

On Evaluation Index System and Evaluation Method of Enterprise Internal Control

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Abstract: Enterprise internal control is a system with continued progresses in pace with development of the enterprise. Only reasonably constructing and properly using the internal control system, can it make effective implement and continuous improvement, and make sure the works of the enterprise to run smoothly and promote the companies' management levels. This paper constructs the evaluation index system of two-storied framework about enterprise internal control, then a comprehensive fuzzy AHP method is applied to provide recommendations reference for the construction of internal controls index system..

Key words: Enterprise internal control; Evaluation index system; Evaluation method

1 Introduction

The implementation of enterprise strategy will undoubtedly need scientific management as the guarantee, and the enterprise internal control is the most effective and most basic means and methods in enterprise management. Throughout ups and downs of domestic and foreign enterprises, the successful usually have different strategies and advantages; but almost all the failed are due to mismanagement or control powerless. Internal control serves as enterprise's guarantee for setting foot in the market which is full of risks, and foundation for its sustainable development. We witness and experience China's reform and opening-up and the process that enterprise is perfected gradually. The more developed enterprise is, the more important internal control is.

There is a set of data is often cited in management consultation industry: In recent 10 years, 12 enterprises collapsed every minute and 1.7 million every day in China among which some had been flourishing once and broken down, failed or collapsed since had not established effective internal control mechanism or invalid. Business failure, the distortion of accounting information or illegal management and so on, to great extent, can be attributed to the lack of enterprise internal control without exception, such as the collapse of China giant group, Zhengzhou Asia's decline, shocked Joan Minyuan, incident of silver metal, and even the U.S. Enron's bankruptcy.

It was based on the importance of internal control for enterprise that both academics and practitioners are currently paying a great deal of attention on the internal control. On an international view, there are a great many of models on the internal control evaluation standards and the most important are "Internal Control Integrated Framework" and "Enterprise Risk Management - Integrated Framework" which are put forwarded by the United States COSO. However, both of the frameworks are conceptual category, because the concept of internal control is defined by practitioners especially by the audit and oversight organizations. When they define the concept they are from the standpoint of audit and oversight, so that the definitions are not adequately reveal the nature of the internal control, not take into account the system of analytical framework and can't enough emphasize the importance of internal controls. In China, the implementation of internal control system is started in the late 1990s, but just in ten years we have promulgated a series of laws and regulations. The construction of internal control has begun to take shape, achieved important results and with the trend of international integration. In June 2008 China Securities Regulatory Commission, the Ministry of Finance, Audit, the CBPC and CIRC jointly issued "Basic Standard of Enterprise Internal Control" which had been being carried on 1 July 2009 and opinion draft of "Application Guide of Enterprise Internal Control", "Evaluation Guide of Enterprise Internal Control" and "Verification of Enterprise Internal Control" to solicit proposals which had been being lauded after improved, which would serve as a "firewall risk prevention" for Chinese enterprises. However, the existing state system of internal control system is focus only on the written part of the text, seriously neglect how to implement of the system, judge and report the status of the system's implementation, correct the implementation bias of the system, and so on. There are many defects and are not ripe in our research on internal control, comparing with the western country. And, the evaluation system and evaluation model are not perfect in practice. Therefore, based on the "application of internal control guidelines", the content about internal control of solicit draft includes:

finance, procurement, inventory, sales and other twenty-seven internal control system, using a combination of quantitative and qualitative methods, this paper constructs the evaluation index system of two-storied framework about enterprise internal control, then a comprehensive fuzzy AHP method is provided. This model can offer reference recommendations for our internal control index system's construction and evaluation, promote the effective implementation and continuous improvement and improve enterprise' management level.

2 Evaluation Index System of Enterprise Internal Control

The contents about enterprise internal control including the capital, purchasing, Inventory, sales and other 27 of internal control system in "Application Guidelines of Enterprise Internal Control" covers all aspects of business activities. The enterprise internal control is complex and open so that each enterprise should construct its system according to the situations and the needs of itself to ensure the system reasonable and efficient. In order to evaluate whether the system is rational or effective, the enterprises need to design a set of evaluation index system which is scientific and complete and all-round, multi-angle to reflect the internal control system. Therefore, this paper constructs the evaluation index system of two-storied framework about enterprise internal control (Figure 1), which consists of the index layer of enterprise internal control subsystem and key control indicators of subsystems, reflecting basic connotation of the system better.

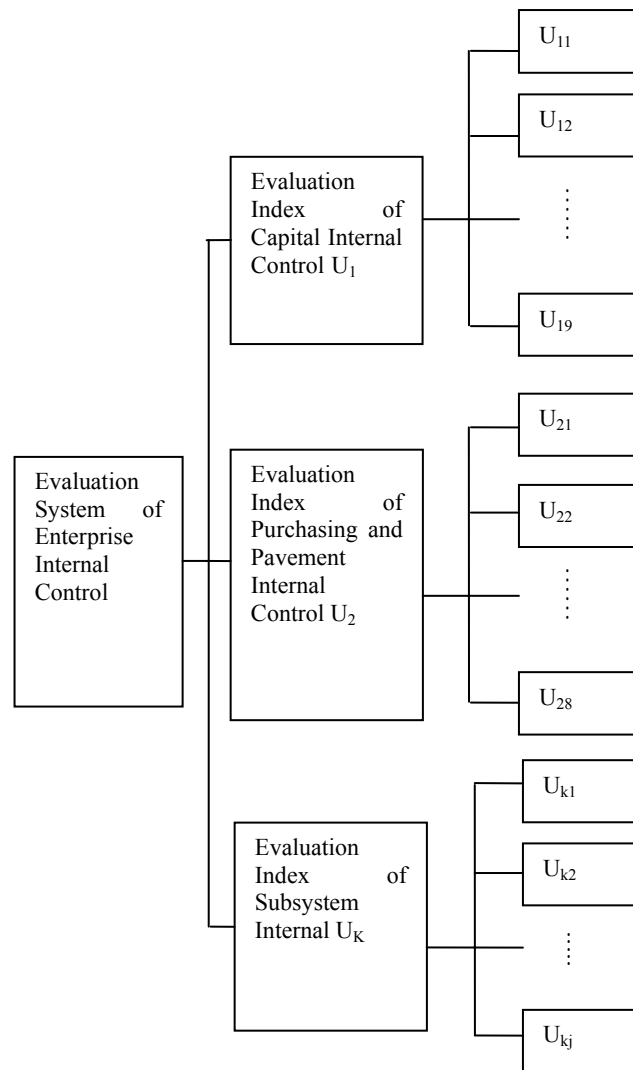


Figure 1 Evaluation Index System of Enterprise Internal Control

The meaning of each symbol in Figure 1 is listed below:

- U₁₁: Evaluation of Incompatible Duties Separation System
- U₁₂: Evaluation of Cash Management System
- U₁₃: Evaluation of Bank Deposit Management System
- U₁₄: Evaluation of Other Capital Management System
- U₁₅: Evaluation of Bank Account Management System
- U₁₆: Evaluation of Securities Management System
- U₁₇: Evaluation of Bill Management System
- U₁₈: Evaluation of Seal Management System
- U₁₉: Evaluation of Settlement Management System
- U₂₁: Evaluation of Incompatible Duties Separation System
- U₂₂: Evaluation of Sales Forecasts and Audit Management System
- U₂₃: Evaluation of Bidding and Sales Contract Management System
- U₂₄: Evaluation of Sales and Delivery Management System
- U₂₅: Evaluation of Gathering and After-sales Service Management System
- U₂₆: Evaluation of Accounts Receivable Management System
- U₂₇: Evaluation of Sales Cost Management System
- U₂₈: Evaluation of Sales Staff performance Management System
- U_{k1}: Key Control Index of Subsystem
- U_{k2}: Key Control Index of Subsystem
- U_{kj}: Key Control Index of Subsystem

3 Evaluation Model of Enterprise Internal Control

3.1 Determining evaluation index set of enterprise internal control

According to the evaluation index system of two-storied framework above, this paper divides evaluation index set of the model into two levels: subsystem index set $U=\{U_1, U_2, \dots, U_k\}$ (k is a natural number, stands the number of the subsystem), subsystem's key control index set $U_i=\{U_{i1}, U_{i2}, \dots, U_{iji}\}$ (i is a natural number, and $i \leq k$; j_i is a natural number, stands the number of subsystem's key control index).

3.2 Setting evaluation set

In the process of evaluation, we design a set as a level set to each subsystem, and U_i 's is set for $V_i=\{V_1, V_2, \dots, V_m\}$ (m is level number of U_i 's evaluation set), such as a five levels evaluation set of fuzzy appraisal value {good control, normal control, basic control, weak control, lose control}. Thus, each index of all subsystem can have a group of fuzzy appraisal value. Similarly, the enterprise internal control system U can also be designed a level evaluation set $V=\{V_1, V_2, \dots, V_n\}$ (n is level number of U 's evaluation set). In order to facilitate evaluation, we can unify the two levels in the practice of evaluation.

3.3 Establishing evaluation information matrix of enterprise internal control

Choose a certain number of experts and enterprise management personnel to be a commission. In the process of evaluation, we can synthesize each contestant personnel's opinion and each evaluation index to evaluate every index of U_i , then the subsystem's comprehensive information matrix R_i is gotten.

$$R_i = \begin{bmatrix} r_{i1v_1} & r_{i1v_2} & \dots & r_{i1v_m} \\ r_{i2v_1} & r_{i2v_2} & \dots & r_{i2v_m} \\ \dots & \dots & \dots & \dots \\ r_{ijv_1} & r_{ijv_2} & \dots & r_{ijv_m} \end{bmatrix}$$

And, r_{ijv_m} is the membership of a rating scale V_m for the j -key control index U_{ij} in i -subsystem U_i . r_{ijv_m} = the number of choosing rating scale V_m for the key control index U_{ij} /the total number of participants in the evaluation.

According to R_i , we can get the comprehensive information matrix R of enterprise internal control system:

$$R = [R_1 \quad R_2 \quad \dots \quad R_k]^T$$

3.4 Establishing evaluation system weight coefficient set of enterprise internal control

Generally, weight can be sure according to the specific circumstance. There are several methods adopted, such as statistical analysis and expert evaluation method etc. The evaluation index system of

enterprise internal control is a two-storied structure, so the weight set should also be divided into two levels: subsystem weight set $A=\{A_1,A_2,\dots,A_k\}$ ($A_i>0$ and $\sum_{i=1}^k A_i = 1, i=1,2,\dots,k$), index weight set of key control index layer $A_i=\{A_{i1},A_{i2},\dots,A_{ij}\}$ ($A_{ij}>0$ and $\sum A_{ij} = 1$).

3.5 Establishing evaluation matrix of evaluation system of enterprise internal control

Based on the data and formula above we can get a comprehensive information evaluation matrix B_i of a single subsystem:

$$B_i = A_i \circ R_i$$

We can see each U_i as a element, as a view with B_i as its single factor evaluation, then get the comprehensive evaluation matrix B of enterprise internal control system:

$$B = A \circ \begin{bmatrix} A_1 \circ R_1 \\ A_2 \circ R_2 \\ \dots \\ A_k \circ R_k \end{bmatrix} = (b_1 \quad b_2 \quad \dots \quad b_k)$$

And,“ \circ ”stands for synthetic operator $M(\vee, \wedge)$. Through B and B_i we can know the enterprise internal control system intuitively and its subsystem’s comprehensive evaluation level.

3.6 Determining the weighted matrix

The weighted matrix of evaluation level is the result without considering the value of fuzzy boundary conditions, which reflects the degree of influence of each evaluation on the final result and quantifies the level of evaluation set with 1 point system. For example, the weighted matrix of a five levels evaluation set of fuzzy appraisal value $V=\{\text{good control, normal control, basic control, weak control, lose control}\}$ can be defined as $Q=\{0.9, 0.8, 0.6, 0.5, 0.3\}$. This paper, U , which is the enterprise internal control system, is marked Q .

3.7 Getting integrated quantity according to the comprehensive evaluation matrix and weighted matrix

We can get enterprise internal control system’s comprehensive evaluation value V through B and Q :

$$V = B \times Q / \sum_{i=1}^k b_i$$

V is the final evaluation result of evaluated enterprise internal control system. It can indicates the effect of the system better that the bigger V is and closer to 1.

4 Applications

Take an enterprise internal control system which consists of three subsystems for an example to explain the specific application of this model.

4.1 Setting the system U and the evaluation set of its subsystem

Set the system U and the evaluation set of its subsystem, $V=\{\text{good control, normal control, basic control, weak control, lose control}\}$ ($m=n=5$).

4.2 Getting comprehensive information matrix R of the system

Evaluating group consists of 10 members who will evaluate each subsystem and its key index of enterprise internal control system, the results are as follows:

Table 1 Evaluation Data for Each Subsystem and Key Index of System

	V_1	V_2	V_3	V_4	V_5
U_{11}	1	8	0	1	0
U_{12}	1	8	0	1	0
U_{13}	2	6	1	1	0
U_{21}	0	5	3	2	0
U_{22}	0	6	2	2	0
U_{31}	3	6	0	1	0
U_{32}	2	6	1	1	0

By the data of table above, according to

r_{ijv_m} =the number of choosing rating scale V_m for the key control index U_{ij} /the total number of participants in the evaluation

The comprehensive information matrix R of the enterprise internal control system can be gotten:

$$R_1 = \begin{bmatrix} 0.1 & 0.8 & 0 & 0.1 & 0 \\ 0.1 & 0.8 & 0 & 0.1 & 0 \\ 0.2 & 0.6 & 0.1 & 0.1 & 0 \end{bmatrix}$$

$$R_2 = \begin{bmatrix} 0 & 0.5 & 0.3 & 0.2 & 0 \\ 0 & 0.6 & 0.2 & 0.2 & 0 \end{bmatrix}$$

$$R_3 = \begin{bmatrix} 0.3 & 0.6 & 0 & 0.1 & 0 \\ 0.2 & 0.6 & 0.1 & 0.1 & 0 \end{bmatrix}$$

Then:

$$R = [R_1 \quad R_2 \quad R_3]^T$$

4.3 Setting two levels of weight set

Subsystem weight set $A=(1/3,1/3,1/3)$,index weight set of key control index layer $A_1=(0.4,0.3,0.3)$, $A_1=(0.5,0.5)$, $A_1=(0.5,0.5)$.

4.4 Getting U_i and U 's comprehensive evaluation matrix

$$B_1 = A_1 \circ R_1 = (0.2 \quad 0.4 \quad 0.1 \quad 0.1 \quad 0)$$

$$B_2 = A_2 \circ R_2 = (0 \quad 0.5 \quad 0.3 \quad 0.2 \quad 0)$$

$$B_3 = A_3 \circ R_3 = (0.3 \quad 0.5 \quad 0.1 \quad 0.1 \quad 0)$$

Then, $B = A \circ \begin{bmatrix} B_1 \\ B_2 \\ B_3 \end{bmatrix} = (1/3 \quad 1/3 \quad 1/3) \circ \begin{bmatrix} 0.2 & 0.4 & 0.1 & 0.1 & 0 \\ 0 & 0.5 & 0.3 & 0.2 & 0 \\ 0.3 & 0.5 & 0.1 & 0.1 & 0 \end{bmatrix} = (0.3 \quad 0.33 \quad 0.3 \quad 0.2 \quad 0)$

4.5 Setting weight matrix of U

$$Q=(0.9 \quad 0.8 \quad 0.6 \quad 0.5 \quad 0.3)$$

4.6 Getting the comprehensive quantity of U

By $V = B \times Q / \sum_{i=1}^k b_i$ Then $V = 0.727$

From value V we can learn the comprehensive evaluation rating of this enterprise internal control system is basic control, which still needs further improvement.

5 Conclusions

Enterprise internal control is a system of numerous and opening, it is continued progress in pace with development of enterprise. We can evaluate the level of enterprise internal control system through comprehensive fuzzy AHP method, which is helpful for its continuous improvement.

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