Research on the Improvement Strategy of OKR-based Performance Evaluation System

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Abstract

This paper proposes a strategy research based on OKR method to improve traditional evaluation system. The evaluation standard generation strategy uses genetic algorithm to optimize the evaluation standard, and finds out the relatively optimal evaluation standard to improve the accuracy of the evaluation standard; The evaluation process control strategy is based on the process model to process performance evaluation. Our purpose is not only to complete the evaluation of the evaluation object, but also to manage the continuous evaluation process management and stimulate the evaluation object to improve performance through the process model algorithm. This article gives the basic design and algorithm description of the proposed strategy, and the experiment proves that the evaluation method can significantly improve the ability and level of the evaluation object.

Keywords

Performance Evaluation; Process Model; Genetic Algorithm; Decision Support.

1. Introduction

OKR (Object & Key Results) is a goal management system that achieves established goals through the setting and achievement of key results, which means goals and key results [1]. As an emerging management system, OKR has been introduced to performance evaluation in recent years. Because of its significant effects in knowledge-intensive companies such as IT, Internet, finance, and games [2].

Target management is not a new management concept. After the MBO target management method was proposed, the basic logic of KPI, balanced scorecard, project management, task management, etc. is consistent with the target management method, and so is OKR.OKR has its own unique management characteristics, which are more eye-catching: goals must be ambitious, KR must be quantifiable, goals must be refined, not tied to rewards and punishments, and review and evaluation on a quarterly basis. In recent years, more and more experts have proposed that the OKR management model is applied to the teaching reform of schools, especially the management of some new technology application-oriented majors will bring unexpected effects and have certain application value.

Performance evaluation is based on a unified evaluation standard, using certain methods, adopting a specific index system, and following certain procedures to make an objective, fair and accurate comprehensive evaluation of the organization's business management benefits for a certain period of time [3-4].

The evaluation process of the performance evaluation system quantifies the strategic goals-creating evaluation indicators, which not only express the interest of stakeholders to their interests, but also make this attention a clear goal that can be measured. At this stage, performance evaluation has become an important part of the BI system, which links the data in the data warehouse with the evaluation indicators, and makes the data analysis closely related to the enterprise. It forms a complete BI structure together with data warehouse, ETL, and OLAP analysis. The current performance evaluation mainly focuses on the evaluation at a point in time, and the selection of evaluation

standards is mainly passive when evaluating the price at that time, especially when there is no more suitable standard for internal performance evaluation of the enterprise. Therefore, we improve the performance evaluation process from two aspects: (1) Improves the production process of the evaluation standard when evaluating the price; (2) Extends from a time point to time series to improve the entire evaluation process.

2. Generation Strategy of Evaluation Criteria

The selection of evaluation standards in the performance evaluation system is an important part, because the selection of different standards will directly lead to the failure of the evaluation results. The two main functions of the performance evaluation system are also closely related to the selection of evaluation standards: (1) Compare with other companies to determine the status of the company. At this time, the traditional performance evaluation system selects evaluation standards mainly through the use of external standards, such as the relevant standards published by the state may adopt the same industry standards. (2) A more important goal of performance evaluation is to evaluate the internal organization of the enterprise in order to allocate the human, financial and material resources of the enterprise.[5] The current practice is to use enterprise custom standards for evaluation. The traditional method of creating custom standards is to manually specify custom evaluation standards, but this method lacks theoretical foundation verification, so its accuracy is quite low. Practice has proved that when an organization adopts a standard, only when the supervisor and the supervised are satisfied with the standard—the standard is recognized, the evaluation results at this time are meaningful [6]. On the contrary, the results evaluated based on inaccurate standards cannot guide the flow of resources, and are even harmful. Here we proposes a strategy for generating evaluation criteria. The use of this strategy can improve the accuracy of the evaluation criteria.

2.1 Generating Strategy based on OKR Evaluation Criteria

Both the evaluator and the evaluated parties participate in the establishment of the initial state settings of each evaluation object within the evaluation range, which is based on genetic calculations in this paper. And then the individuals in the population are reorganized through genetic operations to continuously search for excellent individuals in the population, gradually approaching the optimal solution, formatting the final evaluation criteria. The schematic diagram of OKR system is as follows.

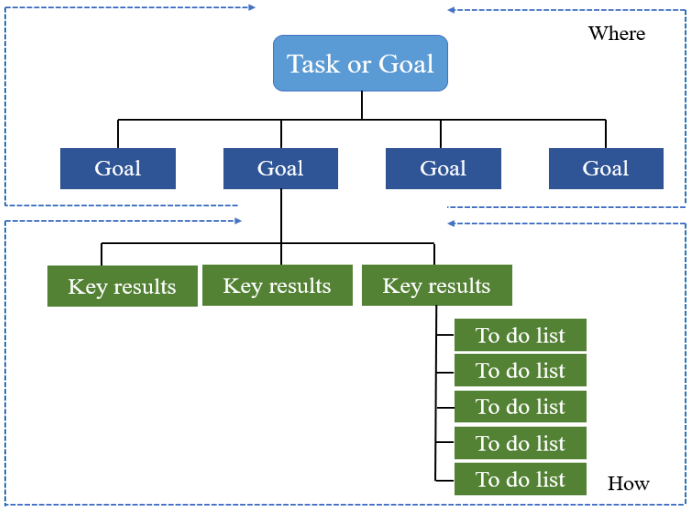

Figure 1. The schematic diagram of OKR system

2.2 Evaluation Criteria Generation Algorithm

2.2.1 Coding

For the actual problem of standard production, this paper adopts the design idea that binary coding can better conform to the coding principle. We use 0-1 binary numbers to code each standard item that the standard produces.

Using 0-1 encoding, it can accurately represent integers, and can also represent items in enumerated standards, such as inventory types (TV, refrigerator, washing machine, microwave oven), which can be simply expressed as a binary number: TV-00, refrigerator -01, washing machine-10, microwave oven-11.

Continuous variables can also be binary coded, but accuracy needs to be considered. For a given interval [a, b], assuming that the binary code length is n, then any variable takes the value shown in formula 1.

$$x = a + a_1 \frac{b-a}{2} + a_2 \frac{b-a}{2^2} + \ldots + a_n \frac{b-a}{2^n} \quad (1)$$

Corresponds to a binary code $a_1 a_2 \ldots a_n$. The maximum error between the binary code and the actual variable is $\frac{b-a}{2^n}$. For example, the range of the net profit acceptable to the standard user is [10, 15], which is taken n as 4, and one of the codes can be obtained by formula (1): 1101.

If the evaluation standard only involves the two evaluation standards of inventory type and net profit, one of the codes of above question can be expressed as: 10 | 1101 (washing machine, 14.06).

When determining the code of each individual in this article, the value range for a certain standard item is taken as the maximum and minimum values of the same item in all individuals. This range is the effective range of the standard item.

2.2.2 Fitness function

In the performance evaluation system, the fitness function value is mainly calculated based on the satisfaction degree of each standard item value determined by the relevant parties of the evaluation standard. The method of satisfaction assumes that due to the complexity of the decision-making environment and the decision-making problem itself, it brings great difficulties to the pursuit of maximization[7-8]. At this time, the standard setting should not be the pursuit of optimization, but the search for one that is satisfactory results. This is the so-called principle of bounded rationality. Therefore, the final standard obtained by the genetic algorithm pursues the most satisfactory solution for both parties to the standard rather than the optimal solution. Here, the following agreement are given for problems arising from the standard:

Agreement 1: Use i to indicate the amount in the standard, where i=1,2...n.

Agreement 2: $x_{ij}(t)$ represents the j-th attribute i=1,2...n that can be taken by the money in the i-th standard in the t-th round; j=1,2...m_i, and t is the round. X(t) is the plan vector, denoted as: $X_k(t)=[x_{1j}(t),x_{2j}(t),...x_{nj}(t)]T$ represents one of the plans, k=1,2...n_t. Among them, $x_{ij}(t)D(t)$, D(t) represents the union of the value ranges set by the relevant parties of the t-th standard for the payment in the i-th standard.

Agreement 3: In the evaluation standard generation, through each round of proposals, the relevant parties p in the bureau are satisfied with the different attribute values of the funds in each standard as $s_{pij}(t)$, where i=1,2...n; j= 1,2...mi. $S_p(t)=[s_{p1j}(t), s_{p2j}(t),...s_{pnj}(t)]T$ is the satisfaction vector of the p-th related party. $f_{pk}(t) = \sum_{i=1}^{n} s_{pik}(t)$ indicates the satisfaction of the related party p with the k-th solution.

Therefore, the fitness function can be expressed as formula 2:

$$fitness_k(t) = \prod f_{pk}(t) \quad (2)$$

Obviously, we require a solution that maximizes the value of the fitness function.

2.2.3 Initialization

At the beginning, the provider of the individual provides the value range of the individual evaluation criteria items and the weights between the items. The next is to determine the satisfaction of the optional value of each evaluation standard item. In fact, the weight of each evaluation standard item is the maximum satisfaction of the evaluator for the most satisfactory standard item. Then the evaluator needs to determine the satisfaction of the most dissatisfied evaluation standard item, that is, the minimum satisfaction. Here, we do not directly set the minimum satisfaction value to zero,

because for different standard participants, the satisfaction of the most dissatisfied evaluation standard item is not necessarily zero. Other optional values of each standard item can be calculated by proportion.

3. Evaluation Process Control Strategy

The problem with most performance evaluation systems now is that they only focus on performance evaluation methods, such as: performance evaluation accounting index method, economic value-added method EVA, strategically-oriented balance scorecard, comprehensive performance evaluation methods[9]. These methods evaluate a period of the company at a certain point in time but did not follow the process of performance evaluation, did not pay attention to the entire process of multiple periods of performance evaluation, and failed to achieve another final process goal besides evaluating the status of the company—the evaluated object can become an excellent object. Therefore, we proposes the evaluation process control strategy, which manages the performance evaluation process from the longitudinal time axis.

3.1 Evaluating process control strategy

The Evaluating process control strategy is to use the process model to give a standard general description of the different evaluation trajectories and the characteristics of the interaction/feedback that cause this trajectory. First, start with a common "give-and-take" process model, and then build other different evaluation trajectory models around this basic theme, so that the proposed model contains different evaluation situations [10].

3.2 Evaluation process function

The functional relationship between information at different points in time can be represented by the following definitions. The evaluation object transfers information at discrete time points t=1, 2, 3,..., t, t+1, t+2,.... The evaluation function f represents the relationship between the information sent by the evaluation object at time t and time t+1.

$$f:\Gamma\rightarrow\Gamma \text{ or } X_{t+1}=f(X_t), \text{ Where } X_{t+}1,\ X_t \text{ is the element of } \Gamma.$$

Given a group suggestion space Γ and f (the group evaluation function of the m-dimensional vector), define the evaluation process N based on information is N={Γ,f}.

If the function f reaches its fixed point, the evaluation process is confirmed, which means that the balance information remains unchanged in future evaluations. For example, $X_{t+1}=X_t$, then t* is the time to reach the fixed point of the process, and X_{t+1} and X_t have m elements, which is a piece of information obtained from each evaluation object (X_i, t, X_i, t +1, i=1, 2,..., m), each new information Xi, t+1 is calculated by the evaluation object i, where i=1, 2,..., m, X_i, t+1=f_i(X_t), i=1, 2, ..., m.

It should be noted that the evaluation object determines its sharing of the elements of the information vector X_{t+1} based on the complete information vector X_t. Therefore, the function f expresses how the evaluation object determines their current information content under the given information. The immobility of an information-based process is verified by information that will not change in the future. At this stage, the consensus solution is the element of the intersection $\cup_{i=1}^{m} Xi, t*$. If the intersection is empty, it means that the process stops or all parties cannot reach consistent.

In our evaluation model, concessions are mainly taken by the evaluation objects, and the evaluators only take concessions when all the evaluation objects do not make concessions and cannot achieve a "win-win" situation. Refer to Table 1 for the results of the evaluation object reaching the standard.

Enterprise evaluation excellence rate after system application

The number of participants in the evaluation: 63

Evaluation period: 1 month

Evaluation and inspection time: 12 months

Table 1. Enterprise evaluation excellence rate

Time	1	2	3	4	5	6	7	8	9	10	11	12
Excellence Rate	42%	45%	46%	43%	56%	55%	63%	49%	57%	65%	66%	69%

4. Conclusion

This paper is a research on the evaluation process of the OKR-based performance evaluation system. It is found that performance evaluation can be improved from two aspects: process control and evaluation standards, so two corresponding improvement strategies are proposed. The performance evaluation system using process control strategies can not only use typical performance evaluation methods to evaluate the evaluation object, but also can form an interactive evaluation process with the evaluation object through the process model. After a period of time, the ability and level of the evaluation object can be significantly improved through evaluation. Due to the actual complexity of performance evaluation and the limited time, our system needs further improvement and research, such as how to control irregularities and how to theoretically accelerate the convergence of the evaluation process.

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