



A Four-Dimensional Comprehensive Performance Appraisal System for Enterprise Secondary Management Units

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Abstract. To address dilemmas in corporate performance appraisal, including disconnection in strategy implementation, vague value contribution, insufficient risk control, and inaccurate evaluation, this study develops and empirically tests a four-dimensional performance appraisal system: Strategic Contribution, Value Creation, Risk Prevention and Control, and Comprehensive Evaluation. The system reflects enterprises' dual orientation of serving national strategies and pursuing market efficiency, as well as their diversified functions and businesses. Empirical results show that the proposed system significantly improves strategic alignment, value creation capability, risk awareness, and collaborative performance, thus effectively supporting high-quality development.

Keywords: enterprise performance appraisal, secondary management units, comprehensive performance appraisal, four-dimensional performance appraisal, performance appraisal system.

1 Introduction

1.1 Research Background

As key players in economic development, the secondary management units of enterprises (including research institutes, business divisions, subsidiaries, and functional departments, hereinafter referred to as “secondary units”) serve as carriers for national strategy implementation and executive units for market competition. The performance of secondary units directly determines an enterprise's ability to serve national strategies and its core market competitiveness.

However, prominent problems exist in the performance appraisal of secondary units:

- Disconnected strategy implementation: Top-level goals of serving national strategies fail to be decomposed into assessable indicators for secondary units, leading to misalignment between corporate strategy and frontline operations.
- Vague value contribution: Indicators focus excessively on scale over quality, resulting in one-sided evaluation and weakened core competence.

- Lack of differentiated appraisal: Uniform indicators are applied to strategic and market-oriented secondary units alike, ignoring their functional differences.

Therefore, constructing a targeted and comprehensive performance appraisal system that matches the attributes and positioning of enterprise secondary units has become an urgent issue.

1.2 Literature Review

Internationally and domestically, research on performance appraisal systems for secondary units has shifted from a single financial orientation to an effectiveness-risk dimension, from outcome-based evaluation to full-cycle management, and from traditional methods to AI-enabled approaches. Chen et al. [1] established a four-dimensional point-based appraisal system for technology-driven enterprises, covering basic guarantee, career development, value recognition, and long-term strategic alignment. Wang et al. [2] identified the misalignment between group strategy and secondary unit indicators and proposed a four-dimensional optimization model: strategy decoding, indicator decomposition, process control, and result feedback. Zhao, X. [3] developed a fuzzy-weight performance evaluation model for R&D units with a dynamic weight adjustment mechanism. Liu, H. et al. [4] proposed a classified and hierarchical appraisal framework to improve industry adaptability. Wang, Y. et al. [5] applied the performance prism model and introduced a national strategy priority coefficient. Wang et al. [6] designed a bundled appraisal system linking functional departments with secondary academic units to enhance collaboration. Yang, L. et al. [7] empirically verified the positive effect of full-cycle performance management on organizational performance. Vilsan, C. et al. [8] conducted a bibliometric analysis and identified three research streams, noting that AI application and long-term impact mechanisms remain underexplored. Djuna Edi et al. [9] highlighted the advantages of AI in heterogeneous appraisal and proposed a transparent algorithm with manual calibration. Kaplan and Norton [10] integrated strategy maps into the balanced scorecard and advocated cascading indicators to secondary units. Li [11] suggested adding a policy implementation dimension to the balanced scorecard. Zhang [12] analyzed biases in resource allocation and proposed optimizing indicator weights. Liu et al. [13] introduced an OKR–risk list dual mechanism with a minimum risk weight of 20%. Zhang et al. [14] developed a dynamic risk weight adjustment model for OKR based on project risk levels. Although existing studies provide valuable insights, they lack sufficient focus on the unique characteristics of enterprises and refined differentiated appraisal. Further research is needed to build a comprehensive system that penetrates strategic guidance, highlights value contribution, and supports targeted performance evaluation.

2 Theoretical Foundations and Method Adaptability for Performance Appraisal of Enterprise Secondary Units

2.1 Core Theoretical Support

Three core theories constitute the theoretical foundation for enterprise performance appraisal:

(1) National Strategy Transmission Theory

It decomposes top-level objectives of “serving national strategies” (e.g., scientific and technological self-reliance, industrial chain security) into strategic task indicators for secondary units, ensuring performance appraisal aligns with national priorities.

(2) Stakeholder Theory

It takes into account the demands of stakeholders including the government (policy objectives), shareholders (market returns), employees (team development), and society (social responsibility), avoiding one-sided appraisal.

(3) Risk-Value Balance Theory

It integrates risk prevention and control into value creation indicators, consistent with the requirements of compliant operation and steady development, and prevents overemphasis on benefits at the expense of risk control.

2.2 Adaptability Comparison of Typical Appraisal Methods

The implementation of different performance appraisal methods in secondary units must match national strategic attributes and business types. Their adaptability is shown in the Table 1 below.

Table 1. Comparison of Typical Performance Appraisal Methods

Appraisal Method	Core Logic	Advantages	Limitations	Applicable Secondary Units
Key Performance Indicators (KPI)	Strategic objectives → Key indicators → Quantitative appraisal	Clear objectives; easy to align with policies	Overlooks long-term value (e.g., R&D)	Value-oriented units (sales, production)
Objectives and Key Results (OKR)	Strategic tasks → Key results → Process tracking	Supports innovation; encourages breakthroughs	Difficult to quantify; high appraisal costs	National strategy-oriented units (R&D, task forces)
Balanced Scorecard (BSC)	Financial-Customer-Internal Process-Learning & Growth	Balances short/long-term, financial/non-financial	Complex indicators; difficult data collection	Integrated business divisions (multi-business)

Economic Value Added (EVA)	Net income after capital cost deduction	Emphasizes value creation; prevents blind expansion	Ignores non-financial value (e.g., social responsibility)	Investment-oriented units (subsidiaries, holding enterprises)
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Although the above typical appraisal methods are applicable to some extent, they have inherent limitations and cannot fully meet the new development requirements of enterprises in the new era. Therefore, it is necessary to develop a comprehensive performance appraisal system that reflects the characteristics of enterprise development based on their core missions and functional positioning.

3 Construction of a Four-Dimensional Comprehensive Performance Appraisal System for Enterprise Secondary Units

3.1 Design Principles for the Appraisal Indicator System

- (1) **Strategy Priority Principle:** Indicators shall prioritize the requirement of serving national strategies (e.g., lowering carbon emission intensity for secondary units of energy enterprises under the “dual carbon” goals).
- (2) **Classification Adaptation Principle:** Secondary units shall be categorized by functional positioning (national strategy-oriented, value creation-oriented, public service-oriented, etc.), with tailored indicator systems to avoid uniform “one-size-fits-all” appraisal.
- (3) **Diversified Differentiation Principle:** Establish multidimensional, differentiated indicators based on unit classification to enhance appraisal precision.
- (4) **Implementability Principle:** Indicators shall be measurable, verifiable, and consistent with performance appraisal policies from higher authorities.
- (5) **Dynamic Adjustment Principle:** Indicators and weights shall be updated in line with national policies, corporate strategies, and higher-level requirements to maintain effectiveness.

3.2 Four-Dimensional Comprehensive Appraisal Indicator System and Weight Design

3.2.1 Framework of the Four-Dimensional System.

Enterprises serve as the political and material foundation of the national economy, undertaking national strategic missions while leading economic development. They must balance development and security in high-quality growth. Accordingly, the performance appraisal system for secondary units should include strategic contribution, value creation, and risk prevention and control. To ensure comprehensiveness, a comprehensive evaluation dimension is introduced as a supplementary module. This forms the four-dimensional framework: Strategic Contribution – Value Creation – Risk Prevention and Control – Comprehensive Evaluation, as shown in Figure 1.

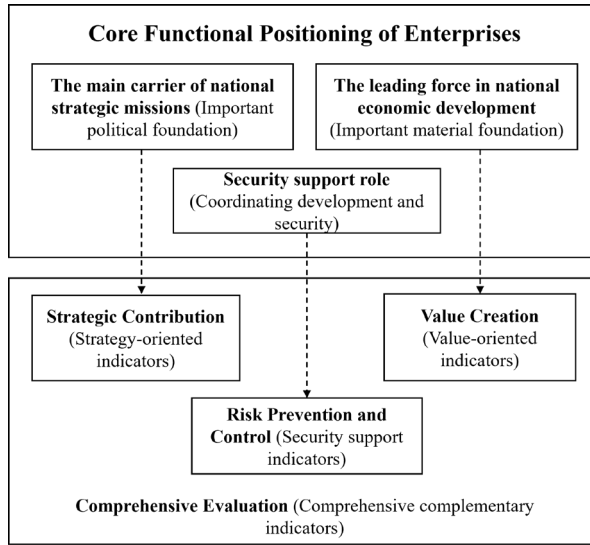


Fig. 1. Framework of the Four-Dimensional Comprehensive Performance Appraisal System for Enterprise Secondary Units

3.2.2 Function-Based Four-Dimensional Appraisal Indicator System and Weight Design.

Secondary management units of an enterprise are classified into three categories according to their functional positioning and strategic tasks undertaken: strategic mission units mainly undertaking national strategic tasks, value creation units focusing on profitability through full market competition, and functional management units providing management and support services. Differentiated indicator systems and weighting schemes shall be adopted for the three types of units to form a targeted appraisal system. The design procedure is as follows:

(1) Design of the Appraisal Indicator System

The appraisal system adopts a multi-level structure. The first-level indicators follow the four-dimensional framework: Strategic Contribution, Value Creation, Risk Prevention and Control, Comprehensive Evaluation. The second-level and multi-level indicators are further decomposed according to higher-level policies, corporate development goals, and weaknesses:

- Strategic Contribution: national strategic task implementation, on-time completion rate, corporate strategy implementation rate, strategic talent ratio, etc.
- Value Creation: total profit, cost control rate, labor productivity, return on net assets, economic value added rate, operating profit margin, R&D investment intensity, etc.
- Risk Prevention and Control: work safety, financial risk, compliance management, legal disputes, audit supervision, potential risks, etc.
- Comprehensive Evaluation: performance responsibility, inter-departmental collaboration, policy implementation, etc.

Second-level indicators can be further refined to support precise appraisal.

(2) Design of Appraisal Indicator Weights

The weights of appraisal indicators are determined by the functional positioning of the evaluated objects and the hierarchical structure of the indicator system, using the Analytic Hierarchy Process (AHP). The main steps are as follows:

- Hierarchy structure construction: Target layer (comprehensive performance of secondary units) →Criteria layer (four first-level indicators: strategic contribution, value creation, risk prevention and control, comprehensive evaluation) →Scheme layer (X second-level indicators refined from the four first-level indicators, as detailed in “Design of Appraisal Indicator System”). Each second-level indicator is specific, quantifiable, and assessable.
- Expert scoring: Senior executives, functional department heads, and domain experts (3–5 experts for each type of unit) are invited. The 1–9 scale method is used to construct judgment matrices and determine the relative importance of indicators. Experts complete judgment matrices independently based on the functional positioning of secondary units. After logical correction, the matrices are normalized.
- Consistency test: The judgment matrix is consistent if $CR < 0.1$, and indicator weights can then be determined. The consistency ratio is calculated as: $CR = CI/RI = (\lambda_{max} - n)/(n - 1)/RI$ where λ_{max} is the maximum eigenvalue, n is the order of the matrix, and RI is the random consistency index. If $CR \geq 0.1$, the matrix is inconsistent and should be revised and reconstructed until $CR < 0.1$.

4 Empirical Study

4.1 Case Background

A research-oriented enterprise with 30 secondary units: 12 strategic mission, 8 value creation, and 10 functional management units.

4.2 Appraisal Implementation and Results Analysis

4.2.1 Appraisal System and Weight Setting.

The assessment system and weight setting of a scientific research enterprise are shown in Table 2 below.

Table 2. Assessment System and Weight Setting of a Scientific Research Enterprise

Primary Indicators	Secondary Indicators	Strategic Mission (12 units)	Value Creation (8 units)	Functional Management (10 units)
Total Weight of Strategic Contribution Indicators		60%	10%	—

Strategic Contribution	National Strategic Tasks	10%	3%	—
	.....	45%	4%	—
	Strategic Talent Ratio	5%	3%	—
Total Weight of Value Creation Indicators		10%	60%	5%
Value Creation	Total Profit	3%	30%	—
	.....	4%	20%	3%
	R&D Intensity	3%	10%	2%
Total Weight of Risk Prevention and Control Indicators		20%	20%	10%
Risk Prevention and Control	Work Safety	4%	4%	—
	.....	12%	12%	10%
	Compliance Management	4%	4%	—
Total Weight of Comprehensive Evaluation Indicators		10%	10%	85%
Comprehensive Evaluation	Performance Accountability	4%	4%	50%
	.....	4%	4%	20%
	Collaborative Performance	2%	2%	15%
Total Assessment Weight		100%	100%	100%

4.2.2 Empirical Results and Effect Analysis.

(1) Strategic alignment has been further improved. After implementation, for strategic mission units, with the number of strategic tasks increasing and staffing basically unchanged, the task fulfillment rate rose from 68% to over 95%, and the strategic planning implementation rate increased from 60% to over 95%, showing a significant effect in strategic transmission.

(2) Value creation capability has been further enhanced. Guided by performance appraisal, value creation units have paid more attention to process optimization and cost

control. The cost ratio decreased from 92% to 86%, with an average annual growth rate of total profit of more than 15% for three consecutive years, and the awareness of whole-process value creation has been significantly strengthened.

(3) Risk control awareness has been further reinforced. By strengthening compliance risk management, the compliance operation rate increased from 82% to 96%, and the number of safety hazards was greatly reduced, which is more in line with the enterprise's requirement of steady development.

(4) Awareness of performance and collaboration has been generally enhanced. Buck-passing among secondary units has been significantly reduced, the ability to promote collaboration based on responsibilities has been generally improved, and the quality and efficiency of functional management have been effectively enhanced.

4.3 Empirical Conclusion

The four-dimensional appraisal system ("Strategic Contribution-Value Creation-Risk Prevention and Control-Comprehensive Evaluation") based on secondary units' functional positioning effectively solves problems such as strategic disconnection, weak value creation, insufficient risk control and inadequate appraisal comprehensiveness. It undertakes the enterprise's dual attributes of serving national strategies and balancing market benefits, aligns with its positioning, and supports its high-quality development.

5 Conclusions and Prospects

5.1 Research Conclusions

The constructed four-dimensional appraisal system effectively addresses the aforementioned problems, undertakes the enterprise's dual attributes, aligns with its functional and mission positioning, and supports its high-quality development.

5.2 Future Prospects

(1) Expand cross-enterprise comparative research: Extend research objects from a single industry to the whole industry to explore appraisal differences and form a more universal method.

(2) Introduce AI-aided evaluation: Utilize digital transformation, combine AI to analyze unstructured data of secondary units, and improve appraisal quality, efficiency and objectivity.

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