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AHP-Based Capacity Evaluation of Enterprise Development

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Abstract

the capacity of enterprise development is the base of enterprise existence and the springhead of profit. The paper will incorporate a variety of single index that reflects the capacity of enterprise development into an organic system based on AHP, and thus show a full range of comprehensive description of the capacity of enterprise development. Finally , proved the validity of the model through a case.

Key words: enterprise; development capacity; AHP method

1.Introduction

Enterprise development capacity, also known as business growth, i.e. the accumulating development potential through the production and operation activities. Evaluating the capacity of enterprise development has a very strong practical significance to improve business management and market competitiveness. However, when analysis the capacity of enterprise development, people faced with an interrelated and mutually conditioned complex system composed by many factors, and coupled with each single factor index reflects only one aspect of the development capacity of enterprises, thus it is difficult to make a comprehensive, objective conclusion in general. AHP is characterized by the hierarchical, quantitative factors to the complex decision problem, and quantitative decision-making basis by mathematical methods. And combined with evaluation index system of enterprise development, a simple and practical way to address the above problem was provided.

1. About AHP

AHP is a combination of qualitative and quantitative, multi-criteria decision making method. Combined with business development capacity analysis, AHP method follows these steps:

2.1. Designing evaluation index and establishing hierarchy structure

Selecting reasonable evaluation indexes is the basis to correctly evaluate enterprise development capacity. Thus the designing of indexes is key link. By Science, objectivity, rationality, feasibility and other guiding principles, the paper selected the credibility of enterprises development, the level of capacity growth, the proportion of technical inputs and the level of earnings growth, four aspects to analysis the capacity of enterprise development, and each aspect is also subdivided into a number of indicators. And structured the AHP model at the same time, in order to make the problem organized, hierarchical. As following table:

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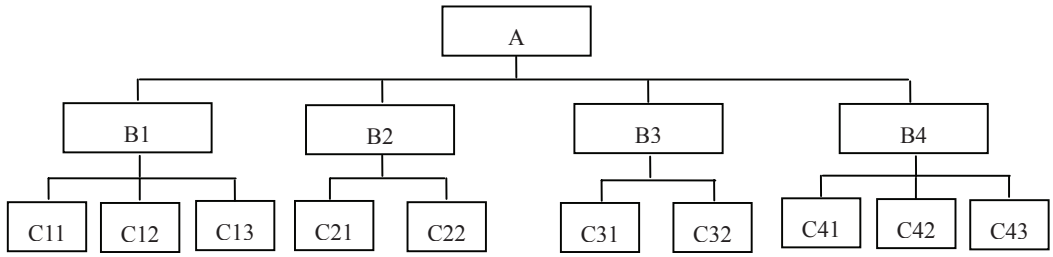
Table 1. AHP chart of enterprise development capacity



A: Comprehensive evaluation of enterprise development; B1: The credibility of enterprise development; C11: Current ratio; C12: Quick ratio; C13: Asset – liability ratio; B2:The level of capacity growth; C21: Ratio of capital accumulation; C22: Capital maintenance and appreciation; B3: The proportion of technical inputs; C31: Proportion of R&D investment; C32: Proportion of training expenditure growth; B4: The level of earnings growth; C41: Revenue growth; C42: Operating profit growth; C43: Net profit growth.

2.2. Judgment matrix construction

After the AHP model established, compare the elements of each hierarchy, and structure the comparison matrix. The value of judgment elements reflects the relative importance, Generally use the 1-9 scale and the bottom scale method.

Table 2. Judgment matrix scale and the meaning

Cij evaluation	Meaning
1	Element i and j are equally important
3	Element i is slightly important than j
5	Element i is obviously important than j
7	Element i is intensely important than j
9	Element i is extremely important than j
2, 4, 6, 8	2, 4, 6, 8 means the value of adjacent judgment respectively

2.3. single hierarchical arrangement and consistency test

In theory, the problem of single hierarchical arrangement can be attributed to the calculation of the characteristic root and the eigenvector of judgment matrix. Take the square-root method as the example:

a. Calculate the product of the elements each row of the judgment matrix, M_{i}

$$M_{\mathrm{i}} = \prod_{\mathrm{j}=1}^{\mathrm{n}} \mathrm{a}_{\mathrm{ij}} \quad \mathrm{i} = 1,2\cdots,\mathrm{n}$$

b. Calculate the n-th root $\overline{W_i}$ of M_i

$$\overline{W_i} = \sqrt[n]{M_i}$$

c. Normalized vector , $\overline{W}$,

$$\overline{W} = \left[\overline{W_1}, \overline{W_2} \cdots, \overline{W_n}\right]^T$$