

The Evaluation Index System Construction of Enterprise Risk—Taking in an Alliance

—Based on Coefficient of Variance Method

YueFeng Zhou^{1, a}, YingBo Li^{2, b*}

¹Economic management institute, DaLian University, Dalian, 116000, china

²Economic management institute, DaLian University, Dalian, 116000, china

^azhouyf66@163.com, ^b1121005528@qq.com

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Abstract. As the economic environment of increasingly complex and changeful, many enterprises through forming a strategic alliance to solve the bottleneck problem in the development of enterprises. League member enterprises face various of risks, which is not only impact the stability of the league as a whole, also an important factor to consider when the alliance making profit distribution. So how to correctly evaluate the risk of the member enterprises is particularly important. This paper constructs the evaluation index system of risk—taking of the member enterprises, based on the analysis of strategic alliance risks. And adopt the coefficient of variation method to get a comprehensive risk of every enterprise. Finally combining with case analysis on the feasibility and rationality of the evaluation index system are verified.

Introduction

Since the 1990 s, the trend of economic globalization is unstoppable, competition has intensified, in order to meet the rapidly changing external environment, the western developed countries seeking a new enterprise management pattern, forming a strategic alliance, especially in multinational companies. With the growing of the advantages of the strategic alliance, according to the thinking of Internet, strategic alliance was taken seriously by more and more enterprises. Risk is the first consideration of enterprises to join the alliance. The reasonable and effective evaluation of risk for each enterprise has a significant effect to the stability of the alliance.

Strategic alliance enterprise risk evaluation index

The analysis of risk factors between members of the enterprise. Reference in the process of enterprise operation risks classification method, combining with some research results of previous scholars, re-drawing the risk factors into cooperation risk, internal operational risk, and external environment risk.

Cooperation Risk. Cooperation risk including credit risk, technology-cohesion risk, goal difference and cultural difference risk. Credit risk is the most important factors to the stability of alliance. In the process of union operation, as a result of the existence of opportunism, a member enterprises for their own interests will make betray other ACTS of union members, it can be shown with contract default rate of enterprise data. Technology-cohesion risk refers to the union in cooperation a project may be because technology and the maturity of technology alliance and compatible degree differences and failure risk. Goal difference also called enterprise management goal difference. Because of the common long-term strategic goals, companies formed a union. But the experience goals may be differences in the short term, this will make it difficult to cooperation. Different enterprise has different management ideas and different standards of behaviors.

Internal operational risk. When making specific project cooperation, alliance will face the internal operational risk. Including human resources risk, lack of funds risk and operational risk.

Human resource risk refers to the project may appear in the process of the core staff turnover, this will be carried out on the project and union caused great influence to eventual success; Money does not reach the designated position risk refers to the process of project, may be because a member enterprise of reserve capital can't arrive and affect the project continues, capital of fracture risk, the risk can be made of various enterprises of asset-liability ratio, current ratio and quick ratio and other financial data to estimate; Operational risk is defined as a member in assigned project areas a mistake not affecting the progress of the project and the final result.

External environment risks. Removing both risk factors, the Alliance will also face the risks of changes in the external environment, including macroeconomic changes, accidents and related legal, policy change brings risks. Macroeconomic changes we used GDP changes, changes in consumer price indices, producer price indices, purchasing managers' indices in four indicators of economic activity to fully represent the enterprise such as the macro-economic environment; Accident with each members enterprise in related business links by occurred of accident times to said; related legal, and policy of changes can query its over to of changes times, history data to said, needs pointed out that of is, because each members enterprise by faced of macroeconomic environment and the legal, and policy changes situation are as, so this two items in calculation weight Shi by accounted for component for zero, but to indicators system of integrity, we joined has this two factors.

The alliance enterprise risk evaluation index system construction. In this paper, in the process of risk evaluation index system to follow the following principles: 1. Comprehensiveness. Evaluation index system and strive to reflect the evaluation of all factors involved; 2. Conciseness. Based on the comprehensive evaluation index system was established to avoid cumbersome and modest; 3. The qualitative and quantitative analysis. The evaluation index system should be both qualitative indexes and quantitative indexes, reflects the index system is scientific, reasonable quantitative and the qualitative index; 4. Flexibility. Evaluation index system can be adjusted depending on the particular facts change.

According to the above principles, set up as shown in Fig. 1 consists of three level indicators, 10 secondary indexes, three-level index 16 members of the alliance risk evaluation index system of enterprise:

Table 1 Union Member risk evaluation index system of enterprise

First grade indexes	Second index	Three-Grade index	
A1 Cooperation risk	B1 Credit risk	C1 Breach of contract rate	
	B2 technology-cohesion risk	C2 Technology maturity	
		C3 Technical compatibility	
	B3 Goal difference risk	C4 Management goal difference degree	
A2 The internal operational risk	B4 Cultural differences risk	C5 Corporate culture tolerance	
	B5 Human resource risk	C6 key employee turnover rate	
		B6 Lack of funds risks	C7 Debt to asset ratio
			C8 Current ratio
C9 Quick ratio			
A3 External environment risk	B7 Risk of business operations	C10 The core link failure times	
		B8 Macroeconomic risk changes	C11 Changes in gross domestic
			C12 Changes in the consumer price indices
			C13 Changes in the producer price index
	C14 Purchasing managers' index changes		
	B9 The accident risk	C15 Number of accidents	
B10 Risk of change in laws, policies	C16 Number of related changes in laws, policies		

The variation coefficient method

Now, most people using the analytic hierarchy process (AHP) and fuzzy comprehensive evaluation method to determine the index weight. But these two methods are subjective. Also some people use the principal component analysis and factor analysis in multivariate statistical analysis method to determine the index weight. But these two methods require all coefficients are positive, otherwise there will be a net.

The variation coefficient method is an objective method. It use the information contained in each index, and then get the index weight by calculation. In evaluation index system, if an index value can clearly separate the evaluation objects, it means that the index on the resolution has a lot of information, so should be with a larger weight to the indicators; the opposite with less weight to the indicators. The calculation principle is suitable for the study of relevant content in this paper. The risk of this paper includes the risk brought by the enterprise due to join the alliance and the risk of enterprise itself. The greater the numerical difference, the greater the risk. The variation coefficient method to determine the index weight concrete steps:

There are m evaluation objects, each evaluation objects have n describe indicators: x_1, x_2, \dots, x_n

To calculate the mean and variance of every index first:

$$X_j = \frac{1}{m} \sum_{i=1}^m x_{ij} \quad (i=1, 2, \dots, m; j=1, 2, \dots, n) \quad (1)$$

$$S_j^2 = \frac{1}{m-1} \sum_{i=1}^m (x_{ij} - X_j)^2 \quad (j=1, 2, \dots, n) \quad (2)$$

x_{ij} indicates the i th evaluation objects in the value of j indicators.

$$v_{j=\frac{s_j}{x_j}} \quad (j=1, 2, \dots, n) \quad (3)$$

v_j indicates the variable coefficient of each index

$$\text{Then take } V_j \text{ normalized, get } w_{j=\frac{v_j}{\sum_{j=1}^n v_j}} \quad (j=1, 2, \dots, n) \quad (4)$$

At the last, N indexes constitute W , $W = (w_1, w, \dots, w_n)$

The original variation coefficient method is for all of the index weight of a whole evaluation objects, but this paper is to evaluate each enterprise risk index weight. So to improve the original algorithm, we find a more reasonable calculation method. For example, if we need to calculate the risk coefficient of each enterprise in a league composed by A,B,C and D. We should calculate three-level index weight for every enterprise, the risk coefficient of the four companies is obviously not the same. When calculating the risk index weight of A, take B, C and D as a whole to compares with A. First, calculate the weighted average of B,C,and D under the same index value weighted average with the method of weighted mean; second, with the variation coefficient method to calculate A's weight of the index. The result is A enterprise under the weight of the index. So on to find out the weight of all index. The weight of average weights are simple to set up: the greater the risk, the higher the weight. So can be determined by the panel fixed numerical group as a weight, and there is no subjective factors to affect the outcome.

If there is only two evaluation objects, each evaluation objects described by x_1, x_2, \dots, x_n , calculate the mean(\bar{x}_j)and variance(S_j^2)of every index first:

$$\bar{x}_j = \frac{1}{n} \sum_{i=1}^n x_{ij} \quad (j=1, 2, \dots, n) \quad (5)$$

$$S_j^2 = \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2 \quad (j=1, 2, \dots, n) \quad (6)$$

x_{ij} indicates the i th evaluation objects in the value of j indicators.

The variation coefficient of each index (v_j)

$$v_{j=\frac{s_j}{x_j}} \quad (j=1, 2, \dots, n) \quad (7)$$

$$\text{Then take } V_j \text{ normalized, get } w_{j=\frac{v_j}{\sum_{j=1}^n v_j}} \quad (j=1, 2, \dots, n) \quad (8)$$

w_j is the weight of each index.

So, to calculate the integrated risk coefficient R , (9) can be used

$$R = 1 - (1 - R_1) (1 - R_2) (1 - R_3) \quad (9)$$

R_1 is cooperation Risk;

R_2 is internal operational risk;

R_3 is external environment risks

Summary

Risk assessment is the primary factor when forming a strategic alliance, it is related to the rationality of the alliance profit distribution. Using variation coefficient method of index weight, more objective, and the dimensionless processing methods to the data is useless, so the calculation process is simpler. To further improve risk of member enterprises of dynamic Alliance provides a possibility of evaluation index system and assessment method.

References

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