



Analysis of Innovative Education Resource Optimization Allocation Model Based on Differential Evolutionary Algorithm

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Abstract. In our country to vigorously implement and improve the process of internal control system, because there is no unified evaluation standard, the level of internal control of accounting information system between different levels and different types of enterprises is inconsistent, can not meet the enterprise requirements for the quality of financial reporting and risk. Therefore, it is necessary to construct an evaluation model that suits the characteristics and requirements of our country, to analyze the accounting information system from the factors of internal control Angle, and to establish a set of effective and feasible internal control system that meets the national conditions of our country and the needs of the development of enterprises with universal applicability. In this paper, the accounting information system is evaluated based on OPM3 model and the internal control evaluation framework of the accounting information system, so as to provide specific, feasible and effective evaluation methods for enterprises.

Keywords: OPM3 model · Accounting information system · Analytic Hierarchy Process · Internal control evaluation model

1 Introduction

In the process of accounting information system construction, enterprises are faced with a lot of risks, such as accounting information fraud, data leakage and other problems. Therefore, it is necessary and meaningful to establish a set of scientific and reasonable evaluation system. The introduction of the OPM3 model into the enterprise internal accounting information system, through the comprehensive analysis of the data, evaluation and corresponding improvement, can provide enterprises with better guarantees, so as to improve the management level of enterprises, and also promote the forward development of our accounting information system. This paper will solve the difficulties and problems faced by enterprises by constructing the accounting information system internal control evaluation model based on OPM3 model.

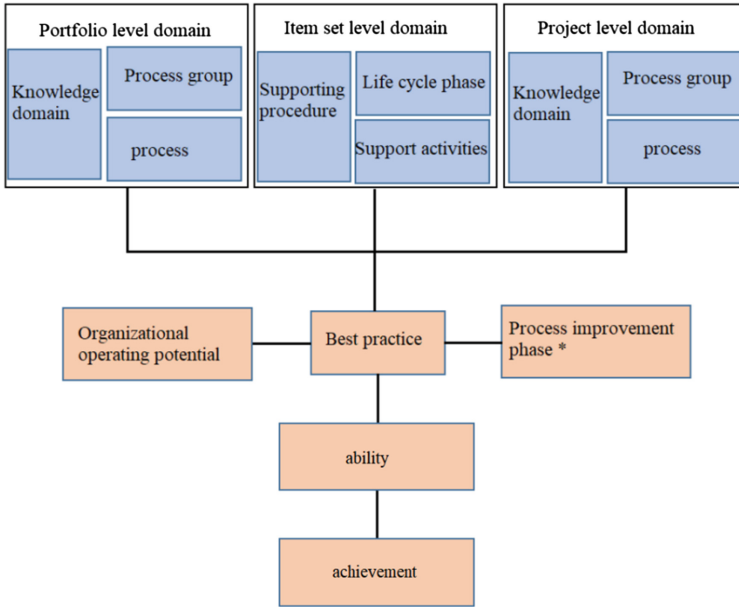


Fig. 1. OPM3 model architecture

2 Organize Project Management Maturity (OPM3) Model

2.1 Overview of OPM3 Model

OPM3 accounting information system is financial as the core, through the real-time reflection of the business situation, and according to the information to make decisions. In this state, the accounting system based on internal control objectives is formed. The model consists of three parts: basic work, control activities and feedback process constitute the basic structure. Among them, the “internal control system”, including the organization and functional departments, plays a central role in the internal control system. The key is the risk assessment and monitoring system and related information system, which puts forward decision-making suggestions and finally realizes the management purpose through real-time reflection of the enterprise’s operating conditions [1]. The OPM3 model architecture is shown in Fig. 1.

2.2 Gradient Level of OPM3 Model

In order to better achieve the development goals of the enterprise, it is necessary to establish an effective and reasonable accounting information system [2]. The system is mainly to improve the efficiency of internal control of the whole organization through data sharing and information transmission of different levels of organizations. Therefore, based on this, it is proposed to take “key performance indicators database” as the center of the internal control system construction gradient, and combined with the hierarchy theory to establish the accounting information system internal control evaluation

model. Combined with the requirements of this paper, the first dimension of OPM3 model is divided into five gradations, which are the initial level of the lowest level of internal control of accounting information system, and 5 represents the highest level. The characteristics of each level are shown in Table 1.

The lower the level, the lower the maturity, the more chaotic the project management, and the higher the risk of internal control failure. In the information system based on ERP and other related systems, accounting data is the core of enterprise production and operation activities, and its information largely depends on original vouchers and accounting basis [3]. What is quoted in this paper is the four gradient levels of the first dimension of OPM3 model, and the relationship between each level is shown in Fig. 2.

Table 1. Characteristics of each level

| Maturity level | characteristic |
|---------------------|--|
| Initial stage | There is no basic internal control system, management is relatively chaotic |
| Simple stage | Some internal control systems have been in place, but they are not perfect |
| Specification level | Specific internal control system has been introduced, but the implementation effect is not ideal |
| Maturity level | The internal control system is improving day by day, but the risk awareness is not strong |
| Improved stage | Continuous improvement of internal control system, strengthen risk awareness |

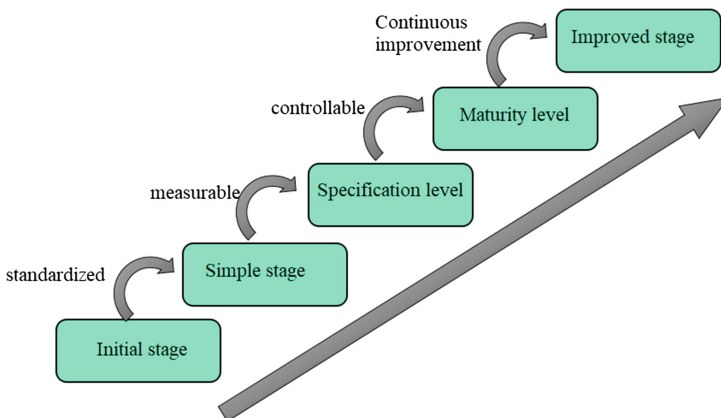


Fig. 2. Gradient grade of OPM3 model

3 Construction of Evaluation Model of Accounting Internal Control of Public Institutions Based on Analytic Hierarchy Process

3.1 Construction Principles

First of all, the purpose of information system construction is determined, then the internal control of the information system is set up, and then the accounting information internal control system based on OPM system is established. Through the risk assessment model, event monitoring model and process sorting, a relatively complete system is formed. Secondly, after clarifying the information needs, corresponding measures are formulated according to the specific situation. Finally, the AHP method is used to establish the index weight and the scoring standard value of each factor to evaluate whether the accounting internal control system of public institutions is running effectively, and the corresponding analysis and evaluation are carried out. At the same time, it puts forward some countermeasures for the risk points in the process of information system implementation [4, 5].

3.2 Construction of Evaluation Model

Accounting information system is a dynamic circulation system, the design of its internal control system is reasonable, directly related to the efficiency and effect of accounting work [6]. The specific steps are as follows:

Step 1: establish the fuzzy judgment matrix of the group.

In this paper, the fuzzy triangular number is used to integrate the opinions of experts, so as to reduce the number of fuzzy numbers, and to analyze the original data, so as to determine its critical value, which provides a reasonable basis for the subsequent system control. It is represented by triangular fuzzy number, as shown in formula (1):

$$\begin{aligned} B_{ij} &= \alpha_{ij}\beta_{ij}\gamma_{ij}, \alpha_{ij} \leq \beta_{ij} \leq \gamma_{ij} \\ \alpha_{ij} &= \min k(B_{ijk}); \beta_{ij} = \text{Geomeank}(B_{ijk}); \gamma_{ij} = \max k(B_{ijk}) \end{aligned} \quad (1)$$

where, Geomean stands for geometric model.

Step 2: Determine the group fuzzy weight vector

In the process of design and operation of internal control, it is often necessary to evaluate the uncertainty factors. Therefore, after building a reasonable and perfect internal control system framework of accounting information system that is in line with the actual situation and characteristics of the unit, the group fuzzy weight vector must be established. Based on the group fuzzy judgment matrix $B = (B_{ij})$, its fuzzy weight vector is expressed as formula (2):

$$w_j = r_j / (r_1 + r_2 + \cdots + r_m), j = 1, 2, \cdots, m \quad (2)$$

Step 3: weight decision analysis

In the evaluation of accounting information system internal control, weight is a key indicator, its level directly affects the effect of internal control [7]. The higher the

weight is, the more accurate the risk assessment results will be. It is very important to use relevant indexes and methods reasonably in the internal control evaluation of accounting information system. Assume $w_i = (w_i^L, w_i^M, w_i^U)$, as shown in formula (3), (4) and (5):

$$w_i^L(\alpha) = (w_i^M - w_i^L)\alpha + w_i^L \quad (3)$$

$$w_i^U(\alpha) = (w_i^U - w_i^M)\alpha + w_i^M \quad (4)$$

$$w_i(\alpha, \lambda) = \lambda w_i^U(\alpha)(1 - \lambda)w_i^L(\alpha) \quad (5)$$

The expression of the normalized weight vector is finally obtained, as shown in formula (6):

$$w_i(\alpha, \lambda) = w_i(\alpha, \lambda) / [\sum_i w_i(\alpha, \lambda)] \quad (6)$$

4 Specific Construction of Accounting Information System Internal Control OPM3 Model

4.1 Accounting Information System Internal Control OPM3 Model Setting

Accounting information system internal control OPM3 model is to analyze the accounting information of enterprises, the company can achieve its operation and management objectives, ensure the integrity and safety of assets, ensure the authenticity and reliability of accounting information, and ultimately achieve the goal of maximizing enterprise value [8]. The construction of accounting information system internal control system framework is a complex and huge work, it not only needs the accounting information system itself in the process of business operation, but also needs internal and external supervision to carry out. The flow chart of its system is shown in Fig. 3.

4.2 Key Indicators of Accounting Information System Internal Control OPM3 Model

4.2.1 Controlling Key Indicators of the Environment

Control environment is an important factor affecting the establishment and improvement of internal control system, and then the effective monitoring of enterprise accounting information system. It determines whether an organization or institution can create a good, reasonable and sustainable development power. The establishment of internal control system is to achieve organizational objectives, ensure the safety and integrity of assets, protect the economic interests of enterprises and comply with laws, regulations and policies. Building a good internal control environment in the accounting information system can enable the information user to obtain the required information in time and effectively help the information user to make decisions and control [9].

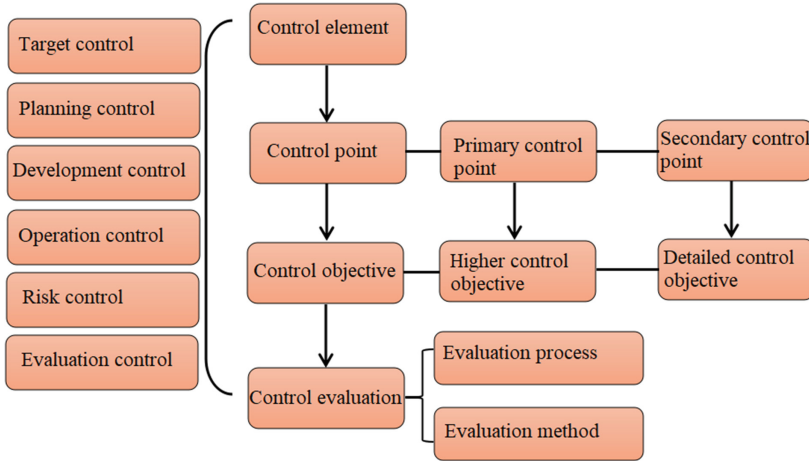


Fig. 3. System flow chart

4.2.2 Key Indicators of Risk Assessment

The objective of risk assessment is to identify and analyze potential or existing significant impacts and other internal control measures to achieve the minimum standards established between its business processes and information systems. Therefore, it is necessary to establish the internal control system of the accounting information system to manage the accounting system comprehensively and effectively.

5 Case Analysis of Internal Control Evaluation of Accounting Information System Based on OPM3 Model

5.1 Evaluation Process of Accounting Information System Internal Control Based on OPM3 Model

The goal of the internal control of accounting information system is to realize the operation management and strategic decision-making of the unit, to provide enterprises with reliable, in line with the requirements of relevant laws and regulations, and to effectively implement various policies and procedures and other aspects of financial information. Therefore, after building the internal control system framework based on OPM model, it is necessary to carry out risk assessment on the system, and put forward control measures, so as to promote the perfection of the internal control system of accounting information system [10].

5.2 Determine the Weight of Each Evaluation Index

The goal of internal control is to ensure the legal compliance of business operation and management, the safety of assets, the authenticity of financial reports and other information, the protection of property and resources, and the improvement of economic

Table 2. Weights of first-level indicators

| index | weight | Total (add up) |
|-------------------------------|--------|----------------|
| Control environment | 0.2 | 0.2 |
| Risk assessment | 0.2 | 0.4 |
| Control activity | 0.2 | 0.6 |
| Information and communication | 0.2 | 0.8 |
| supervise | 0.2 | 1 |

efficiency. Therefore, the weight of each risk assessment index should be determined in the design of the information system, and the accounting information system based on internal control should be established to provide the basis for effective monitoring and evaluation of the unit risk management, internal control environment and other aspects [10]. The weights of first-level indicators are shown in Table 2.

5.3 Evaluation Results of OPM3 Model

According to the above evaluation results, it can be seen that in the accounting information system, the design of internal control environment and risk assessment link is relatively weak, the lack of control activities is more serious, and the internal control system of the accounting information system fails to give full play to its due role. Based on this, this paper puts forward the accounting information risk assessment model with COSO report as the core. The model will be facing or about to face the financial crisis of the enterprise may occur errors and fraud caused by the loss as the analysis focus, and finally according to the evaluation results to determine what measures should be taken by the management to prevent these potential mistakes and bring more harm and to control and adjust the relevant personnel, so as to effectively prevent the recurrence of such events.

6 Conclusion

Nowadays, it is of great significance to construct a reasonable evaluation model of internal control of accounting information system to ensure the normal operation of enterprise accounting information system. Based on the OPM3 model and the traditional internal control evaluation information model theory, this paper further proposed an evaluation model based on analytic hierarchy process, and on this basis, combined with a specific company case to verify the design. Through research, this paper puts forward the construction of accounting information system internal control evaluation model based on OPM3 model and traditional internal control evaluation model, to solve the current problems in the study of enterprise accounting information system, and it also provides a new way of thinking for other related research.

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