the relationship between human behavior and environment factors, so the optimization of enterprise resource allocation through a variety of simulation, the nature of resource allocation. The allocation of enterprise resources is a dynamic, nonlinear and long-term process, and its distribution process and final purpose can be expressed as follows:

Figure 1: Map of human resources, material resources and financial resources

2.2 Model hypothesis

Because the reality of business activities is unpredictable, and the scheduling of enterprises will be affected by the external environment, the theoretical models can't fully contain all factors that affect the resource allocation of enterprises. In order to simplify the model, the following assumptions are made to simplify the model as far as possible.

Hypothesis one: in the allocation of enterprise resources, only three main resources are considered, that is, manpower, material and financial resources.

Hypothesis two: the factors that affect enterprise resource allocation do not consider a series of uncontrollable external factors.

Hypothesis three: the optimization of the realization of enterprise resource allocation depends

on whether the economic benefit of the enterprise is maximized.

Hypothesis four: Enterprises have σ departments need to carry out the allocation of resources, that is, Department 1, Department 2... Department σ, and the nature of the departments of the same and independent management, the main factor in the division of the Department is the level of the management of the Department.

2.3 Design of model

In this paper, Eviews and Net Logo are used for nonlinear analysis and simulation modeling.

From an economic point of view, the economic benefits of all sectors of the enterprise are positively related to the Department's capacity. According to hypothesis four, the output values of all departments are expressed by Cobb Douglas production function.

$$Q_{nt} = A_{ni}L_{nt}^{a}K_{nt}^{\beta}M_{nt}^{\gamma}, \alpha + \beta + \gamma = 1$$

The Q_{nt} said the n （$1 \leq n \leq N$） sector output in t phase; A_{ni} said the n sector 's management and technical level, The management level between different departments is expressed by I. L_{nt} indicates the human resource input of sector t to department n in t phase. K_{nt} indicates the material resources input of department n in enterprise t stage, M_{nt} indicates the financial input of sector t to department n. The input of various resources in each department is limited by the scheduling of the total resources of the enterprise. The total output value of the enterprise is measured by the $Q_t = \sum_{n=1}^{N} p_{nt}$.

In the process of enterprise development, is the allocation of resources recycling, resource allocation strategy of enterprises in this stage requires consideration on the stage of the manpower, material resources and financial resources, and when the stage of resource operation, enterprise resource share, utilization and allocation of enterprise resources under the stage of choice effect of input-output ratio will also affect the Department's economic benefits, thus affecting the resources sector.

2.3.1 The distribution strategy of "fair priority"

There are two allocation strategies for enterprise resource allocation around the "fairness first" principle, that is, the allocation of resources according to the average resource allocation and the sector resource occupancy rate. The two strategies are different expressions of human resources, material resources and financial resources allocation.

(1) Under the principle of equity, the allocation of resources can be expressed as:

$$L_{nt} = L_{nt-1} + \frac{L_t}{N}$$

$$K_{nt} = K_{nt-1} + \frac{K_t}{N}$$

$$M_{nt} = M_{nt-1} + \frac{M_t}{N}$$

(2) Under the principle of priority, the allocation of resources can be expressed as:

$$L_{nt} = L_{nt-1} + \frac{L_{nt-1}}{L_{t-1}}L_n$$

$$K_{nt} = K_{nt-1} + \frac{K_{nt-1}}{K_{t-1}}K_n$$

$$M_{nt} = M_{nt-1} + \frac{M_{nt-1}}{M_{t-1}}M_n$$

2.3.2 The allocation strategy of "efficiency priority"

According to the principle of "efficiency first", enterprise resource allocation also has two allocation strategies, that is, according to the per capita efficiency of the Department, it is allocated and allocated according to the total efficiency of the Department.

(1) In accordance with the per capita efficiency of the Department, the allocation of resources can be expressed as follows:

$$L_{nt} = L_{nt-1} + \frac{Q_{nt-1}}{L_{nt-1}}L_n$$

$$K_{nt} = K_{nt-1} + \frac{Q_{nt-1}}{K_{nt-1}}K_n$$

$$M_{nt} = M_{nt-1} + \frac{Q_{nt-1}}{M_{nt-1}}M_n$$

(2) In accordance with the overall efficiency of the Department, the allocation of resources can be expressed as follows:

$$L_{nt} = L_{nt-1} + \frac{Q_{nt-1}}{Q_t}L_t$$

$$K_{nt} = K_{nt-1} + \frac{Q_{nt-1}}{Q}K_t$$

$$M_{nt} = M_{nt-1} + \frac{Q_{nt-1}}{Q_t}M_t$$

Based on the above analysis of the principles of resource allocation in different departments, in the complex relational system, using the Agent modeling method as the basic idea, according to the basic principles and basic assumptions of the

modeling, we finally establish the logical relationship between the overall resource allocation of the enterprise department.

2.3.3 A case study of resource allocation model

In this paper, a textile enterprise as the research object of the allocation of resources, the company established in 2001, mainly engaged in garment development, production and sales, with the domestic first-class industrial park covers an area of 120000 square meters, the market share of similar products in three consecutive years ranked first, internationalization and efficient production of the road. As a result of business secrets, this paper uses the real value of the proportional data, and still represents the real situation.

According to the company's main projects, it can be divided into three departments. The management level between departments is from office to production department, R & D department and sales department according to the company's propensity. From this point of view, the technology management level is:

$$A_1 = 0.75, \quad A_2 = 0.85, \quad A_3 = 0.95, \quad A_4 = 1.05$$

The initial value of human, material and financial resources is set to

$$L_{10} = 15, \quad K_{10} = 40, \quad M_{10} = 100$$
$$L_{20} = 20, \quad K_{20} = 80, \quad M_{20} = 200$$
$$L_{30} = 25, \quad K_{20} = 120, \quad M_{30} = 300$$
$$L_{40} = 30, \quad K_{40} = 160, \quad M_{40} = 400$$

At each stage, the company will invest in new resources. Sign the $L_t = 100$, $K_t = 500$, $M_t = 1000$, The problem that the company needs to solve is to allocate the three resources to the three departments to achieve the optimal utility. In this paper, the textile enterprise is simulated and the initial value of the experimental parameters is set as follows:

Table 1: Calculation of the experimental parameter

	Parameter name	Initial parameter value
variable	General stage of department production t	200
	Weight coefficient of human resources α	0.2
	Weight coefficient of material resources β	0.3
	Weight coefficient of financial resources γ	0.5

	Business sector number N	4

a) The principle of fair priority

An average allocation strategy and a resource share allocation strategy are used to configure the human resources, material resources and financial resources, and the following simulation results are obtained.
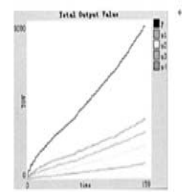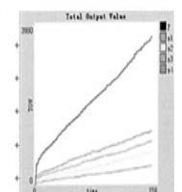

Fig. 2 Human resources allocated by average

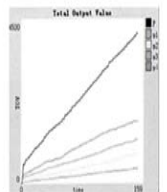Fig. 3 Distribution of human resources according to the share of resources

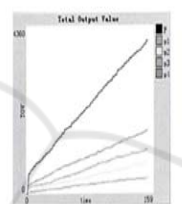Fig. 4 Distribution of material resources according to average

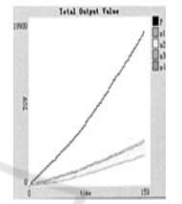Fig. 5 Distribution of material resources according to the share of resources

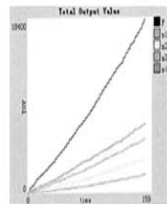Fig. 6 Financial resources according to the average distribution

Fig. 7 Financial resources are allocated according to the share of resources

b) Principle of efficiency priority

The allocation of human resources, material resources and financial resources by per capita efficiency allocation and department efficiency allocation strategy is used to obtain the following simulation results.
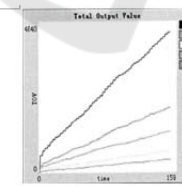

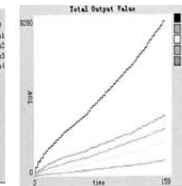Fig. 8 Human resources are allocated by department efficiency

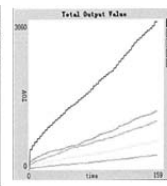Fig. 9 Human resources are allocated according to per capita efficiency of the Department

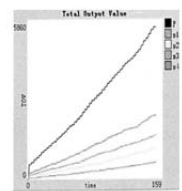Fig. 10 Distribution of material resources according to department efficiency

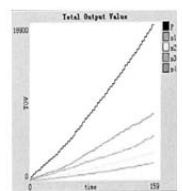Figure 11 Material resources are divided according to the per capita efficiency of the Department

Figure 12 Financial resources allocated according to department efficiency
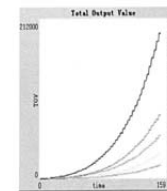
Figure 13 Financial resources allocated according to the per capita efficiency of the Department

2.4 Model solving algorithm

Because there are some internal relations between elements of resources, the textile enterprises, the Department of human resources investment changes, the rest of the two kinds of resources were also realized as a positive correlation; when the Department of material resources change, but remained unchanged in human resources, financial resources are positively related; when the Department of financial resources change when the rest of the two kinds of resources are unchanged.

Based on the relationship between the resources of a textile enterprise mentioned above, this paper believes that it is in accordance with the following rules: Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

$$L_{nt} = L_{nt-1}$$
$$K_{nt} = K_{nt-1} + a(L_{nt} - L_{nt-1})$$
$$M_{nt} = M_{nt-1} + b(L_{nt} - L_{nt-1}) + c(K_{nt} - K_{nt-1})$$

Among them, a and b respectively indicate the change rate of material resources and financial resources input when human resources input changes. c indicates the change rate of financial resources input when the material resources input changes. As the rate of change of resources is difficult to measure in the enterprise, This article assumes that $a = 1, b = 0.4, c = 0.6$, According to the above rules, the following resource allocation methods are summarized.

Table 2: The allocation of human, material and financial resources in a textile enterprise

	Human resource allocation	Allocation of material resources	Financial resources allocation
The principle of fair priority	Average distribution	Distribution according to the share of resources	Average distribution
Principle of efficiency priority	Per capita efficiency by Department	Per capita efficiency by Department	Per capita distribution by Department

2.5 Research conclusion

Different types of enterprises are different in the allocation of resources, but the ultimate goal of resource allocation is to maximize the efficiency of the enterprise. If we consider the problem of resource location from the angle of return of the target market itself, it will be the subjective initiative of the enterprises who lose the resource location in the control of the invisible hand in the market mechanism. Therefore, in the process of enterprise resource allocation, we should not only consider the rate of return of the target market, but also consider the adaptability of the resources. Under the principle of fairness and efficiency, the rational allocation of three resources of human resources, material resources and financial resources must be achieved through effective scientific management.

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